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xlix. " " " "	1- 79. 25 July, 1917.
l. Rhodora (Boston)	xix. 133-155. 10 Sept., 1917.

ERRATA

xxvi.	281,	line	5,	for	Wildenow read Willdenow.
"	"	"	7,	"	<i>Nauemburgia</i> read <i>Nauenburgia</i> .
"	"	"	14, 16	"	<i>Nauemburgia</i> read <i>Nauenburgia</i> .
"	283,	"	26,	"	<i>Nauemburgia</i> read <i>Nauenburgia</i> .
"	284,	"	27,	"	<i>Nauemburgia</i> read <i>Nauenburgia</i> .
"	285,	"	26,	after	A. H. Moore insert no. 25.
"	"	"	27,	for	25 read 16.
xxvii.	248,	"	13,	"	<i>rhodostylis</i> read <i>rhodostyla</i> .
"	254,	"	3,	"	<i>rhodostylis</i> read <i>rhodostyla</i> .
"	264,	"	27,	"	Hushagak, British Columbia read Nushagak, Alaska.
xxviii.	8,	"	38,	"	1838 read 1833.
"	18,	"	26,	"	<i>H. tolucanum</i> read <i>Hieracium tolucanum</i> .
"	22,	"	36,	"	<i>intybiformia</i> read <i>intybiforme</i> .
"	25,	"	24,	"	1.5 cm. read 1.5 dm.
xxix.	686,	"	39,	"	14 read 16.
"	691,	"	34,	"	<i>Caseareae</i> read <i>Caseariae</i> .
"	696,	"	7,	"	<i>gracillima</i> read <i>gracillimum</i> .
xxx.	153,	"	15,	"	<i>Stenantha</i> read <i>stenantha</i> .
xxxvi.	239,	"	4,	"	jaliscense read jaliscensis .
"	260,	"	37,	"	<i>Liebmanii</i> read <i>Liebmannii</i> .
xxxvii.	13,	"	22,	"	3/4 read 3/2.
"	16,	"	15,	"	<i>P. latifolia</i> read <i>Piqueria latifolia</i> .
"	"	"	25,	"	422 read 432.
"	20,	"	6,	"	<i>Charua</i> read <i>charua</i> .
"	"	"	42,	"	CHARUA read CHARUA.
"	26,	"	32,	"	409 read 178.
"	27,	"	9,	"	<i>tetranthii</i> read <i>tetranthi</i> .
"	34,	"	7,	"	membranaceous read membranaceous.
"	35,	"	10,	"	<i>Argeratum</i> read <i>Ageratum</i> .
"	48,	"	3,	"	<i>B. cedrosensis</i> read <i>Brickellia cedrosensis</i> .
xxxviii.	532,	"	27,	"	Colombia read Columbia.
"	553,	"	10,	"	1874 read 1784.
"	"	"	11,	"	1873 read 1783.
xxxix.	34,	"	24,	"	guatemalensis read guatemalense .
"	39,	"	27,	"	<i>Helianthearum</i> read <i>Heliantheorum</i> .
"	42,	"	34,	"	Robinson, n. comb. read O. Ktze. Rev. Gen. iii. pt. 2, 148 (1893).
"	45,	"	12,	"	<i>P.</i> read <i>T.</i>
"	61,	"	18,	"	<i>anistostachys</i> read <i>anisostachys</i> .
xxxvi.	566,	"	14,	"	<i>Nelsoni</i> read <i>Nelsonii</i> .
"	567,	"	42,	"	<i>tapeinoclada</i> read <i>tapeinoclada</i> .
"	590,	"	36,	"	TEPEINOCLADA read TAPEINOCLADA.
"	603,	"	15,	"	<i>C. cordata</i> read <i>A. cordata</i> .
"	615,	"	7,	"	n. comb. read [Wettst. acc. to] Edwall, Bol. Comm. Geogr. Geol. São Paulo, xiii. 176, 180 (1897).
"	621,	"	1,	"	n. comb. read Greenm. Field Col. Mus. Bot. Ser. ii. 268 (1907).

xxxvi.	627,	line 32,	for Duval read Dunal.
"	628,	" 22,	" Solanum citrullifolium read SOLANUM CITRULLI-FOLIUM.
"	629,	" 21,	" <i>Botrichii</i> read <i>Botrychii</i> .
xxxvii.	205,	" 3,	" COCOLOBA read COCCOLOBA.
"	219,	" 20,	" HYMENEAE read HYMENAEA.
"	249,	" 2,	" GLAUCA read GLAUCUM.
"	251,	" 6,	" <i>cylindrostachya</i> read <i>cylindristachya</i> .
"	266,	" 19,	" SURINAMENSIS read SURINAMENSE.
"	268,	" 2,	" HYSTEROPHORUM read HYSTEROPHORUS.
"	"	" 20,	" SONCHIFOLIA read SONCHIFOLIUS.
"	275,	" 19,	" <i>Res na</i> read <i>Resina</i> .
"	277,	" 32,	" HYSTEROPHORUM read HYSTEROPHORUS.
"	278,	" 6,	" RHOMIFOLIA read RHOMBIFOLIA.
"	280,	" 2,	" <i>Oreodoxa</i> read <i>Oreodoxa</i> .
"	"	" 21,	" <i>Gonzalugania</i> read <i>Gonzalagunia</i> .
"	281,	" 25,	" <i>Hymenea</i> read <i>Hymenaea</i> .
"	"	" 36,	" <i>Hymenea</i> read <i>Hymenaea</i> .
"	282,	" 31,	" <i>Kalstroemia</i> read <i>Kallstroemia</i> .
"	284,	" 3,	" <i>Buginvillea</i> read <i>Buginvillaea</i> .
"	285,	" 4,	" <i>Plumieri</i> read <i>Plumierii</i> .
"	"	" 6,	" <i>sonchifolia</i> read <i>sonchifolius</i> .
"	"	" 9,	" <i>nepetaefolia</i> read <i>nepetifolia</i> .
"	"	" 13,	" <i>ficoides</i> read <i>ficoidea</i> .
"	286,	" 7,	" <i>periflocifolia</i> read <i>periplocifolia</i> .
"	"	" 7,	" <i>Sebastiania</i> read <i>Sebastiania</i> .
"	opposite	pl. 27, line 3,	for <i>Ernestii</i> read <i>Ernstii</i> .
xxxviii.	396,	line 27,	for nana read nanum .
"	397,	" 12,	" most read moist.
"	"	" 39,	" <i>cantha</i> read <i>chantha</i> .
xxxix.	200,	" 18,	" <i>cordifolius</i> read <i>coridifolius</i> .
xl.	110,	" 7,	" our read one.
"	118,	" 19,	" Mr. read Mt.
"	123,	" 22,	" vegetation read vegetation.
"	130,	" 3,	" <i>carcina</i> read <i>caricina</i> .
"	132,	" 25,	after for insert comma.
"	137,	" 38,	for <i>Cryptogramma</i> read <i>Cryptogramma</i> .
"	138,	" 27,	" <i>meliciodes</i> read <i>melicoides</i> .
"	138,	" 38,	" see p. read see p. 131.
"	141,	" 17,	" <i>Sandbergi</i> read <i>Sandbergii</i> .
"	"	" 34,	" <i>Capillare</i> read <i>Capillaire</i> .
"	145,	" 35,	¹ after Gulf refers to note 1 on p. 146.
"	"	" 38,	before Warming insert ¹ .
"	146,	" 30,	for Anticosti, ³ read Anticosti, ²
"	"	" 33,	" Lawrence. ¹ read Lawrence. ³
"	151,	" 23,	" <i>quadalupensis</i> read <i>quadalupensis</i> .
"	"	" 30,	¹ after <i>ambigua</i> refers to note 1 on p. 152.
"	155,	" 19,	" <i>Echonodorus</i> read <i>Echinodorus</i> .
xli.	336,	" 20,	" <i>calliopsisidea</i> read <i>calliopsidea</i> .
"	353,	" 37,	" +- Heads larger, rays 2-4.5 cm. read +- Heads larger, rays 2-4.2 cm.
"	394,	" 1,	" <i>latis</i> read 4 mm. <i>latis</i> .
"	396,	" 1,	" omit 4 mm.
xlii.	441,	" 38,	" 12 quarum 3 read 21 quarum 10.
"	"	" 39,	after <i>mexicanae</i> insert et <i>centrali-americanae</i> nec non <i>rariter venezuelanae</i> sunt.
"	"	" "	for <i>incolens</i> read <i>incolit</i> .
"	"	" 40,	" <i>habitantes</i> read <i>habitant</i> .

- | | | | | | |
|---------|------|------|---------------|-------|---|
| xlii. | 444, | line | 8, | for | 9 read 17. |
| " | 468, | " | 42, | " | <i>scorpoideum</i> read <i>scorpioideum</i> . |
| " | 487, | " | 28, | " | <i>Ag. fas-</i> read <i>Al. fas-</i> . |
| " | 489, | " | 37, | " | <i>europhyllum</i> read <i>euryphyllum</i> . |
| " | 506, | " | 23, | " | comb. nov. read Thellung, Fedde, Rep. xi. 308 (1912). |
| xliii. | 27, | " | 15, | " | 2249, 1866/7 read 2449, 1863. |
| xliv. | 184, | " | 3, | " | <i>O. Williamsii</i> read <i>E. Williamsii</i> . |
| " | 193, | " | 1, | after | in part insert comma. |
| xlv. | 520, | " | 32, | for | <i>Helianthus</i> L. read <i>Helianthella</i> T. & G. |
| xlvii. | 5, | " | 5, | " | subsection read section. |
| " | 15, | " | 30, | " | 1915 read 1913. |
| " | 114, | " | 18, | after | (25); insert 165 $\frac{1}{2}$ (27); |
| " | " | " | 20, | " | (102); omit 165 $\frac{1}{2}$ (27); |
| xlviii. | 8, | " | 29, | " | <i>siberica</i> read <i>sibirica</i> . |
| " | 12, | " | 6, 14, 32, 39 | for | <i>siberica</i> read <i>sibirica</i> . |
| " | 13, | " | 4, | for | <i>siberica</i> read <i>sibirica</i> . |
| " | 14, | " | 19, | " | LATIFLORA read LATERIFLORA. |
| " | 17, | " | 9, | " | glabrans read glabrous. |
| " | 22, | " | 1, | " | proably read probably. |
| " | " | " | 14, | " | <i>Krynitzkia</i> read <i>Krynitzkia</i> . |
| " | 23, | " | 18, | " | <i>humilis</i> read <i>echinoides</i> . |
| " | 29, | " | 14, | " | <i>Kittitas</i> read Douglas. |
| " | 33, | " | 4, | " | 213 read 243. |
| " | " | " | 36, | " | lxi read lxii. 145. |
| " | 36, | " | 2, | " | <i>cinera</i> read <i>cinerea</i> . |
| " | 41, | " | 29, | " | <i>Antiphytym</i> read <i>Antiphytum</i> . |
| " | 42, | " | 10, | " | <i>Plabiobothrys</i> read <i>Plagiobothrys</i> . |
| xlix. | 17, | " | 16, | " | <i>Helitropium</i> read <i>Heliotropium</i> . |
| " | 19, | " | 4 & 5, | " | comb. nov. read Thellung. |
| " | " | " | 10 & 17, | " | Cavenilles' read Cavanilles'. |
| " | 20, | " | 16, | " | <i>occidentalis</i> read <i>occidentale</i> . |
| " | 23, | " | 33, | " | Phacelia minor (Harvey) comb. nov. read PHA-
CELIA MINOR (Harvey) Thellung. |
| " | 24, | " | 1, | " | <i>Macbr.</i> read Thellung. |
| " | 27, | " | 36, | " | var. read subvar. |
| " | 37, | " | 26, | " | <i>circinnata</i> read <i>circinata</i> . |
| " | 63, | " | 16, | " | <i>gracilum</i> read <i>gracile</i> . |
| " | 74, | " | 27, | " | <i>Hollway</i> read <i>Holway</i> . |
| " | 75, | " | 6, | " | <i>Hollway</i> read <i>Holway</i> . |
| " | 76, | " | 25, | " | <i>Hollway</i> read <i>Holway</i> . |
| l. | 144, | " | 21, | " | 826 read 827. |

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VOL. XXXIX. No. 11. — DECEMBER, 1903.

X CONTRIBUTIONS FROM THE GRAY HERBARIUM OF
HARVARD UNIVERSITY.

NEW SERIES. — No. XXVI.

A REVISION OF THE GENUS FLAVERIA.

BY J. R. JOHNSTON.

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BY J. R. JOHNSTON.

A REVISION OF THE GENUS FLAVERIA.

BY J. R. JOHNSTON.

Presented by B. L. Robinson April 8, 1903. Received October 12, 1903.

NOT since 1836, when A. P. DeCandolle enumerated in the *Prodromus*, v. 635, only four species of *Flaveria*, has there been a revision of the genus. Since DeCandolle's time there have been over a dozen different plants published as new *Flaverias*, seven of which have proved to be good species. The need of another revision so far as the Mexican species are concerned is mentioned by Hemsley in the *Biol. Cent.-Am. Bot.* ii. 215 (1881-82), and the confusion in identification of certain species, together with the recent accumulation of specimens in the herbaria of this country, have emphasized its need.

The history of the genus is considerably complicated by the diverse views expressed by the early writers, who treated its species. The name *Flaveria* (from the Latin *flavus*, golden yellow, the plants having been used to dye yellow) was first proposed by A. L. de Jussieu (1789), in his *Genera Plantarum*, for two plants from Chili and Peru. His meagre descriptions and the fact that he omitted specific names for the plants, and distinguished them from each other only by the spicate inflorescence of the Peruvian plant and the glomerate capitate heads of the Chilian, have given rise to different ideas concerning the type plant as well as its name.

The reference of Jussieu to Feuille, *Journ. Obs. Physiques, Mathematiques et Botaniques*, iii. 18, t. 14, in speaking of the Chilian species, leaves no doubt that at least this one of the species described was the plant called "contrayerba" by the natives of Chili. Cavanilles in his *Icones Plantarum*, i. 2, t. 4 (1791), also referred to Feuille's figure in describing *Milleria Contrayerba*, thus making it synonymous with the Chilian plant of Jussieu, who had distinguished *Flaveria* from *Milleria* merely because of the supposed absence of ligulate flowers. These were, nevertheless, found by Cavanilles, and in consequence he returned to the name *Milleria*, thus reducing *Flaveria* to the rank of a synonym. Ruiz

and Pavon, who likewise had to deal with this "contrayerba" of South America in writing their *Flora Peruviana Prodrum.* 114 (1794), asserted rightly that from its characters it could not belong to the genus *Milleria*, hence they proposed a new name *Vermifuga*, but it was not until later in their *Systema Vegetabilium Fl. Peruv. et Chil.* 216 (1798), that they added the specific name "corymbosa." Persoon in his *Synopsis Plantarum*, ii. 489 (1807), referred both *Milleria Contrayerba*, Cav., and *Vermifuga corymbosa*, R. & P., to *Flaveria Contrayerba*, the name which has been used up to the present time.

In the meantime, however, Gmelin in his *Systema*, 1549 (1796), reverted to *Flaveria* and published the specific binomials *F. chilensis* and *F. peruviana* for the two original plants of Jussieu. It is thus evident that *F. chilensis*, Gmel., is the first properly named species of *Flaveria*, and it is also clear that this was the Chilean plant of Jussieu, the "contrayerba" of the Chileans. It may be said further in regard to Gmelin's two names, that later writers have quite correctly called *F. peruviana* a synonym of *F. Contrayerba*, Pers., but that they have also with little reason considered *F. chilensis* a synonym of *F. angustifolia*, Pers., which was first described as a *Milleria* by Cavanilles in his *Ic. Plant.* iii. t. 223. This opinion seems to have been based on very slight grounds; in fact, merely upon the incomplete description of the form of inflorescence. The Chilean plant is described as having a glomerate capitate inflorescence which fits *F. angustifolia* well, but Jussieu refers the Chilean plant to that of Feuille, the illustration of which agrees fairly well with the appearance of *F. chilensis*, Gmel., and is undoubtedly the "contrayerba." Moreover, "angustifolia" is typically a Mexican plant, having never been reported, so far as I can make out, in South America.

To the Peruvian plant, however, Jussieu ascribes a spicate inflorescence which does fairly well for some species of *F. Contrayerba*, Pers., or, using the earlier name, *F. chilensis*, Gmel. Thus, it seems probable that both of Jussieu's specimens may properly be referred to *F. chilensis*, Gmel., and that *F. peruviana*, Gmel., may be considered its synonym. Although Jussieu identified his plants with *Milleria chiloensis* in *Hortus Regius Parisiensis*, the first instance of a specific name under *Flaveria* is that of *F. chilensis*, Gmel., so that that name should take precedence over all others.

F. chilensis, Gmel., is then the type plant of the genus, and *F. angustifolia*, Pers., is the second good species published in the group. A detailed study of *F. Contrayerua*, Cav. (*F. Contrayerba*, Cav.) was undertaken by Sprengel in *Schrad. Journ. Bot.* pt. 2, 186, t. 5 (1800).

As he concluded both that the plant he had at hand was not a *Milleria*, and that *Flaveria* was not a good genus, he proposed a new name, *Brotera*, so that the plant stood as *Brotera Contrayerba*, Spreng. The plant described and illustrated by Sprengel is, however, an entirely different plant from *Milleria Contrayerba*, Cav. Willdenow (1804) in *Species Plantarum*, iii. pt. 3, 2393, having previously used the name *Brotera* for a genus (*Cardopatium*, Juss.) published *Nauemburgia trinervata* for Sprengel's plant, not for Cavanilles's. Lagasca, however, *Gen. et Sp. Nov.* 33, no. 406 (1816), named a plant *Flaveria repanda*, which Sprengel in 1826, *Systema Vegetabilium*, iii. 500, identified with both *Nauemburgia* and *Brotera*. Sprengel also enumerated *F. Contrayerba*, Pers., *F. angustifolia*, Pers., and *F. linearis*, Lag. As late as 1832, Lessing, *Synopsis Generum Compositarum*, 235, maintained *Nauemburgia* distinct from *Flaveria*, and DeCandolle, *Prod.* v. 635 (1836), retained *Broteroa* (*Brotera*, Spr.) *trinervata*. As the distinction between *Brotera* (or its synonym *Nauemburgia*) and *Flaveria* consists merely in the presence of setae upon the receptacle, a character variable in some genera of the *Compositae*, it alone is not sufficient to separate the two. As other characteristics of the plants correspond very well, it has seemed best to unite the two genera in this revision.

Since the publication of the above species, as has been said, seven good species have been added to the genus, and about as many more plants have been given new names under *Flaveria*, which have subsequently proved identical with existing species or not to belong to the genus at all. The abundance of material at hand has afforded opportunity for better characterizing the species, for increasing the known range of some of them, and it has also furnished sufficient evidence for naming one variety and four new species of plants which have hitherto been placed with others.

It may be said that the genus groups itself fairly well into subdivisions; for example, *F. australasica* and *F. repanda* are similar in habit, and are the only two having setae upon the receptacle. Those whose heads have three bracts also form a characteristic group, which, however, passes into the group characterized by five bracts. Besides those with perennial roots which do not resemble each other at all, there are several other exceptional forms, as *F. anomala*, which has the three bracts with bulbous bases, and *F. chloraefolia*, which is the only species with conspicuously perfoliate leaves. In the subgroup, which is characterized by possessing three involucre bracts, however, there has been considerable confusion in separating the species, due to the similarity sometimes in habit and again in floral structure. *F. chilensis* is the only one of this group having a

distinctive ligulate flower, the ligule being slender, upright, and short, compared with the others, which are oval, usually reflexed, and large, the specific distinctions between the latter consisting mainly in habital characters. Again, the group characterized by five involucre bracts has an element of confusion in it, due rather to the extreme variation from a shrubby form, growing on hot and dry sea beaches, to herbaceous forms found in wetter places. In one species, *F. linearis*, as heretofore understood, may be found forms possessing no regular branching at all, and forms having the dichotomy characteristic of the genus. There is also a variation from plants having the leaves mostly whorled, about .2 cm. wide and 2 to 3 cm. long, to others having the leaves prevailingly opposite, .5 to 2.5 cm. wide and 4 to 12 cm. long. Moreover, the internodes in plants of this so-called species vary from 1.5 to 5 cm. long, a difference, however, which may well be due to individual environment. Notwithstanding these differences, however, among the species, the genus, as a whole, is one easily recognized and not likely to be confounded with others.

The characteristic habitat is shown by *F. longifolia*, which grows in alkaline meadows of San Luis Potosi, Mexico. The genus, for the most part, is Mexican, though *F. australasica* is found only in Australia, and *F. repanda* and *F. chilensis* have a range from southern United States to Chili and Argentine Republic. *F. linearis*, also, grows in Yucatan, Cuba, and Florida on the sandy beaches, and *F. campestris* is confined, so far as is known, to the western central United States, Arkansas to Colorado, growing in alkaline soil. The remainder, with the exception of the Florida species *F. floridana*, occur in Mexico. *F. angustifolia* is found in rich valleys of Mexico and ascends to 2,000 or 2,500 m. altitude, and *F. chilensis* has been reported at the same height in Peru.

So far as uses are concerned, *F. chilensis*, Gmel., is the only plant in the genus which has been reported of any economic value. Feuille, Ruiz, and Pavon, all speak of its medical properties. The latter say that the natives bruise the plants in a salt brine and apply to putrid ulcers to drive out worms. Feuille states that, boiled in water, it makes a beautiful yellow stain.

In preparing this paper the library and specimens of the Gray Herbarium have been consulted, as well as material from the private herbarium of Mr. John Donnell Smith, from the herbarium of the Missouri Botanical Gardens, from the Engelmann Herbarium, and from the United States National Herbarium. To those who have so kindly given the use of these, and especially to Professor B. L. Robinson, under whose super-

vision the writer has been working, and to Miss M. A. Day, librarian at the Gray Herbarium, many thanks are due.

FLAVERIA. Heads small, heterogamous or homogamous, 1- to 15-flowered, rays usually only one. Involucral bracts 2 to 8, subequal, sometimes with two smaller exterior bracts. Receptacle small, naked or setose. Achenes linear-oblong, glabrous, 8- to 10-ribbed, black. Corolla ♀ ligulate, from $\frac{1}{2}$ length of achene to 3 or 4 times as long, entire, emarginate or tridentate, upright or reflexed. Corolla ♂ regular, turbinate, 5-parted. Corolla tubes villous or not, the hairs consisting of 6 to 12 short thick cells. Anthers at base obtuse, entire. Apex with a conical appendage. Style of ♂ flower 2-parted, reflexed, obtusely rounded. Pappus usually none, in one species broad, scale-like, dentate, or fimbriate.

Herbs glabrous or puberulous, often yellowish or rubescent. Leaves opposite, narrow, entire or dentate. Capitula narrow, sessile or with short pedicels, borne in dense cymes or glomerules, which are pedunculate or sessile, corymbose-paniculate or solitary at tips of branches. Corolla pale to deep yellow.—Juss. Gen. Pl. 186 (1789); Gmel. Syst. 1269 (1791); Willd. Enumeratio, 941; Persoon, Synopsis Plantarum, ii. 489; Spreng. Syst. iii. 500, n. 2737; Less. Synopsis Generum Compositarum, 235; DC. Prod. v. 635; Torr. & Gray, Fl. N. Am. ii. 360; Benth. & Hook. f. Gen. Pl. ii. 407; Hemsl. Biol. Cent.-Am. Bot. ii. 215; Hoffm. in Engl. & Prantl, Nat. Pflanzenf. iv. Abt. 5, 258. *Vermifuga*, Ruiz & Pavon, Flora Peruviana Prod. 114, t. 24 (1798–1802). *Mil-leria*, pro parte, Cav. Ic. Pl. i. 2, t. 4 (1791). *Brotera*, Spreng. in Schrad. Journ. iv. 186, t. 5 (1800). *Nauemburgia*, Willd. Sp. Pl. iii. 2393 (1804). *Broteroa*, DC. Prod. v. 636 (1836). *Selloa*, pro parte, Nutt. Am. Journ. Sc. v. 300 (1822). *Gymnosperma*, pro parte, DC. Prod. v. 312 (1836).

‡ § 1. Receptacle setose.

* Leaves linear to lanceolate, entire or serrulate; Australian.

1. **F. AUSTRALASICA**, Hook. Herbaceous, 30 to 60 cm. high; stem striate, glabrate: leaves with base dilate, linear-lanceolate, entire or serrulate, glabrous, 3-nerved, .2 to 1.4 cm. wide, 2 to 7.5 cm. long: heads densely glomerate, glomerules 1 to 2.5 cm. wide, subinvolucrate: involucral bracts 2 to 4: corolla ♀ ligulate, lamina equalling tube or nearly so, upright or oblique, entire, emarginate or tridentate, corolla tube slightly villous: achenes nearly equal, 2.25 mm. long.—In Mitchell's Journ. Trop. Austral. 118; Mueller, Frag. i. 183.—**N. AUSTRALIA**,

Nichol Bay, N. W. coast, *F. Gregory's* Expedition; Victoria River and Hooker's Creek, *F. Mueller* (hb. Gr., hb. U. S.); islands of the Gulf of Carpentaria, *R. Brown*; in the interior, *M'Douall Stuart's* Expedition; Albert River, *Henne*; Balonne River, Queensland, *Mitchell* (hb. Gr.): these acc. Benth. Fl. Aust. iii. 546 (1866).

** Leaves lanceolate to elliptical; American.

2. *F. REPANDA*, Lag. Herbaceous, stem 30 to 120 cm. high, green or reddish, dichotomous, striate, glabrate: leaves opposite, lanceolate, prominently 3-nerved, apex rounded or acute, 2 to 9 cm. long, .6 to 2.5 cm. wide, the base of the lower leaves tapering into a sort of petiole, the two opposite ones being connate at the stalk; the upper leaves are decidedly connate; leaves in three pairs about inflorescence; lanceolate leaves serrate, elliptical leaves repand-dentate: heads usually 1-flowered, gathered in dense axillary or terminal clusters: ♀ bracts 1 to 2, usually 2, both concave, acute or rounded at apex, even emarginate, one larger than the other: corolla subligulate, emarginate, entire or tridentate, a little over .1 cm. long, lamina the length of the tube, oblique, entire corolla a little over $\frac{1}{2}$ length of achene, lower part of tube villous: achene scarcely .1 cm. long: ♂ bracts 1 to 2 as in ♀; corolla tube narrow becoming full at throat, lobes acute, reflexed, tube villous as ♀; anthers with obtuse appendages at apex; filaments thickened immediately below the anther: setae filamentous, slightly flattened and spreading at apex, or flattened throughout as half-aborted bracts; achene of ♂ smaller by $\frac{1}{3}$ than that of ♀. — Lag. Gen. et Sp. Nov. 33, no. 406 (1816). *Oedera trinervia*, Spr. in Bot. Gart. Halle, 63 (1800). *Brotera Contrayerva*, Spr. in Schrad. Journ. Bot. iv. t. 5 (1800), not *Millera Contrayerba*, Cav. *Nauemburgia trinervata*, Willd. Sp. Pl. iii. 2393 (1804). *Broteroa trinervata*, DC. Prod. v. 636 (1836). *Brotera Sprengelii*, H. Cass. Dict. xxxiv. 304. *Flaveria trinervata*, Baillon, Hist. Pl. viii. 55 (1886). *Flaveria trinervia* (Spreng.) Mohr, Cont. Nat. Herb. vi. 810 (1901). — ALABAMA: adventive with ballast, Mobile County, *Mohr*, Cont. Nat. Herb. vi. 810 (1901) (hb. Geol. Surv., hb. Mohr). TEXAS: Barstow, *S. M. Tracy*, 8161, Oct. 1902 (hb. Gr.); Rio Grande, *Wright*, 356, Oct. 1849 (hb. Gr., hb. U.S.); near Doñana, valley of Rio Grande, *Parry*, *Bigelow*, *Wright*, and *Schott*, 593 (hb. U.S.). NEW MEXICO: Mesilla, *E. O. Wootton*, 51, June, 1898, alt. 1300 m. (hb. M. B. G., hb. U. S.); Roswell, *F. S. Earle & E. S. Earle*, 304, Aug. 1900, alt. 1,200 m. (hb. M. B. G., hb. U. S.); Las Cruces, *Vasey*, 184, 1881 (hb. J. D. S., hb. U. S.). COAHUILA: San Carlos, *Berlandier* 2372, Nov. 1831 (hb. Gr.); Parras, *Palmer*, 686, Oct. 1880 (hb. Gr., hb. U. S., hb. J. D. S., hb. M. B. G.),

Saltillo, *Palmer*, 284, Sept. 1898 (hb. Gr., hb. U. S.); Jimulco, *Pringle*, 83, May, 1885 (hb. Gr., hb. J. D. S., hb. U. S.). NUEVA LEON: Monterey, *Enero*, 1422 & 162, 1828 (hb. Gr.). DURANGO: rich moist bottom-lands, *Palmer*, 481, Aug. 1896 (hb. Gr., hb. M. B. G., hb. U. S.). SAN LUIS POTOSI: en route from San Fernando to Santander, *Berlandier*, 839, Oct. 1839 (hb. Gr.); *Parry & Palmer*, 499, 1878 (hb. Gr., hb. M. B. G., hb. U. S.). CHIHUAHUA: *Potts* acc. Hemsl. Biol. Cent.-Am. Bot. ii. 216. GUANAJUATO: Jaral, *Walther Schumann*, 64, 1885 (hb. Gr., hb. J. D. S.); *Alfredo Dugès*, Nov. 1897 (hb. Gr.); Irapuato, *Pringle*, 2688, May, 1889 (hb. M. B. G.). OAXACA: *L. C. Smith*, 307, Nov. 1894 (hb. Gr.); *Conzatti & González*, 1016, Aug. 1900 (hb. Gr.), *E. W. Nelson*, 130, Sept. 1894, alt. 1,600 to 1,700 m. (hb. Gr.). HIDALGO: Cadena in rich valley, *Gregg*, 22 (hb. Gr.) & 594 (hb. Engel.). TEOTITLAN: Tecomavaca, *Pringle*, 5724, Sept. 1894 (hb. Gr., hb. U. S.); *C. L. Smith*, 264, Sept. 1894, alt. 650 m. (hb. M. B. G., hb. U. S.). TEHUACAN: *Galeotti*, 2639 acc. Hemsl. l. c., alt. 2,000 m. MORELOS: Jojutla, *Pringle*, 9508, June, 1901, alt. 1,000 m. (hb. Gr., hb. U. S.). YUCATAN: ditches near Progreso, *Millspaugh*, 1653, and along railroad south of lagoon, Progreso, *Millspaugh*, 1699 & 1731, Pub. Field Columb. Mus. Bot. ii. 109; downs of Progreso, *Schott*, 973, Dec. 1865, acc. *Millspaugh*, Pub. Field Columb. Mus. Bot. i. 395. CUBA: *Liebmann*, 452 (hb. Gr.); salt marshes near Guanimas, *Wright*, 2860 (hb. Gr., hb. Engel., hb. U. S.); waste places, field and roadsides, Cieneguita, *R. Combs*, 473, Aug. 1895 (hb. Gr., hb. M. B. G.); Havana, *Palmer & Riley*, 1156, July, 1900 (hb. U. S.). VENEZUELA: Tovar, *A. Fendler*, 692, 1854-5, alt. 1,000 m. (hb. Gr.); Caracas, *A. H. Moore*, 25, Mar. 1899 (hb. Gr.). PERU: Huanuco, acc. Spr. in Schrad. Journ. Bot. iv. 186 (1800). BRITISH GUIANA: *Schomburgk*, 247, acc. Baker in Mart. Fl. Bras. vi. pt. 3, 270. BRAZIL: *Riedel*, 813 (hb. Gr.); Bahia, *Riedel*, 938, and *Luschnath*, acc. Baker, l. c. Cult. specimen: Hort. Cantabr. 1849 (hb. Gr.), Hort. Genev. (hb. Gr.), Hort. Bot. Berol. (hb. Gr.).

§ 2. Receptacle not setose.

* Heads 3- to 8- flowered.

+ Annual.

↔ Bracts plain.

= Ligule slender, nearly upright.

3. *F. CHILENSIS*, Gmel. Herbaceous, erect, .6 to .9 m. high, with a copious dichotomous branching: stem green or rubescent, branches gla-

brous or villous at nodes: leaves opposite, slightly connate, lanceolate-elliptical, narrowing at base, sometimes appearing petiolate, 3-nerved, serrate; lower leaves 6 cm. long, .4 to 5 cm. wide: cymes 2 to 2.5 cm. in diameter; branches densely scorpioid: involucre bracts .4 cm. long, oblanceolate, obtuse, subequal, exterior bracts 1 to 2, lanceolate; heads consist of one ♀ and one ♂, or usually one ♀ and 2 to 5 (sometimes 8) ♂, undeveloped ♂ often present: corolla tube villous or not; ♀ subligulate, ligule narrow, upright, acute, exceeded by lobes of style before they are reflexed, slightly more than $\frac{1}{2}$ length of ♂ corolla; ♂ corolla exceeding achene; corolla tube .3 cm. long: achene of ♀ slightly exceeding ♂ achene. — Gmel. Syst. 1269 (1796). *Flaveria peruviana*, Gmel. Syst. 1549 (1796). *Milleria chiloensis*, Hort. Reg. Paris, acc. to Juss. Gen. 187 (1789), nomen seminudum. *M. Contrayerba*, Cav. Ic. Pl. i. 2, t. 4. *Flaveria Contrayerba*, Pers. Syn. ii. 489. *Vermifuga corymbosa*, Ruiz & Pavon, Fl. Per. 114, t. 24. *Flaveria bonariensis*, DC. Prod. v. 635. *Flaveria capitata*, Juss. ex Sm. in Rees, Cycl. xv. n. 1. *Flaveria peruviana*, Juss. Gen. Pl. 187. *Milleria contrahierba*, Lam. Dict. iv. 183. *Eupatorium chilense*, Mol. Chil. 335, acc. Gay, Flora Chilena, 278. — GEORGIA: waste places among rosin wharves, Brunswick, Harper, 1521 (hb. Gr.). FLORIDA: Pensacola, Curtiss, 1504, Sept. 1886 (hb. Gr., hb. J. D. S., hb. M. B. G., hb. U. S.); Curtiss, 5, Sept. 1886 (hb. Gr.); Curtiss, 6495, July, 1899 (hb. Gr., hb. M. B. G., hb. U. S.), on waste ground. ALABAMA: Mobile, Mohr, 17, 1891 (hb. U. S.). MEXICO: Real del Monte, Berlandier; Guanajuato, Mendez, acc. Hemsl. l. c. PERU: Lima, Gaudichaud, 113 (hb. Gr.); in yards and fields of Cercado, Chaucay, Cautae, Huarocheri, Huanuci, and Cuzco provs. Commonly called "contrayerba" and "matagusanos" in Lima, and in Cuzco, "chinapaya," acc. Ruiz et Pavon, Syst. Veg. Fl. Per. et Chil. 216; in Peruvian Andes near Guancabamba, alt. 2,000 m., acc. HBK. Nov. Gen. et Sp. iv. 285; Calloa and Lima, U. S. Exploring expedition under Capt. Wilkes. ECUADOR: Manobi, Eggers, 15704. BOLIVIA: Bang, 2026 (hb. Gr.); Socata, G. Mandon, 58, 1859 (hb. Gr.); Cochabamba, Bang, 968, 1891 (hb. Gr., hb. J. D. S., hb. M. B. G., hb. U. S.). CHILI: Valparaiso, Mertens (hb. Gr.); Tarajuaca, R. A. Philippi, Chili Museo National Santiago, 1888 (hb. J. D. S.); Concepcion, about 1709, acc. Feuille in Journ. Obs. Phys. iii. 18, t. 14. URUGUAY: Tweedie (hb. Gr.); Mendoza, Gillies, 146 (hb. Gr.). ARGENTINE REPUBLIC: Cordoba, Lorentz, 1874 (hb. Gr.); Naporta Grande, Lorentz, 1874 (hb. Gr.); Buenos Ayres, Hb. Parker (hb. Gr.); near S. Juan, Jachal, Cordoba, Tweedie, Jameson, Hieronymus, acc. Baker l. c.; near Buenos Ayres, Bacle, acc. Baker, l. c.

= = Ligule oval, reflexed.

a. Leaves lanceolate, bracts 3 (sometimes 4 or 6).

b. Leaves serrate, inflorescence leafy, not compact; stem glabrous or villous at nodes, stout.

4. *F. campestris*, nov. sp. Herbaceous: stem erect, branching dichotomously, green or rubescent, glabrous or villous at nodes: leaves linear to lanceolate, serrulate, 3-nerved, narrowing at base, slightly connate, 2.5 to 6.5 cm. long, 1 to 2.5 cm. wide: inflorescence densely cymose, cymes corymbose-paniculate, involucre bracts 3 nearly equal, .5 cm. long; outer bracts usually 2 unequal, .1 to .6 cm. long, linear-lanceolate: flowers usually one ♀ and 3 to 4 ♂; corolla tube slightly villous, lamina of ♀ large, oval, reflexed, nearly equalling ♀ achene, which is .3 cm. long; achene of ♂ .25 cm. long. — MISSOURI: Courtney, *B. F. Bush*, 51, Sept. 1890 (hb. U. S.). KANSAS: Pawnee Rock, *A. Gordon*, Sept. 1895 (hb. Engel.); Argentine, *K. Mackenzie*, Sept. 1895 (hb. M. B. G.); *M. A. Carleton*, 740, 1896 (hb. Gr., hb. U. S.); Belvidere, *S. F. Ward*, 1897 (hb. Gr., hb. U. S.); Wichita, *B. B. Smyth*, 240, 1890, low sandy dunes and flats near river (hb. U. S.); Medicine Lodge, *Smyth*, 292, 1890, low prairies (hb. U. S.). INDIAN TERRITORY: Cherokee Outlet, *Carleton*, 505, Sept. 1891 (hb. U. S.). TEXAS: Mustang Spring, *V. Havard*, 13 (hb. U. S.); Baylor County, *Reverchon*, 22, 1879 (hb. Gr.); banks of the Brazos, Seymour, *Reverchon*, 506, 1879 (hb. J. D. S., hb. U. S.); alkali flat, Big Spring, Howard County, *V. Havard*, 13, Sept. 1881 (hb. Gr.); Antelope Hills of the Canadian, *Bigelow*, 1853-4 (hb. U. S.); Cimarron Creek, low prairies, *A. Fendler*, 536 (hb. Gr., hb. Engel.). COLORADO: Pueblo, *R. W. Woodward*, 1882 (hb. Gr.); Huerfano, *G. Engelmann*, Sept. 1881 (hb. Engel.).

b. b. Leaves remotely denticulate, tapering at base; inflorescence naked, compact; upper stem usually pubescent, stout; outer bracts large.

5. *F. ANGUSTIFOLIA*, Pers. Herb erect, 30 to 90 cm. high, branching dichotomous, upper part puberulent, branching little up to the inflorescence which is corymbiform or almost umbellate: leaves linear-lanceolate, 2.5 to 11.5 cm. long, 2.2 to 4 cm. wide, obsolete denticulate or entire, glabrous: inflorescence naked, densely glomerate: bracts usually 3, rarely 4 or 6; two outside bracts conspicuous, unequal: 1 ♀ and 3 to 5 ♂, sometimes 6 to 8 ♂ and no ♀; corolla tube villous: achenes about equal. — Pers. Syn. ii. 489 (1807). *Milleria angustifolia*, Cav. Ic. Pl. iii. 12, t. 223 (1795). *F. integrifolia*, Moc. & Sessé, acc. to DC. Prod. v. 635. *F. elata*, Klatt, Leopold. xxiii. 146 (1887). *F. contrayerba*,

Sch. Bip. acc. to Klatt, l. c. — OAXACA: *Galeotti*, 2122, *Andrieux*, 345; Tehuacan, *Liebmann*, 267 (drawing in hb. Gr.), *Schmitz*, 1027 (hb. Gr.); Coixlahuaca, *Nelson*, 1935, alt. 2,000 to 2,500 m., 1894 (hb. Gr.). PUEBLA: Puebla, *Smith*, 912, alt. 2,000 m., 1895 (hb. Gr.), *Pringle*, 4749, fields, 1894 (hb. Gr., hb. J. D. S., hb. M. B. G., hb. U. S.); Chapultepec, *Schaffner*, 16 (hb. Gr.); Hort. Mex., *Berlandier*, 640 (hb. Gr.).

b. b. b. Leaves remotely denticulate, narrow at base; inflorescence naked, not compact; upper stem pubescent, slender; outer bracts usually conspicuous.

6. *F. intermedia*, nov. sp. Stem about 30 cm. high, slender, erect, angled, purplish, pubescent, dichotomously branching, primary branches in the two specimens all simple, terminated by a loose corymbiform glomerule resembling that of *F. campestris*: leaves minutely serrate, 1.2 to 5 cm. long, .2 to .4 cm. wide, usually opposite, sometimes whorled in axils: heads few-flowered, bracts minute to 3 mm. long: ♀ achene $\frac{1}{3}$ larger than ♂ achene. — DURANGO: Plains near Yermo, *Pringle*, 7359, Oct. 1896 (hb. U. S., hb. Gr.).

This species differs from *F. linearis* in having only three bracts, in possessing a ♀ achene much larger than the achene of ♂ flower, and in form of leaves. It differs from *F. campestris* in its very slender stem, in shape of leaves, and in size of flowers; and from *F. angustifolia* in its slender stem, comparatively loose inflorescence, and size of floral organs.

b. b. b. b. Leaves remotely denticulate, narrowing to a petiole-like base; stem pubescent; outer bracts minute or absent.

7. *F. ROBUSTA*, Rose. About 1.2 m. high, pubescent or glabrate below: leaves lanceolate or linear above, 4.5 to 13 cm. long, acute to acuminate, tapering into a slender petiole, 3-nerved, entire or slightly serrate: inflorescence open, corymbose; heads small, with 3 involucre bracts: flowers 3; ray 1, orbicular, about .2 cm. long; disk flowers 2: achenes .15 cm. long. — Rose, Cont. Nat. Herb. i. 337 (1895). — MEXICO: Colima, *Palmer*, 1299, Feb. 27–28, 1891 (hb. Gr., hb. J. D. S., hb. M. B. G., hb. U. S.); Armeria, *Marcus E. Jones*, 276, June 28, 1892 (hb. Gr., hb. U. S.); Chihuahua, Batopilas, *E. A. Goldman*, 240, Oct. 1898 (hb. Gr., hb. U. S.).

a. a. Leaves linear, bracts 5.

b. Stem strict.

8. *F. LINEARIS*, Lag. Stem shrubby, erect or more commonly sprawling, branching indefinite, branches of unequal length; lower internodes short, made conspicuous by the remnants of the leaves, striate, glab-

rate: leaves linear, connate to connate-vaginate, the lower ones breaking away, typically opposite, but this character becomes inconspicuous by the presence of numerous leaves whorled in the axils of the opposite ones, entire, from 2 cm. to 10 cm. long, and from .1 to .4 cm. wide: inflorescence irregular, consisting of small loose glomerules or larger compact aggregations; involucral bracts equal, enclosing 3 to 8 flowers, usually one ligulate; outside bracts small; ligule of ♀ oval, almost equalling the long slender tube: achenes about equal, ♀ somewhat stouter than ♂. — Lag. Gen. et Sp. Nov. 33, n. 40 (1816). *F. maritima*, HBK. Nov. Gen. et Sp. iv. 285. *F. tenuifolia*, Nutt. in Journ. Acad. Phil. n. s. vii. 81. *Selloa nudata*, Nutt. in Am. Journ. Sc. v. 300 (1822). *Gymnosperma nudata*, DC. Prod. v. 312. — FLORIDA: Biscayne Bay, *Palmer*, 292, 1874 (hb. Gr., hb. U. S.); Miami, *Garber*, May, 1877 (hb. Gr., hb. U. S.); New Found Harbor Key, *Pollard*, *Collins*, and *Morris*, 79, Mar. 1898 (hb. U. S.); No Name Key, *J. H. Simpson*, 185, May, 1891 (hb. U. S.); Key West, *Blodgett* (hb. Gr.). CUBA: Toscano seashore, *Wright*, 2859, 1860-64 (hb. Engel., hb. U. S., hb. Gr.); Mariel, Province of Pinar del Rio among coral rocks near sea, *Wm. Palmer* and *J. H. Riley*, 713, May, 1900, and 811, June, 1900 (hb. U. S.). BAHAMAS: Red Bays, Andros, *John I. and Alice R. Northrop*, 462, Apr. 1900 (hb. Gr.). MEXICO: *Galeotti*, 23 (hb. Gr.). YUCATAN: *G. F. Gaumer* 1141 (hb. Gr.); Holbox Is., Bay of Honduras, *Gaumer*, 1886 (hb. Gr.)

Var. *latifolia*, nov. var. Stem herbaceous, erect, greenish or rubescent, slender, striate, glabrate; lower internodes not conspicuously shorter than the upper ones: leaves opposite, linear to lanceolate, conspicuously narrowed above the expanded connate base; whorls of leaves inconspicuous; leaves entire or denticulate, 2.5 cm. to 10.5 cm. long, and .4 cm. to 3 cm. wide: heads gathered in rather small glomerules which are arranged in an open quite regular corymb; heads similar to type of the species. Although this variety is very distinct in habit from the type of the species, there are intermediate and dubious forms. — FLORIDA: shore of Lake Worth near Palm Beach, *Curtiss*, 5524, Aug. 1895 (hb. M. B. G., hb. U. S.); Key West, *Palmer*, 292; Sneed's Is., *Tracy*, 6356, Sept. 1899 (hb. Gr., hb. U. S., hb. M. B. G.); shore of Indian River, *Curtiss*, 1504 (hb. Gr., hb. M. B. G.); Titusville, Breward Co., *G. V. Nash*, 2301, Jul.-Aug. 1895 (hb. M. B. G., hb. U. S., hb. Gr.). YUCATAN: Cozumel Is., *Gaumer*, Aug. 1885 (hb. Gr.).

b. b. Stem branching copiously.

9. *F. RAMOSISSIMA*, Klatt. Stem purplish, terete, striate, glabrate,

branching; branches diffuse, fastigiate-corymbose, leafy; upper stem somewhat villous, leaves linear-lanceolate, acute, remotely dentate, 1-nerved, 2.5 cm. long, .2 cm. wide, base connate-vaginate: peduncles and pedicels winged: heads .3 cm. long, with a bracteate base, 1-ligulate, 5-flowered: ♀ achene 1.5 mm. long, ♂ 1 mm. long. — Klatt, Leopold. xxiii. 146 (1887); *F. angustifolia*, Sch. Bip. non Pers. var. *ramosissima*, Klatt, l. c. — MEXICO: Tehuacan, *Pringle*, 6756, Aug. 1897, alt. 1500 m. (hb. Gr., hb. U. S.); Puebla near Tehuacan, *Pringle*, 7031, 1895 (hb. U. S., hb. Gr.); *Liebmann*, 456 and 457 (hb. Gr.).

++ ++ Bracts swollen.

10. *F. ANOMALA*, Rob. A glabrous annual, a span high: stem striate, angulate, much branched: leaves linear or lanceolate-linear, gradually narrowed to a slightly connate base, acute, 4 cm. to 5 cm. long, .3 cm. to .5 cm. wide: heads numerous, aggregated at the ends of the branches in dense corymbs, very small, subtended by minute dark-tipped bracts, 1-(rarely 2-) flowered; the single flower either tubular or ligulate: involucreal scales of unequal breadth, lanceolate-linear or oblong, more or less narrowed but obtuse at the apex, persisting in fruit, and becoming swollen and bulbous on the back near the base; corollas bright yellow; in the tubular flowers the campanulate throat and spreading limb equalling the tube, the latter hairy on the outer surface; the ligules .2 cm. or less in length: achenes about equal. — Rob. Proc. Am. Acad. xxvii. 178 (1892). — MEXICO: San Luis Potosi, Sept. 1890, *Pringle*, 3669; Plains of Venegas, *Pringle*, 5367, Nov. 1892 (hb. U. S.); *Parry*, in 1878, North Mexico, 31, and in 1878 en route from San Luis Potosi to San Antonio, Texas, 500 (hb. Gr., hb. U. S.).

+ + Perennial.

++ Inflorescence much branched; glomerules of few heads.

11. *F. Palmeri*, nov. sp. Thickened perennial root, giving rise to 1 to several more or less reclining stems; stem pale, branching copiously, glabrous: leaves linear-lanceolate, sparingly denticulate, slightly connate, 1 to 3.5 cm. long: heads in rather small cymes; cymes in compound corymbiform panicles: involucreal bracts 3, equal, slightly keeled, .5 cm. long, the 1-2 outside bracts minute: lamina ♀ oval, .3 cm. long, exceeding slightly the achene; corolla tube villous. — MEXICO: San Lorenzo de Laguna, 93-114 kms. southwest of Parras, Coahuila, *Palmer*, 684, May, 1880 (hb. Gr., hb. U. S.).

↔ ↔ Inflorescence densely corymbose, terminal on long stalks.

12. *F. VAGINATA*, Rob. & Greenm. Perennial with stout lignescent root: stems several, ascending from a decumbent or even prostrate somewhat branched base, terete, striate, purplish, with biliniate short grayish woolly pubescence, leafy above, naked below except for the persistent and sheathing bases of the fallen leaves: internodes very short: leaves linear-lanceolate, clasping at the base, very gradually attenuate, often fascicled in the axils, 1(-3)-nerved, rather pale green, finely ciliated toward the base: heads small, closely aggregated into terminal solitary or corymbose-paniculate glomerules; these simulating the normal involucrate heads of the order: glomerules .12 to .16 cm. in breadth, subtended by a few short recurved foliaceous bracts, and containing 30 or more heads: involucre scales 3 to 4 in each head, hyaline: ray-flower solitary, conspicuous, .5 cm. long, with oblong slightly 2 to 3 toothed yellow ligule: disc flowers 5 to 7, yellow: style of ♀ 3-cleft: achenes black, lucid, about 10-nerved, ♀ 2.25 mm. long, ♂ achene 1.75 mm. long. — Rob. & Greenm. Proc. Am. Acad. xxxii. 48 (1896). *E. W. Nelson*, 1933, between Coixlahuaca and Tamazulapam, Oaxaca, alt. 2,000 to 2,500 m. Nov. 1894.

* * Heads 10- to 15-flowered.

+ Leaves linear to lanceolate, slightly connate.

↔ Ligulate flowers not present, inflorescence usually naked.

13. *F. LONGIFOLIA*, Gray. Rather stout, 3 to 9 dm. high, pale: leaves glabrous, broadest or not narrowed at the closely sessile base, 5 to 12.5 cm. long, entire or with rare spinulose denticulations: heads in regular very ample cymes, which are often destitute of leaves. — Gray, Pl. Fendl. 88. *Gymnosperma oppositifolia*, DC. Prod. v. 312. — MEXICO: San Luis Potosi, *Parry and Palmer*, 498, 1878 (hb. Gr., hb. Engel., hb. U. S.), also *Pringle*, 3767, July, 1891 (hb. Gr.); Parras, Coahuila, *Palmer*, 685, 1880 (hb. Gr., hb. J. D. S., hb. U. S.); Saltillo, Coahuila, *Palmer*, 304, Sept. 1898 (hb. Gr.); also *Palmer*, 681, 1880 (hb. Gr., hb. J. D. S., hb. U. S.); Tehuacan, *Liebmann* acc. Hemsl. l. c.; *Berlandier*, without locality (hb. Gr.); Cienega Grande, *Gregg*, 705, May, 1847 (hb. Engel.); Tamaulipas, Jaumam Valley, *E. W. Nelson*, 4450, June, 1898 (hb. U. S., hb. Gr.).

↔ ↔ Ligulate flowers present, inflorescence usually subtending a small whorl of leaves.

14. *F. floridana*, nov. sp. Herbaceous, erect or ascending, branching dichotomous, branches often unequal in length, striate, glabrate:

leaves opposite, linear to lanceolate, base narrowing somewhat above the expanded often connate portion, rarely denticulate, 2.5 cm. to 7.5 cm. long, .3 cm. to 1.25 cm. wide: inflorescence irregular in form; glomerules fairly compact, subtending a whorl of leaves which are usually broad and conspicuous: involucre bracts subequal; head 10- to 13-flowered, sessile, the ray flower has a large oval ligule equalling in length the slender corolla tube: achenes of ♀ and of ♂ about equal, that of the ♀ usually stouter: most nearly allied to *F. linearis*, Lag., from which it differs mainly in the number of flowers in a head, in possessing a whorl of leaves about the glomerules, and in habit; and to *F. longifolia*, Gray, from which it differs in the possession of ligulate flowers, and the whorl of leaves about the glomerule, and in habit. — FLORIDA: Sonibel Is., *H. J. Webber*, 175, Jan. 1896 (hb. U. S.); Manatee, *J. H. Simpson*, 1889 (hb. U. S.); Hog Is., *S. M. Tracy*, 7341, Nov. 1901 (hb. Gr., hb. M. B. G.).

+ + Leaves ovate, conspicuously perfoliate.

15. *F. CHLORAEFOLIA*, Gray. Stem glaucous, striate, 3 to 9 dm. high: leaves ovate-oblong to narrowly lanceolate, broadest and connate or connate-perfoliate at base, glabrous, 2.5 to 9 cm. long, 1.2 to 3.5 cm. wide: heads more or less clustered in a broad and open naked pedunculate compound terminal corymbiform cyme: heads 11- to 13-flowered, involucre bracts 5, the 2 smaller and outer bracts quite distinct; ray flowers 0, disk flowers .6 cm. long; 2 to 3 small pales on most achenes (4 acc. Gray). — Gray, Pl. Fendl. 88 (1849), & Syn. Fl. ii. pt. 2, 353. — TEXAS: Screw Bean, *G. C. Nealley*, 688, 1889 (hb. U. S.); on the banks of the Rio Grande, *Wright*, 357 (hb. Gr.); below Doñana, valley of Rio Grande, *Parry*, *Bigelow*, *Wright*, and *Schott*, 592 (hb. U. S.). MEXICO: Coahuila, *Palmer*, 682, 1880 (hb. Gr., hb. J. D. S., hb. M. B. G., hb. U. S.), and 2083, 1897 (hb. Gr., hb. J. D. S., hb. M. B. G.).

DOUBTFUL AND EXCLUDED SPECIES.

F. HUMILLIMA, Sch. Bip. in *Linnaea*, xxxiv. 529 (1865-66), without description.

F. SPICATA, Juss. mss. acc. Smith in Rees, *Cyclopedia*, xv. Collected by Dombey in Peru. Acc. to Hook. f. & Jacks., in *Index Kewensis*, it is *Piqueria artemisioides*.

F. PERUVIANA, Juss. acc. DC. *Prod.* v. 635, is *Piqueria artemisioides*.

F. PERFOLIATA, Klatt, *Leopold.* xxiii. 146 (1887), is *Desmanthodium perfoliatum*.

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BY B. L. ROBINSON.

1. DIAGNOSES AND SYNONYMY OF SOME MEXICAN AND CENTRAL AMERICAN EUPATORIUMS.

EUPATORIUM ANGOSTURAE, Polak., *Linnaea*, xli, 575 (1877), has been recently examined by Dr. J. M. Greenman, who has found that the type, preserved in the Royal botanical museum at Berlin, is *Erechtites valerianaefolia*, DC.

E. ARGUTUM, HBK., *Nov. gen. et spec.*, iv, 121 (1820), according to Dr. Greenman, who has examined authentic material of this species in the Willdenow herbarium, is *Fleischmannia rhodostylis*, Sch. Bip.

E. BRAUNII, Polak., *l. c.*, 576, is similarly, according to Dr. Greenman, a species of *Baccharis*, probably *B. speciosa*, DC.

E. campylocladum, spec. nov. Frutex ramosissimus, ramis oppositis articulatis flexuosis a cortice fuscescenti vel nigrescenti tectis apice solum foliatis; foliis oppositis parvis petiolatis ovatis vel breviter ovato-oblongis serratis obtusis mucronulatis glabris viridibus subconcoloribus vernicoso-viscosis lucidis basi rotundatis vel subcordatis integris trinervatis leviter venuloso-reticulatis 1.5–2 cm. longis, 1.2–1.8 cm. latis, petiolo 6–8 mm. longo; capitulis paucis in thyrsis foliosis congestis, bracteis lanceolatis acutis sessilibus plus minusve glanduloso-puberulis, pedicellis teretibus viridibus copiose glanduloso-puberulis 4 mm. longis, involucri squamis circa 14 subaequalibus 7–9 mm. longis lineari-oblongis dorso glanduloso-puberulis 3–4-nervatis viridibus apice attenuatis; flosculis circa 20, corolla alba glanduloso-granulata 7 mm. longa angustissima tubulosa in fauces perangustas leviter ampliata, dentibus perbrevis; achaenio immaturo gracili 4 mm. longo pubescenti, setis pappi 22–30 albis sursum scabridis 8 mm. longis.—Mexico: at General Cepéda, Coahuila, 20 April, 1902, *E. W. Nelson*, no. 6735 (hb. Gr. and hb. U. S. nat. mus.).

A striking and well marked species most nearly related to *E. mygindaefolium*, Gray, and having similar flexuous many-jointed branches, glabrous vernicose leaves, and few rather large heads. It differs, however, strongly in leaf-contour, as well as in the puberulence and somewhat also in the texture of the involucre.

E. CHLOROPHYLLUM, Klatt, Bull. soc. bot. Belg., xxxi, pt. 1, 187 (1892), scarcely differs from *E. badium*, Klatt, *l. c.*, 186, and should, I believe, be reduced to it. The chief distinction indicated by Dr. Klatt is the greater length of the involucreal scales; but as these are from 5 to 6 mm. long in the type specimens of *E. badium* and do not exceed 6 to 6.5 mm. in the type of *E. chlorophyllum*, this difference is certainly insufficient to distinguish a species.

E. CHRYSOCEPHALUM, Klatt, Bot. Beiblatt z. Leopoldina, 1895, 2, and *E. VALVERDIANUM*, Klatt, Bull. soc. bot. Belg., xxxi, pt. 1, 188 (1892), are both *Neurolaena lobata*; R. Br.

E. COLLINUM, DC., Prodr., v, 164 (1836). Add synonym *E. plectranthifolium*, Klatt, Bull. soc. bot. Belg., xxxi, pt. 1, 193 (1892), not Benth.

➤ ***E. erythropappum***, spec. nov. Lignescens ramosum, ramulis subteretibus arcuatis striatis fuscis minutissime glanduloso-pulverulentis; foliis oppositis petiolatis anguste obovatis obtusis vel acutiusculis integerrimis vel paucè obscureque dentatis basi acutis 6–8 cm. longis, 2.5–3.5 cm. latis undique glabris supra laete viridibus sub-lucidis subtus paulo pallidioribus punctatis; petiolo 5–8 mm. longo supra canaliculato puberulo; corymbis terminalibus convexis polycephalis oppositirameis glanduloso-puberulis, bracteis inferioribus lanceolatis, superioribus anguste linearibus patentibus, pedicellis gracilibus 4–12 mm. longis; capitulis 8-floris 1 cm. altis, involucri squamis circa 8 subaequalibus oblongis acutis ciliatis 4 mm. longis purpurascens; corollis albis 5–6 mm. longis, tubo proprio brevi gracili, faucibus longis ampliatis, limbo 5-dentato plus minusve puberulo, dentibus ovato-deltaideis; achaeniis 3 mm. longis, nigris argute prismaticis hispidulis; pappi setis circa 40 sursum hispidulis conspicue roseis.—Mexico: Alvares, San Luis Potosi, 28 September to 3 October, 1902, Dr. Edw. Palmer, no. 200 (type in hb. Gr.).

This species is obviously related to *E. micranthum*, Less. The leaves, however, are subcoriaceous, more obtuse and at the base they show no tendency to the crisping which seems always to be present in *E. micranthum*.

E. fistulosum, spec. nov. Robustum 2–3 m. altum, caule tereti fistuloso, in parte juvenili tomentello, aetate griseo-puberulo, internodiis longis; foliis oppositis magnis orbicularibus cordatis cum sinu patente latoque leviter 3–12-lobatis acute dentatis 3–9-palmato-nervatis 1.5 dm. diametro supra pubentibus scabriusculisque subtus in venis reticulatis tomentosis maturitate nec translucidis nec punctatis, petiolo tomentoso 1 dm. longo; capitulis 1 cm. longis 4–5-floris numerosissimis pedicellatis in panicula ampla oppositiramea rotundato-corymbosa dispositis, involucre elongato tereti, squamulis valde inaequalibus et pluriseriatim imbricatis obtusis ciliatis, exterioribus apice pubescentibus; corollis azureis 9 mm. longis glabris, tubo tenui in fauces latiores sensim ampliato; achaeniis glabris lucidis ad basim attenuatis 3.5 mm. longis, pappi setis 30–40 simplicibus luteis lucidis. — Costa Rica: in forests of La Palma toward the Pacific, alt. 1550 m., September, 1896, *H. Pittier*, no. 10,167; borders of pastures at La Palma, alt. 1459 m., 25 October, 1898, *Ad. Tonduz*, no. 12,505 (type in hb. Gr.).

A species remarkable for its *Cacalia*-like foliage.

E. HEBEBOTRYUM, Klatt, Bull. soc. bot. Belg., xxxv, 280 (1896), as far as it relates to no. 7523, and **E. HEBEBOTRYUM**, Coult., in J. D. Smith, Enum. pl. Guat., iv, 74 (1895), as to no. 6339, are *E. populifolium*, HBK., Nov. gen. et spec., iv, 111 (1820).

E. hylobium, spec. nov. Lignosum, ramis subteretibus flexuosis per lenticellas prominulas bullato-scabris glabris, ramulis inflorescentiae puberulis vel tomentellis; foliis oppositis ovatis petiolatis tenuibus attenuatis acuminatis 7 cm. longis, 3.5 cm. latis, supra glabris viridibus subtus vix pallidioribus pinnatinervatis in nerviis et venis maximis puberulis vel tomentellis, margine argute serrulato, dentibus angustissimis divergentibus; pedicellis gracilibus flexuosis, bracteolis filiformibus, capitulis circa 14-floribus 7 mm. altis in paniculo rotundato oppositirameo dispositis, involucri squamulis pubescentibus valde inaequalibus, exterioribus brevibus lanceolato-linearibus attenuatis, interioribus multo longioribus oblongo-linearibus obtusiusculis, receptaculo glabro; corollis 4.5 mm. longis a tubo proprio gracili in fauces longiores gradatim ampliatis glabris, dentibus 5 perbrevibus minutissime puberulis; styli ramis perlongis filiformis, achaeniis atrofuscis glabris prismaticis, pappi setis circa 18 albis scabridis 3.2 mm. longis. — Mexico: mountain woods between San Martin and Ococingo, Chiapas, *C. and E. Seler*, 13 March, 1896, no. 2170 (type in hb. Gr.).

Distributed as *E. perornatum*, Klatt, *Leopoldina*, xx, 90 (1884), a species nearly related but differing in several points, among them the different serration of the leaves and the hairy receptacle.

E. hylonomum, spec. nov. Arborescens, ramulis gracilibus striatis subteretibus brevissime tomentellis vel puberulis pilis sordidis incurvatis; foliis oppositis oblongis 14–16 cm. longis, 5–6 cm. latis leviter serratis vel subintegris penninervatis nigrescentibus tenuiter reticulatis glabris supra sublucidis subtus nigro-punctatis obscure et crebre pellucido-punctatis basi acutis apice longe caudato-acuminatis saepe falcatis, petiolo exalato subtereti puberulo supra canaliculato circa 8 mm. longo; panícula ampla pyramidata polycephala sordido-tomentella oppositiramea, ramis patentibus; capitulis circa 7-floris perparvis numerosis in glomerulis subglobosis plus minusve aggregatis, involucri squamis circa 9 valde inaequalibus imbricatis exterioribus perbreuibis ovatis acutiusculis puberulis interioribus late oblongis subacutis subglabris 1.8 mm. longis; corollis glabris 2 mm. longis, faucibus ampliatis quam tubus proprius perbrevis ter longioribus; achaeniis fuscis deorsum attenuatis 1.3 mm. longis puberulis.—Costa Rica: a small tree in woods at Las Vueltas, Tucurrique, alt. 650 to 700 m., December, 1898, *Ad. Tonduz*, no. 12,882 (type in hb. Gr.).

This species is clearly related to *E. Pittieri*, Klatt, which is also a Costa Rican plant of tree-like growth. In *E. hylonomum*, however, the leaves are longer, thinner, and much less sharply serrate-dentate; the inflorescence is quite different in appearance, the heads being arranged in subglobose clusters. The heads as well as the individual flowers are also much smaller, scarcely more than half as large as in *E. Pittieri*.

E. hypodictyon, spec. nov. Lignosum, ramis teretibus griseo-purpureis glabris, lenticellis parvis oblongis sparsis; foliis oppositis petiolatis firmis late ovatis acuminatis 5–9 cm. longis, 4–6 cm. latis leviter crenato-dentatis supra viridibus leviter reticulato-venosis obscure granulato-puberulis subtus vix pallidioribus valde reticulato-venosis in nerviis fulvo-tomentosis pinnatinervatis, petiolis 1–2 cm. longis pubescentibus, pedicellis 5–12 mm. longis rigidiusculis tomentellis; inflorescentia cymoso-corymbosa sordide pubescenti 1.6 dm. lata convexa, bracteis foliaceis gradatim reductis ovatis petiolatis; capitulis numerosis 1 cm. altis, involucri ovoidei squamulis 3–4-seriatim arcte imbricatis pubescentibus sordide fusco-viridibus obtusis,

floribus circa 25 involucro multo superantibus; corollis (verisimiliter albidis) 5 mm. longis anguste tubulosis sine faucibus ampliatis, limbo dentibus 5 brevibus patentibus consistente; achaeniis nigris glabris 3 mm. longis basi plus minusve attenuatis, pappi setis circa 15 flavescens.—Guatemala: near Nenton, alt. 900 to 1200 m., *E. W. Nelson*, 17 December, 1895, no. 3517 (type in hb. Gr.).

Of the affinity of *E. collinum*, DC., and *E. Neaeorum*, DC., but readily distinguished from them by the pinnately nerved and strongly reticulate-veiny leaves of rounder contour. The type was distributed as *E. plectranthifolium*.

E. MYGINDAEFOLIUM, Gray, Proc. Am. acad., xvi, 101 (1881). Add synonym *Bigelovia oppositifolia*, Gray, Proc. Am. acad., xv, 32 (1880). The identity of these species seems to be perfect.

E. laurifolium, spec. nov. Lignosum vel lignescens alte scandens, ramis gracilibus striatis obscure angulatis glabrescentibus viridibus lenticellis parvis sparsis scabridis; foliis oppositis ovalibus obscure undulato-dentatis vel integris utrinque glabris minute reticulato-rugulosis et obscure pellucido-punctatis circa 12 cm. longis, 5 cm. latis apice caulato-acuminatis basi acutis, nerviis 5, duabus nerviis exterioribus prope basi orientibus mediam partem folii non attingentibus duabus nerviis lateralibus interioribus supra basim orientibus validioribus fere ad apicem percurrentibus, petiolis gracilibus supra canaliculatis 1.5 cm. longis; capitulis in panicula pedunculata oppositiramea sordide pubescenti bracteata dispositis, involucri squamulis rigidiusculis circa 4-seriatim imbricatis ovali-oblongis valde striatis concavis praeter marginem ciliatum glabris; corollis 5 mm. longis anguste tubulosis sine faucibus conspicuis, limbi dentibus 5 angustis lanceolatis acutiusculis; achaeniis immaturis 2 mm. longis pubescentibus, pappi setis circa 35 sordide flavescens simplicibus laevibus 5–6 mm. longis.—Costa Rica: on hills near the Rio Chirripó, January, 1900, *H. Pittier*, no. 16,065 (type specimens in hb. Gr. and hb. Inst. fisico-geograf. San José, Costa Rica).

This species is obviously related to *E. populifolium*, but it is clearly distinct from that species, differing in both the form and nervation of the leaves as well as in minor particulars.

E. NEMOROSUM, Klatt, in Engl. Jahrb., viii, 35 (1887). To the description of this very distinct species of Klatt the following supplementary characters may be added:—Caule atropurpureo breviter glanduloso-pubescenti internodiis perlongis; foliis penninervatis cau-

dato-acuminatis pubescentibus subtus paulo pallidioribus; capitulis 1.5 cm. diametro numerosis in panicula composita nutantibus involucri squamulis viridibus laxè imbricatis, exterioribus herbaceis tomentosis valde brevioribus, interioribus pallidioribus subglabris 6 mm. longis; floribus pergracilibus; corolla glabra pallide viridi-flavescenti anguste tubulosa nec ampliata, limbi dentibus 3-4 brevissimis erectis; pappi setis circa 16 tenuissimis albis et lucidis corollae aequantibus; achaeniis glabris columnaribus nigrescentibus 1.4 mm. longis.

This species originally described from Colombian material has been rediscovered in marshy places of La Palma, Costa Rica, 24 August, 1898, by *Ad. Tonduz*, no. 12,490.

E. PLECTRANTHIFOLIUM, Benth., Vidensk. meddel., 1852, p. 76. This species has been so poorly understood that it seems worth while to give it here a new and somewhat more detailed description. The characterization below has been drawn from specimens collected by Prof. H. Pittier and carefully compared with a detailed drawing and fragments of the original plants of Oersted for which I am indebted to the kindness and generosity of Sir W. T. Thiselton-Dyer, the director of the Royal gardens at Kew. Concerning the exact identity of the plants of Oersted and Pittier there can be no doubt. Although the scales of the involucre are in several ranks this species certainly does not belong to the *Cylindrocephala* (*E. odoratum*, etc.) to which it was by Bentham unfortunately referred. — *Ramosum*, ramis teretibus striatis juventate tomentellis demum glabris; foliis oppositis ovatis cordatis vel subcordatis acute acuminatis crenato-serrulatis basi ad apicem tenuibus membranaceis inter venis translucentibus 7-nervatis, 8-11 cm. longis, 5-7 cm. latis, supra pubescentiae sparsis vestigiis tectis subtus in venis reticulatis tomentellis, petiolo tenui tomentoso flexuoso 3-7 cm. longo; capitulis parvis 4-5 mm. longis numerosis 30-40-floris brevipedicellatis paniculam oppositirameam densam folioso-bracteatum rotundato-corymbosam formantibus; involucri squamulis ovato-lanceolatis vel lanceolati-linearibus acutis vel breviter acuminatis valde inaequalibus pluriseriatim imbricatis, exterioribus brevibus tomentellis, interioribus longioribus 3-5-striatis apice tomentellis; corollis tenuibus 3 mm. longis glabris parte suprema tomentella excepta, in fauces parum ampliatis; achaeniis brevibus glabris. — *E. subcordatum*, Klatt, Bull. soc. bot. Belg., xxxi, pt. 1, 194 (1892) partly (as to no. 778), not

Benth. — Costa Rica: at the foot of Carrizal, "massif" of Barba, alt. 1600 m., January, 1889, *H. Pittier*, no. 778.

E. PRATENSE, Klatt, Bull. soc. bot. Belg., xxxi, pt. 1, 193 (1892), is scarcely to be distinguished from *E. pycnocephalum*, Less., an annual and very variable weed. *E. pratense* appears to represent merely a trifling variation with more copious pubescence and somewhat shorter petioles than usual in the species.

E. PRUNELLAEFOLIUM, HBK., Nov. gen. et spec., iv, 123 (1820). Some authentic fragments of this hitherto little understood Mexican species were kindly sent from the Royal botanical museum in Berlin for deposit in the Gray herbarium. These show the plant to be exactly what has later been redescribed as *E. Saltivarii*, Sch. Bip. (see Robinson & Seaton, Proc. Am. acad., xxviii, 108, 1893), and *E. abronium*, Klatt, Ann. k. k. naturh. Hofmus. Vienna, ix, 355 (1894). The species has somewhat peculiar corollas with very slender proper tube and suddenly expanded relatively broad cup-shaped throat, which especially near the limb is covered with loose pubescence. To this species I would refer Schaffner's no. 298, Bourgeau's no. 818, and Pringle's no. 4286, all from the state of Mexico; also Pringle's no. 5699 from the mountains of Oaxaca, and his no. 7609 from Hidalgo.

E. psoraleum, spec. nov. Lignosum, ramis teretibus glabris, ramulis leviter 6-angularibus striatis squamulis minutis transversis tectis; foliis oppositis late lanceolatis integerrimis pinnatim nervatis utrinque glabris utroque acuminatis 4–9 cm. longis, 1.4–3 cm. latis, petiolo glabro 0.7–1.5 cm. longo; capitulis 5-floris breviter pedicellatis paniculam patente ramosam formantibus, bracteis lanceolato-linearibus parvis, involucri squamulis scariosis stramineis vel saepe roseis margine ciliolatis praeterea glabris tenuiter striatis valde inaequalibus 3–4-seriatim imbricatis, exterioribus perbrevibus ovatis, interioribus ovato-oblongis obtusis apice paulo ampliatis; corollis glabris 4–5 mm. longis roseis, tubo gracili 2–3 mm. longo, faucibus valde sed gradatim ampliatis limbo 5-partito paulo longioribus; achaeniis olivaceis glabris basi tenuiter attenuatis 2 mm. longis pappo simplice sordido corollae superante coronatis.—Costa Rica: as a "false epiphyte" on a tree at La Palma, alt. 1459 m., September, 1898, *Ad. Tonduz*, no. 12,589 (type in hb. Inst. fisico-geograf. San José, Costa Rica, fragments and tracing in hb. Gr.).

This species considerably resembles *E. daleoides*, Hemsl., but differs in its scaly branchlets and in other ways.

E. QUINQUESETUM, Benth., Vidensk. meddel., 1852, 79, according to the original description would appear to be *Fleischmannia rhodostylis*, Sch. Bip.

E. silvicola, spec. nov. Fruticosum, ramulis sordido-tomentosis ad nodos compressis; foliis oppositis magnis ovatis serratis vel subintegris acuminatis basi obtusis tenuibus viridibus glabrisque sed in nerviis subpinnatis et venis principalibus sordido-tomentosis 1.2–1.7 dm. longis, 8–12 cm. latis venulis translucentibus, petiolo sordido-tomentoso 3–7 cm. longo; capitulis pedicellatis 7–10-floris 7 mm. longis in panicula composita oppositiramea folioso-bracteata dispositis, involucri squamulis circa 3-seriatim imbricatis valde inaequalibus, exterioribus brevibus ovatis acutiusculis viscidis tomentosis intermediis interioribusque lanceolato-linearibus acutis subsarciosis viridi-striatis glabris vel glabriusculis; corollis glabris gradatim a basi ad apicem ampliatis 5 mm. longis (immaturis), limbo 5-dentato erecto; stylis filiformi-clavellatis perlongis, achaeniis parce glandulosis.—Costa Rica: in the forest of Copey, alt. 1800 m., *Ad. Tonduz*, nos. 11,694, 11,848, and 12,203.

2. SYNOPSIS OF THE MIKANIAS OF COSTA RICA.

MIKANIA, Willd., Spec. pl., iii, 1742 (1804); DC., Prodr., v, 187, vii, 270; Benth. & Hook. f., Gen. pl., ii, 246; Hemsl., Biol. Cent.-Am., Bot., ii, 102; Hoffm. in Engl. & Prantl, Nat. Pflanzenf., iv, Ab. 5, 140; Robinson & Greenman, Proc. Am. acad., xxxii, 10. *Willughbaeya*, Neck., Elem., i, 82. *Corynanthelium*, Kunze, Linnaea, xx, 19.—Capitula homogama discoidea 4-flora; squamulae involucri 4 aequales. Styli rami elongati leviter clavellati. Antherae apice appendiculatae basi muticae.—Herbae vel frutices scandentes foliis oppositis dentatis vel integris saepius cordatis vel hastatis.

* Capitula evidenter racemosa vel spicata in paniculis ramosis disposita

+ Capitula sessilia.

1. **M. BOGOTENSIS**, Benth., Pl. Hartw., 201 (1845). Species forma corollae facile recognoscenda; foliis tenuibus subhastato-cordatis; corollis 3 mm. longis valde exsertis glabris tubo pergracile elongato per fauces subnullos in limbum latum profunditer

5-lobatum abrupte dilatatis.—Palmares del General, valley of the Diquis, alt. 600 m., 9 January, 1898, *H. Pittier*, no. 12,030.

The identification of this species has been obligingly verified by Dr. Otto Stapf at the Royal gardens of Kew.

2. **M. riparia**, Greenman, spec. nov. "Scandens, caule tereti striato glabro rubro-brunneo internodiis etiam ad 24 cm. longis; foliis oppositis petiolatis caudato-attenuatis apice acutis ultra mediam integerrimis basi saepe grosse dentibus paucis undulato-dentatis hastatis et sinu lato cordatis utrinque glabris; capitulis circa 7 mm. altis basi 1-2-bracteolatis spicato-racemosis in paniculis pyramidatis dispositis, involucri squamulis anguste oblongis aliquid oblanceolatis acutiusculis vel obtusiusculis saepe plus minusve erosis glabris vel prope apicem inconspicue puberulis; pappi setis pallide rufo-brunneis, achaeniis glabris.—Thickets on the banks of the Rio Las Vueltas, Tucurrique, alt. 635 m., January, 1899, *Ad. Tonduz*, no. 13,163 (type in hb. Gr.).

This species is most nearly related to *M. hastata*, Willd., and *M. bogotensis*, Benth. From the former it differs in having larger leaves, denser panicles, and longer heads; from the latter in the more decidedly hastate leaves, longer and more oblong involucreal scales, flowers fully a third longer, and finally in the brownish, less red pappus."

3. **M. LEIOSTACHYA**, Benth., Pl. Hartw., 201 (1845); Hemsl., *l. c.*, 103; Robinson & Greenman, *l. c.*, 12; J. D. Smith, Enum. pl. Guat., v, 41.—Species foliis subcoriaceis reticulatis ovatis integerrimis.—Suerre, Llanuras de Santa Clara, alt. 300 m., *J. D. Smith*, no. 6616.

+ + Capitula pedicellata.

4. **M. HOUSTONIS**, Willd., Spec. pl., iii, 1742 (1804); DC., Prodr., v, 190.—In woods, Shirores (Talamanca), alt. 100 m., *Ad. Tonduz*, no. 9316.

* * Capitula in panicula thyrsoidea densa vel e glomerulis numerosis plus minusve globosis composita sessilia.

+ Achaenium corolla longius.

5. **M. Pittieri**, spec. nov. Paniculis exceptis glaberrima, ramis teretibus curvatis; foliis ovatis integerrimis longe caudato-acuminatis basi rotundatis subcoriaceis 7 cm. longis, 3 cm. latis subtus

leviter reticulatis costis lateralibus 2-jugis jugo uno basi folii arcte approximato altero plus minusve remoto; capitulis numerosis sessilibus in ramulis puberulis paniculae densae thyrsoidae brevibus, involucri squamulis anguste oblongis apice tenuibus et leviter dilatatis obtusiusculis subglabris 5-6 mm. longis; tubo corollae faucibus late campanulatis parum aequante, limbo breviter 5-dentato suberecto; achaeniis prismaticis glabris 4 mm. longis corollae longitudine superantibus.—Cuesta de los Borucas, January, 1897, *H. Pittier*, no. 10,540.

+ + Achaenium corolla multo brevius.

6. **M. Tonduzii**, spec. nov. Subglabrata, ramis teretibus fistulosis, internodiis longis; foliis ovatis integris cordatis acuminatis crassiusculis 14 cm. longis, 9 cm. latis supra glabris lucidis in specimine siccato ruguloso-reticulatis subtus pallidioribus tenuiter pubescentibus conspicue reticulatis a basi 7-costatis, petiolis flexuosis verisimiliter prehensilibus; paniculis ovoideis vel subcylindricis densis thyrsoidaeis 8-12 cm. longis 7 cm. diametro pedunculo crasso subaequilongis, capitulis in apicibus ramulorum pubescentium sessilibus et glomerulas subcongestas formantibus, involucri squamulis oblongis extus griseo-tomentosis apice obtusissimis rotundatis 3 mm. longis; corolla glabra tubulosa 5 mm. longa sensim leviterque ampliata sine faucibus evidentibus, limbo breviter dentato erecto; achaenio glabro olivaceo columnari 2 mm. longo, pappi setis fuscescentibus corollae fere aequantibus.—In woods, Tucurrique, February, 1899, alt. 635 m., *Ad. Tonduz*, no. 13,274.

M. GLOBOSA, Coult., *Bot. gaz.*, xx, 46 (1895) (*Willughbaeya globosa*, Coult., *l. c.*), is a species habitually similar found in Guatemala. It differs in the structure of the involucre and in having the leaves rounded, not cordate at the base. It may well occur also in Costa Rica.

7. **M. PUNCTATA**, Klatt, *Bull. soc. bot. Belg.*, xxxi, pt. 1, 195 (1892); Robinson & Greenman, *l. c.*, 13. Corolla in fauces ampliata et tubum gracile proprius evidenter differentiata; foliis late ovatis cordatis cum lobis vel angulis salientibus duabus lateralibus acuminatis. — Clearings of General, alt. 600 m., *H. Pittier*, no. 3434; on the banks of a small stream, Buenos Aires (Costa Rica), *H. Pittier*, no. 4934; woods, Shirores (Talamanca), alt. about 100 m., *Ad. Tonduz*, no. 9312; Boca de Zhorquin, *Ad. Tonduz*, no. 8524; also near Chicharras, alt. 2700 m., *E. W. Nelson*, no. 3805.

* * * Capitula plus minusve pedicellata in panicula cymosa vel corymbosa vel
(in *M. hirsutissima*) obscure racemosa disposita.

+ Caulis fulvo hirsutissimus; capitula in apicibus paniculae ramorum
subracemosa.

8. *M. HIRSUTISSIMA*, DC., Prodr., v, 200 (1836).— On mountains,
Velirla of Copey, alt. 1800–1900 m., April, 1898, *Ad. Tonduz*, no.
12,208. A South American species.

+ + Caulis plus minusve pubescens, vel tomentosus, vel subglaber; capitula
cymosa vel corymbosa.

+ + Capitula 8–10 mm. longa.

= Folia basi acuta vel acuminata.

9. *M. OLIVACEA*, Klatt, *l. c.*, xxxi, pt. 1, 195 (1892). Foliis
integerrimis. — In woods, Buenos Aires (Costa Rica), January, 1892,
alt. 200–300 m., *H. Pittier*, no. 4933. This species is scarcely dis-
tinct from *M. Guaco*, HBK.

= = Folia basi cordata.

10. *M. CORDIFOLIA*, Willd., Spec. pl., iii, 1746 (1804). Agua
Caliente, *H. Pittier*, no. 137; in underbrush, Surubres near San
Mateo, *P. Biolley*, no. 7025; Ujarras, Buenos Aires (Costa Rica),
H. Pittier, no. 10,626; and at Navarro, Prov. Cartago, *J. D. Smith*,
no. 4855. Widely distributed in the tropics of the New World.

+ + + Capitula minora, 5–6 mm. longa.

11. *M. SCANDENS*, Willd., *l. c.*, 1743 (1804). Foliis variabilibus
sed semper tenuibus saepissime hastato-cordatis. — Costa Rica: *H.*
Pittier, no. 3231; *Ad. Tonduz*, nos. 7067, 7264, 8589; *P. Biolley*,
no. 7425. The commonest and most widely distributed species of
the genus. ■

3. NOTES ON THE GENUS *MIMOSA* IN MEXICO AND CENTRAL AMERICA.

Mimosa argillotropha, spec. nov. Frutex, ramis gracilibus
obscure puberulis striatis atropurpureis aculeatissimis, aculeis parvis
seriatim orientibus valde recurvatis peracutis 2 mm. longis; petiolis

propriis circa 1.4 cm. longis et rhachidibus foliorum 4–5 cm. longis aculeis minoribus recurvatis armatis; pinnis 5-jugis 3–4 cm. longis in rhachillis aculeis minimis armatis; foliolis 9–11-jugis oblongis vel obovato-oblongis obtusis acute mucronulatis utrinque obscure adpresse puberulis uninervatis integerrimis circa 7 mm. longis, stipulis subulato-filiformibus integris; capitulis numerosis globosis in panicula pyramidata racemosa dispositis circa 6 mm. diametro (staminibus patentibus exclusis), ramulis pedicellisque inflorescentiae adpresse puberulis; floribus albis glabris, calyce 0.7 mm. longo leviter denticulato, corolla 3 mm. longa ad mediam 5-dentata, dentibus ovatis subacuminatis; staminibus 7–8; ovario subsessile margine hispido-piloso, fructu ignoto.—*M. sepiaria*, Micheli, Leguminosae Langlasseanae, 279, not Benth. — Mexico: in clayey soil at La Correa, Guerrero, alt. 50 m., 4 October, 1898, *E. Langlassé*, no. 415 (type in hb. Gr.).

M. sepiaria, Benth., a Brazilian species, is widely different. It has few scattered strong spines and very numerous linear leaflets (20 to 40 pairs on each pinna).

M. colimensis, spec. nov. Verisimiliter suffrutescens, caule obtuse angulato glabro armato, aculeis brevibus crassiusculis peracutis valde compressis; foliis 2 dm. longis (petiolo incluso), pinnis 15–18-jugis 4–5 cm. longis foliolis 27–32-jugis lineari-oblongis acutis 4 mm. longis 1 mm. latis basi valde obliquis subtus sparse puberulis nervo medio eccentrico, stipulis subulato-filiformibus 1–1.5 mm. longis erectis vix induratis, stipellis subulatis 1–1.5 mm. longis, rhachide principali 1.5 dm. longo supra puberulo subtus aculeis parvis recurvatis munito, rhachidibus secundariis inarmatis; inflorescentia magna pyramidalis racemoso-paniculata infra folioso-bracteata, pedicellis fasciculatis filiformibus 1–1.8 cm. longis puberulis; floribus capitatis glabris, capitulis primum ovalibus deinde subglobosis, calyce perbrevis subtruncato cuspidato-denticulato; corolla 2 mm. longa glabra tenui dentibus acutiusculis; fructu ignoto.— Mexico: Colima, *Dr. Edward Palmer*, 1897, no. 128 (type specimens in hb. Gr. and hb. U. S. nat. mus.).

This species differs from *M. eurycarpa* and *M. eurycarpoides*, Robinson, in its more numerous pinnae, armed rhachises, and to some extent in the oval form of the young heads, which in the species just mentioned are essentially spherical.

M. EURYCARPOIDES, Robinson, Proc. Am. acad., xxxvi, 472

(1901). Dr. J. N. Rose has called my attention to the fact that the detached pod mentioned in the description of this species was erroneously associated with the rest of the material presumably during the mounting. It is probably the fruit of *Acacia farnesiana*.

M. INVISA, Martius, Flora, xx, Bd. 2, Beibl., 121 (1837). Add synonym *M. sepiaria*, Micheli, Leguminosae Langlasseanae, 279, as to no. 423, not Benth.

M. LANGLASSEI, Micheli, *l. c.*, 277, t. 22 (1903). From the description and figure it is quite impossible to find a single difference between this species and *M. Xanti*, Gray, Proc. Am. acad., v, 157 (1861). If, however, the two prove identical the distribution of the species (Cape St. Lucas, Lower California, and Mt. Jorullo, Mexico) is unusual and interesting.

M. Micheliana, spec. nov. Frutex armata, ramis gracillimis elongatis teretibus purpurascens glaberrimis, aculeis sparsis flavo-brunneis gracilibus subrectis paulo recurvatis 3 mm. longis; petiolis filiformibus 1.5–3 cm. longis glabris obscure sparsissimeque armatis, stipulis filiformibus vel anguste subulatis erectis patente ciliatis, pinnis foliorum unijugis 3–5 cm. longis, foliolis circa 8-jugis oblongis 9–12 mm. longis 3.5–4 mm. latis acutis undique glabris margine adpresse ciliato-serrulato; capitulis laxe racemosis globosis circa 7 mm. diametro (staminibus patentibus exclusis), pedunculis ex axillo geminis orientibus filiformibus 2 cm. longis, floribus glaberrimis, calyce campanulato 1 mm. longo leviter 4-dentato; corolla erubescens 3 mm. longa, dentibus 4 angusti-deltaeideis subacutis 1 mm. longis, staminibus 4, ovario sessili glabro; fructu ignoto. — *M. schrankioides*, Micheli, *l. c.*, 279, not Benth. — Mexico: La Correa, Guerrero, alt. 250 m., September, 1898, *E. Langlassé*, no. 386 (type in hb. Gr.).

M. schrankioides, Benth., a species of British Guiana, to which this plant has been referred, is exceedingly different, having much larger and more numerous appressed-villous leaflets, hairy ovaries, longer petioles, etc.

M. NELSONII, Robinson, Proc. Am. acad., xxxiii, 314 (1898). Add synonym *M. lignosa*, Micheli, Leguminosae Langlasseanae, 278, t. 23 (1903).

M. PAUCIFOLIOLATA, Micheli, *l. c.*, 278 (1903). This is just the plant which was described in the Proc. Am. acad., xxxiii, 317 (1898), as *M. laxiflora*, var. *zygophylloides*, Robinson. The reduction of

the leaflets to a single slightly enlarged pair gives a rather distinct habit, but the examination of a series of specimens of the rather variable *M. laxiflora*, Benth., leads to the conclusion that this plant is only an extreme variation of that species.

✓ ***M. polyanthoides***, spec. nov. Fruticosa 3–5 m. alta, ramis striatis griseo-brunneis aculeis magnis compressis recurvatis atrorubentibus subaxillaribus munitis; foliis 1.5 dm. longis, pinnis 4–7-jugis 3–4 cm. longis basi geniculatis stipellatis, rhachide rhachillisque angulatis sparsissime pubescentibus, foliolis 13–17-jugis oblongis glabris 8 mm. longis 3–4 mm. latis apice rotundatis mucronatis basi obliquis supra viridibus subtus vix pallidioribus; floribus spicatis ignotis, spicis 2–3 cm. longis breviter pedunculatis, pedunculo puberulo rhachide florifero glabrato; legumine compressissimo 5–6 cm. longo 10–13 mm. lato irregulariter crenato apice abrupte acuminato stylo tenui saepe falcato breviter rostrato basi longe cuneato-attenuato, stipiti circa 1 cm. longa, reple valvisque setoso-hispidis, seminibus 8.—Mexico: on mountains above Iguala, Guerrero, alt. 1230 m., 5 October, 1900, *C. G. Pringle*, no. 8408 (type in hb. Gr.).

Distributed as *M. polyantha*, Benth., but readily distinguished from that species by its more numerous pinnae and leaflets and especially by its long-stiped and somewhat larger fruit. From *M. stipitata* it differs in the larger leaflets and broader hispid not glabrous pods.

M. rhododactyla, spec. nov. Frutex ramoso 3 m. alto, ramis griseis flexuosis in specimine viso inarmatis, ramulis flavescenti-tomentellis; stipulis parvis subulatis, petiolis propriis 12–16 mm. longis et rhachidibus foliorum circa 4 cm. longis inarmatis tomentellis, foliis bipinnatis, pinnis circa 9-jugis 2 cm. longis, foliolis 9–14-jugis anguste oblongis haud imbricatis apice rotundatis basi obliquis supra glaberrimis subtus adpresse pubescentibus arcte sessilibus 3 mm. longis, floribus pallide roseis dense spicatis, spicis cylindricis 4 cm. longis longe pedicellatis binis vel trinis orientibus in racemis longis terminalibus dispositis; calyce brevi extus sericeo-pubescenti, corolla 1.6 mm. longa extus sericeo-pubescenti ad mediam in dentes 5 ovato-deltaideos acutiusculos secta; staminibus 10; fructu ignoto.—*M. puberula*, Micheli, *l. c.*, 279, not Benth.—Mexico: in tropical region at Las Higueritas near the boundary between Michoacan and Guerrero, on granitic soil, alt. 500 m., 11 July, 1898, *E. Langlassé*.

Although I have never seen authentic material of *M. puberula*,

Benth., I cannot believe that this plant of Langlassé with its small leaflets glabrous above, its peduncles 1.2 cm. long, and silky-villous flowers, is the species which Bentham (in Hook. Lond. journ. bot., v, 88, & Trans. Linn. soc., xxx, 413) described as having leaflets in 15-40 pairs, 2-2½ lines long, puberulent on both surfaces, spikes very shortly pedicelled, and flowers nearly glabrous.

✓ ***M. stipitata***, spec. nov. Fruticosa 3-5 m. alta, ramis flexuosis brunneo-griseis inarmatis vel aculeis gracilibus recurvatis subaxillaribus munitis; foliis 1 dm. longis rhachide pubescenti, pinnis circa 5-jugis subremotis, rhachillis pubescentibus prope basim geniculatis stipellatis 2 cm. longis, foliolis circa 10-jugis anguste oblongis subacutis 5 mm. longis 1.7 mm. latis margine parce ciliata excepto subglabris supra viridibus subtus vix pallidioribus; floribus spicatis ignotis; spicis breviter pedunculatis 2-3 cm. longis; legumine oblongo tenui compressissimo lateraliter crenato 4-5 cm. longo 1 cm. lato abrupte acuminato stylo persistente graciliter rostrato basi cuneato longe graciliterque stipitato valvis minutissime granulatis inarmatis fuscescentibus plus minusve lucidis, stipite 5-10 mm. longo, seminibus 8.—Mexico: on mountains above Iguala, Guerrero, alt. 1230 m., 5 October, 1900, *C. G. Pringle*, no. 8406 (type in hb. Gr.).

This number was distributed as *M. polyantha*, var. *levior*, but on re-examination it is found to differ from that plant in the long-stiped pods and more numerous pinnae and leaflets. To *M. stipitata* may be referred Rose & Hay's no. 5331 (hb. U. S. nat. mus.), collected near Puente de Ixtla, Morelos, 4 July, 1901, the only difference being the somewhat broader spines on the older branches. The flowers present in this specimen are white with shortly 4-dentate calyx, turbinate 4-lobed corolla, the lobes being broadly lanceolate and glabrous, and the stamens 8 in number. The affinity of *M. stipitata* is evidently with *M. polyantha*, Benth.

4. NOTES ON SOME POLYGONUMS OF WESTERN NORTH AMERICA.

While revising the New England Polygonums of the section *Avicularia* some months ago,¹ I found occasion to examine several

¹ See *Rhodora*, iv, 65-73 (1902).

of the more western species of the same genus, and the notes prepared on these may be presented as follows:—

POLYGONUM CAMPORUM, Meisner. This species, published in Martius's *Flora Brasiliensis*, v, pt. 1, 21 (1855), was characterized thus: "caulibus elongatis ramisque filiformibus subsimplicibus, acute sulcatis, ad apicem usque foliosis; ochreis internodio multo brevioribus, hyalinis, basi fuscis, circa 6-nervis, demum laceris deciduis; foliis sessilibus, anguste lanceolatis linearibusve; floribus axillaribus subsolitariis; spicam longam interruptam foliosam formantibus; pedicellis demum ochream calicemque aequantibus; nucula inclusa, nitida, faciebus late ovatis minutissime punctatis (haud striatis)."

" α BOREALE nob. foliis omnibus planis, margine leviter recurvo, inferioribus venosis."

"*Habitat in Texas: Drummond Coll. I, n. 274., II. n. 254; circa Bejar, Berlandier n. 1770.*"

" β AUSTRALE nob. foliis inferioribus, superioribus subulato-linearibus, margine revolutis, supra sulcato-lineatis, subtus 1-nerviis."

"*Habitat circa Buenos Ayres: Tweedie; verisimiliter etiam in Brasilia australi.*"

On examining in the Gray herbarium Drummond's no. 254 of his second Texan collection and Berlandier's no. 1770 from Bejar, I find that they represent two quite different and as I believe distinct plants. In Berlandier's specimen the spikes are bracteate throughout their length, the bracts being from 2 to 9 mm. in length and considerably longer than the subtended flowers. The leaves and bracts in a dried state are smoothish or only obscurely rugulose on the upper surface. In Drummond's plant no. 254, however, the inflorescence consists of about 6 essentially naked spikes racemosely or subumbellately clustered at the end of the stem or branch. The bracts are very inconspicuous and are much exceeded by the flowers. The leaves and bracts, moreover, are very definitely striate-nervate on the upper surface. On reading Meisner's description with these points in mind, I think there can be no doubt that the expression "floribus sessilibus subsolitariis spicam longam interruptam formantibus" applies to the plant of Berlandier and not to Drummond's no. 254. Unfortunately Drummond's no. 274 is not at hand and it is impossible to say to which form it belongs. However, it is clear that the species as cited by the original author includes two quite different plants, and it is certainly best to take as typical the one to

which the description clearly applies. The other plant I would separate as follows:—

P. (§ **Avicularia**) **striatulum**, spec. nov. Perenne gracile 3–7 dm. altum glaberrimum, caule tereti glaucescenti striato plus minusve flexuoso nodoso infra delapsu foliorum nudo, ocreis striatis 5–7 mm. longis, limbo profunde in fibras lacerato; foliis lineari-lanceolatis 2.5–3.5 cm. longis 2–3 mm. latis integerrimis undique bene striatulo-venosis subnigrescentibus apice basique peracutis; spicis 2–9 cm. longis, internodiis rhachidum 3–10 mm. longis, ocreis 2–3-floris; laminis bractearum parvis lanceolatis 2–3 mm. longis a floribus superatis; pedicellis nutantibus filiformibus apice articulatis; floribus turbinato-campanulatis; calycis segmentis 5 elliptico-oblongis glabris 2 mm. longis pallidis epunctatis; staminibus 6; filamentis glabris; styli ramis 3; ovario triquetro; fructu ignoto. — Texas: *Drummond*, no. 254 of his second expedition (type in hb. Gr.); also *Drummond*, no. 266 of his first Texan expedition (hb. Gr.); and on sterile prairies, granitic soil, near Llano, October, 1847, *Lindheimer*, no. 57 (hb. Gr.).

Of *P. camporum* and *P. striatulum* I have seen no specimens from north of Texas. The numerous plants of Kansas, Missouri, Nebraska, and Dakota, which various authors have from time to time referred to *P. camporum*, have so far as I have been able to examine them proved to be *P. aviculare*, L., *P. ramosissimum*, Michx., or *P. prolificum*, Robinson. These species are not difficult to distinguish, although from habital similarity they have been much confused. In *P. camporum* the flowers are borne on much longer pedicels than in *P. aviculare* or its variety *littorale*; the flowers are much larger than in *P. prolificum*; and the segments of the calyx, which are 5 in number, are far more petaloid and less strongly keeled than the outer calyx-lobes of the habitually 6-cleft calyx in *P. ramosissimum*.

P. (§ **Avicularia**) **leptocarpum**, spec. nov. Glaberrimum 3 dm. altum profuse ramosum; radice lignescenti, caulibus numerosis teretibus delapsu foliorum nudis, ramulis 3–4-angulatis, ocreis 3 mm. longis basi ferrugineis, limbo profunde in fibras sordidas lacerato; foliis inferioribus ignotis, superioribus lanceolato-linearibus 7 mm. longis 1–1.5 mm. latis crassiusculis pallide viridibus vel etiam griseis apice basique acutis uninerviis; floribus axillaribus minimis inconspicuis sessilibus; calyce 2 mm. longis epunctato ad mediam vel

ultra in lobos 4–5 oblongos apice rotundatos partito, lobis in parte media viridibus sed margine albescentibus vel tardius erubescens; staminibus 4–5; antheris 0.5 mm. longis; ovario triquetro elongato; fructu 2.8 mm. longo lanceolato apice tenui falcato e calyce longe exserto.— Winfield, Kansas, *Paul J. White*, 10 October, 1898 (type in hb. U. S. nat. mus.; fragment in hb. Gr.). This species although as yet known from a single individual seems so well marked as to merit description. In habit and foliage it most nearly approaches *P. prolificum*, Robinson. The fruit, however, is very different in form and as in *P. exsertum*, Small, protrudes far out of the calyx. From the latter species, *P. leptocarpum* is readily distinguished by its much smaller flowers and fruit, which are scarcely half as large as in *P. exsertum*.

P. (§ *Avicularia*) caurianum, spec. nov. Annum gracillimum glaberrimum a basi ramosum et floriferum, caulibus subfiliformibus prostratis vel adscendentibus subsimplicibus vel plus minusve ramosis 12–25 cm. longis foliosis, ocreis brevibus scariosis ad insertionem folii ultra mediam partitis, lobis obtusis vel acutis saepe laceratis sed haud in fibras dissolutis; internodiis pergracilibus maturitate 1–3 cm. longis quam folii longioribus; foliis anguste ellipticis vel oblongis 1–1.6 cm. longis, 3–5 mm. latis integerrimis tenuibus penniveniis apice rotundatis basi in petiolam filiformem attenuatis; floribus axillaribus ternis vel quinis quam ei *Polygoni avicularis* minoribus graciliter pedicellatis basi turbinatis; calyce erubescens, lobis orbicularibus tenuibus margine petaloideis plus minusve patentibus ab achaenio nigro-brunneo triquetro minutissime punctato conspicue superatis; staminibus 5 inclusis.— Hushagak, British Columbia, 18 August, 1882, *McKay*, no. 49 (type in hb. Gr. and hb. U. S. nat. mus.); also on the middle and lower Kuskawin, Alaska, *F. C. Hinckley*, August, 1898 (hb. Gr.).

Although in technical characters this species is very near *P. aviculare*, L., it may be readily distinguished by its very slender almost filiform stems, slightly smaller flowers and achenes (2.6 mm. long), and by the form and venation of the leaves. These in *P. aviculare*, when observed in transmitted light, are seen to have firm straightish lateral veins departing from the mid-nerve at an angle of about 30°. In *P. caurianum* on the other hand the lateral veins are much finer and leave the mid-nerve nearly at right angles, curving forward and anastomosing freely before they reach the margin.

From *P. islandicum*, Meisner, to which *P. caurianum* shows also much affinity, it may be distinguished by its more slender stems, smaller flowers, and erubescens calyx with a more spreading limb. The achenes are also shorter.

DIMORPHISM IN POLYGONUM LONGISTYLUM. An examination of typical material of *P. longistylum*, Small, with its long-exserted style-branches and short included stamens immediately suggested that this was merely one form of a dimorphic species, and that the other form would be found to have a complementary flower with proportionately short style-branches and long stamens. Search in the related material in the Gray herbarium has shown this to be the case. The short-styled form is represented by specimens from Dunklin county, Missouri, *Bush*, no. 117A; western Kansas, *Meehan*; Kingfisher county, Oklahoma, *L. A. Blankinship*; Houston and Lynchburg, Texas, *Lindheimer*; and Southerland Springs, Texas, *Dr. Palmer*, no. 1188. These specimens have been variously distributed under the names of *P. pennsylvanicum* and *P. mexicanum*. During anthesis the length of the style from the summit of the ovary to the tip of the stigma is 1.2 mm., while the filaments are 3 mm. in length. In the long-styled form these lengths are just reversed. It may be noted that the stigmas are subglobose in the short-styled form, but clavate in the long-styled. In the light of the dimorphic character of the flowers the specific name seems unhappily chosen. In the habitually similar *P. pennsylvanicum*, L., anthers and stigmas attain at anthesis essentially the same height and no dimorphism can be detected.

5. NEW SPERMATOPHYTES OF MEXICO AND CENTRAL AMERICA.

Hechtia tehuacana, spec. nov. Robusta; foliis lineari-lanceolatis a basi ampliata ad apicem rigidum gradatim angustatis argenteis 4 dm. longis, margine aculeis atrobrunneis lucidis tenuibus rigidis falcato-curvatis 4-5 mm. longis armata; scapo robusto, ramulis inflorescentiae ♂ in axillis bractearum magnarum ovatarum acuminatarum glabrescentium ad 3-4 fasciculatim orientibus 4-8 cm. longis curvato-adscendentibus subdense floriferis; floribus viride lutescentibus subsessilibus 4-5 mm. longis; bracteolis late ovatis acutiusculis glabris 2-2.5 mm. longis; sepalis ovatis vel suborbicular-

ibus concavis obtusis glabris 3 mm. longis; petalis late ovatis apice rotundatis 5 mm. longis 4 mm. latis; filamentis glabris obcompressis 4 mm. longis; antheris circa 2 mm. longis; ovario abortivo minuto fere vel omnino glabro; ramulis inflorescentiae ♀ 3-8 cm. longis; floribus breviter pedicellatis; sepalis petalisque ovatis subacutis vel acutis; capsulis glabris argute triquetris pallide brunneis 8-10 mm. longis 4-5 mm. crassis; stigmatibus brevibus sessilibus.—Mexico: on calcareous hills near Tehuacan, alt. 1725 m., *C. G. Pringle*, no. 8578 (type in hb. Gr.).

A stout species to be readily recognized by its crowded greenish yellow subsessile staminate flowers with broad free petals rounded at the apex.

Cerastium Barberi, spec. nov. Laete viride perenne a basi ramosum 1.8-2.8 dm. altum, caulibus 1 vel pluribus erectis vel basi decumbentibus inferne foliosis superne subnudis praeter lineam angustam lateralem puberulam glaberrimis; foliis oblongo-lanceolatis acutiusculis crassiusculis sessilibus 1.2-2 cm. longis 5 mm. latis 1-nervatis utrinque laete viridibus margine prope basim retrorse ciliatis; pedicellis 1-2 cm. longis unilateraliter retrorse puberulis apice nutantibus; bracteis ovatis ciliatis aliter glabris; sepalis ovato-oblongis tenuibus 6-7 mm. longis laete viridibus ciliolatis obtusis margine plus minusve scariosis; petalis albis 6 mm. longis vix per quarternam partem longitudinis bipartitis, parte indivisa obovata 2-2.5 mm. lata; staminibus 10; filamentis basi ad apicem gradatim attenuatis; stylis 3 valde exsertis; capsula ovoideo-cylindrica 8-10 mm. longa exserta, seminibus circa 20.—Mexico: in the Sierra Madres near Colonia Garcia, Chihuahua, 27 June, 1899, *C. H. T. Townsend and C. M. Barber*, no. 453 (type in hb. Gr.).

Related to *C. nutans*, Raf., but readily distinguished by its very different pubescence.

Parnassia Townsendii, spec. nov. Glaberrima, radice fibroso, caule solitario 3.5 dm. alto angulato unifloro erecto paulo supra mediam unifoliato; foliis radicalibus circa 6 oblongo-oblanceolatis 5-7-nervatis erectis integerrimis lamina obtusa 4-6 cm. longa 14-16 mm. lata basi in petiolam latiusculam aequilongam gradatim attenuata subtus minutissime fulvo-punctatis, folio unico caulini ovato arcte sessili 1.5 cm. longo obtuso; floro erecto 3 cm. vel ultra lato; sepalis oblongis 5-nervatis 9 mm. longis 3.5 mm. latis pallide viridibus; petalis 1.5 cm. longis 8 mm. latis pallide luteis ovatis circa

7-nervatis margine in parte media conspicue fimbriato-ciliatis sed basi late cuneato unguiformi et apice obtuso integerrimis; staminodiis in partes circa 6 filiformes apice capitato-glandulosas profunditer divisis; filamentis glabris 7 mm. longis, antheris 3 mm. longis mucronatis; fructu ignoto.—Mexico: in the Sierra Madres near Chuichupa, alt. 2600 m., 16 September, 1899, *C. H. T. Townsend and C. M. Barber*, no. 431 (type in hb. Gr.).

This species is readily distinguished from any other by the oblong-ob lanceolate leaves which are cuneate at the base.

HYPTIS SEEMANNI, Gray, var. **stenophylla**, var. nov. Magis puberula quam molliter pubescens; foliis angustis 8–14 mm. latis basi cuneatis utrinque viridibus.—Mexico: at Badehuache, Sonora, 2 December, 1890, *F. G. Lloyd*, no. 450 (type in hb. Gr.); also not far from Seven Star mine, Rio de Aros in the Sierras of Chihuahua, 3 September, 1899, *C. H. T. Townsend and C. M. Barber*, no. 400.

In the typical form of this species the stem and branches of the inflorescence are covered with a soft spreading tomentum, the leaves (at the base of the inflorescence) are 2 cm. broad, obtuse at the base and canescent-tomentose beneath. No floral differences have been detected.

Pentstemon isophyllus, spec. nov. A basi subdecumbente erectus 7 dm. altus, caulibus simplicibus robustis teretibus purpureis pulverulentis foliosissimis; foliis lanceolatis crassiusculis integerrimis glabris sessilibus acutis saepissime conduplicatis, primariis circa 25-jugis subaequalibus (infimis brevioribus exceptis) 3–4 cm. longis 1 cm. latis, margine revolutis; panicula secunda 3 dm. longa, bracteis sessilibus ovatis acuminatis, cymis oppositis pedunculatis 3-floris, bracteolis ovatis acutis, pedicellis 1.4 cm. longis; floribus nutantibus; calyce fere ad basim in segmenta 5 late ovata erosa brevissime acuminata 8 mm. longa enervosa atropurpurea diviso; corolla coccinea 4 cm. longa in faucibus leviter ampliata plus minusve albo-puberula, limbo 5-lobato eroso crenulato; filamentis staminum duorum inferiorum filiformibus 1 cm. supra basim affixis, parte libera 2.8 cm. longa, filamentis staminum duorum superiorum basi valde incrassatis in fundo infimo corollae affixis, antherae loculis divergentibus plumbeis, rudimento 2.4 cm. longo filiforme glabro apice leviter incrassato.—Mexico: on hills above Chalchicomula, Puebla, alt. 2750 m., 13 August, 1901, *C. G. Pringle*, no. 8568 (type in hb. Gr.).

In habit this species differs rather conspicuously from its Mexican congeners in its very numerous subequal pairs of cauline leaves.

Piptothrix jaliscensis, spec. nov. Ramosa glaberrima glaucescens, caule tereti laevissimo atropurpureo; foliis oppositis subsessilibus crassiusculis patentibus vel etiam reflexis ovatis leviter serrulatis acutis basi rotundatis 3-nervatis subtus minute reticulatis, 3-4 cm. longis, 13-20 mm. latis; corymbis parvis terminalibus rotundatis, capitulis sessilibus 3-4-floris 8 mm. altis, involucrio cylindrico glaberrimo, squamis circa 7, interioribus subaequalibus lineari-oblongis acutiusculis 3.8 mm. longis, exterioribus multo brevioribus; corollis albis ex involucrio longe exsertis glabris, tubo proprio gracili faucibus breviter cylindricis subaequante; achaeniis nigris laevibus 1.2 mm. longis, pappi setis 10-12 inaequalibus niveis caducis.— Mexico: dry rocky mountains above Etzatlan, Jalisco, 1903, *C. G. Pringle*, no. 8764.

A plant with the habit of *P. pubens*, Gray, but readily distinguished from that species by its less pointed and entirely glabrous leaves, glaucescent surface, etc.

Brickellia monocephala, spec. nov. Erecta perennans, rhizomate crassiusculo horizontali noduloso, caule simplici tereti striato tenuiter pubescenti 8 dm. alto ad mediam folioso; foliis alternis ovatis graciliter petiolatis integris obtusis basi subcordatis vel subtruncatis ad insertionem petioli breviter acuminatis undique opace viridibus puberulis subtus glanduloso-vel resinoso-punctatis 3-5 cm. longis 2.5-3.4 cm. latis 3-nervatis; foliis superioribus angustioribus bractealibus in pedunculo solitario terminali remotis; capite pro genere permagno 3.8 cm. diametro nutante, involucri campanulati squamis oblongis acutis viridibus externe pubescentibus circa 3-seriatim imbricatis interioribus striato-nervatis; corollis viride albis tubo longo sine ullis faucibus distinctis, limbo perbrevis glabro; styli ramis valde clavatis atropurpureis; achaeniis fusco-atris glabris valde 10-costatis 6 mm. longis, pappi setis 20-25 laete albis subplumosis.— Mexico: on hills near El Salto, Hidalgo, 16 September, 1901, alt. 2150 m., *C. G. Pringle*, no. 8621 (type in hb. Gr.).

A species remarkable for its very large solitary heads, but otherwise possessing all the characteristic features of the genus.

Brickellia pulcherrima, spec. nov. Herbacea erecta, caule tereti striatulo purpureo crispe albo-puberulo; foliis anguste lanceolatis superne alternis conduplicatis patentibus vel reflexis integris

longe attenuatis acutis basi cuneatis utrinque viridibus tenuissime pubescentibus supra basim trinervatis 5-7 cm. longis 12 mm. latis subsessilibus; capitulis densissime corymbosis numerosis 1.5 cm. altis 9-floris, pedicellis gracilibus 3-8 mm. longis glanduloso-puberulis, involucri squamulis paucis linearibus acutis viridibus striatis laxè imbricatis exterioribus externe puberulis, interioribus longioribus minutissime ciliolatis 7 mm. longis; corollis anguste tubulosis 7 mm. longis limbo quinquifido laete roseis; achaeniis immaturis 5 mm. longis stramineis gracilibus in costis 10 prominulis puberulis, pappi setis corollae fere aequantibus purpurascensibus barbellatis circa 30. — Mexico: on limestone hills at Yautepec near Cuernavaca, alt. 1225 m., 8 November, 1902, *C. G. Pringle*, no. 11,336 (type in hb. Gr.); also no. 8753 collected at the same place in 1903.

Verbesina gracilipes, spec. nov. Fruticosa, ramis alternis striatis gracilibus teretibus exalatis a lenticellis sparsis scabridis, ramulis tomentellis alatis; foliis oblanceolatis vel obovatis integriusculis saepius obtusis vel apice rotundatis basi longe attenuato sessilibus modice tenuibus supra saturate viridibus scabridis subtus pallidis molliter griseo-pubescentibus 5-8 cm. longis 1.3-2.5 cm. latis pinnatim nervatis; pedunculis 2 vel pluribus subumbellato-corymbosis 4-7 cm. longis gracilibus teretibus tenuiter et patente pubescentibus, capitulis (radiis exclusis) subglobosis 1.5 cm. diametro, involucri squamulis pubescentibus valde inaequalibus exterioribus oblongis vel etiam aliquid obovatis obtusis vel obtusiusculis patentibus vel reflexis interioribus lanceolatis erectis adpressis; ♀ floribus circa 12 pistillatis sed sterilibus, ligulis laete flavis lineari-oblongis 3 mm. latis tubo brevi viridi pubescenti; disci floribus numerosis in receptaculo valde convexo; achaeniis 5 mm. longis obovoideis vel oblanceolatis tuberculoso-hispidulis, alis latis albidis, pappi aristis 2 inaequalibus quam alae paulo longioribus. — Mexico: on tufa bluffs near Tehuacan, Puebla, 1 August, 1901, alt. 1725 m., *C. G. Pringle*, no. 8582 (type in hb. Gr.); also in same locality *Rose and Hay*, no. 5829.

Near *V. Liebmannii*, Sch. Bip., which, however, has acute serrate petiolate leaves with different pubescence. *V. neriifolia*, Hemsl., is also a related species, but has narrower lanceolate acute much more finely pubescent leaves. *V. hypoglauca*, Sch. Bip., differs in the same regards and has opposite leaves.

Verbesina hypsela, spec. nov. Alta erecta verisimiliter herbacea, caulibus teretibus glabris purpurascensibus medullatis, inter-

nodiis a basibus cuneatis decurrentibus petiolorum alatorum alatis; foliis alternis profunde et regulariter pinnatifidis 1-3 dm. longis 7-18 cm. latis supra atroviridibus glabris laevissimis subtus tenuiter adpresso-pubescentibus, rhachidibus petiolisque cum alis integris munitis, nervo medio laeve subtus prominulo, lobis 13-15 lanceolatis acuminatis 3-9 cm. longis obscure cartilagineo-denticulatis in margine aliquid revolutis; panicula magna convexa multicapitata, ramulis alternis gracilibus tenuiter pubescentibus, bracteis lanceolatis-linearibus vel linearibus, capitulis parvis 6 mm. longis graciliter pedicellatis, involucri anguste campanulato; floribus disci circa 20, tubo corollae conspicue sub faucibus constricto pubescenti, achaeniis obovoideis basi attenuatis, pappi aristis duabus tubo corollae superantibus; floribus ♀ 3-4 pistillatis, ligulis albis 8 mm. longis basi tubulosa pubescenti, achaenio abortivo.— *V. pinnata*, Robinson & Greenman, Proc. Am. acad., xxxv, 562, not Clark.— Mexico: on plains of Chiapas, *Dr. Ghiesbreght*, no. 782; flowering in November and December.

Nearly related to *V. gigantea*, Jacq., but with internodes winged throughout, leaf-divisions more numerous, heads more slender-pedicelled, etc. An examination of the type material of *V. pinnata*, Clark, preserved in the De Candolle herbarium, at Geneva, shows it to be a plant quite distinct from this with leaves scabrous above and merely auriculate not decurrent at the base.

BIDENS TERETICAULIS, DC., var. **indivisa**, var. nov. Foliis indivisis oblongis serratis circa 8 cm. longis 4 cm. latis; aliter illis formae typicae simillima.— Nicaragua: Masaya, Department of Masaya, 27 January, 1903, *C. F. Baker*, no. 2214 (type in hb. Gr.).

Liabum Tonduzii, spec. nov. Robustum lignosum scandens, caule cortice griseo-fusco cum lenticellis prominulis sparsis scabro, ramulis pubescentia brevi fusca dense tectis; foliis rhomboideo-ovatis acuminatis basi acutiusculis integerrimis vel mucronulato-serrulatis 1-1.5 dm. longis, 5-10 cm. latis supra viridibus et pubescentia brevi scabriusculis tectis subtus albis tenuiterque pubescentibus, petiolo (1.5-4 cm. longo) et nerviis (subpinnatis) fusco-tomentosis; capitulis numerosis 1.2 cm. crassis in panicula oppositifera fusco-tomentosa valde convexa gestis, involucri squamulis oblongis obtusis sparse pubescentibus tenuiter marginatis, exterioribus multo brevioribus; corollis glabris flavis, tubo longo gracili, faucibus brevioribus; achaeniis sericeis pappo copioso fulvo coronatis.— *L. asclepiadeum*,

J. D. Smith, Enum. pl. Guat., v, 45, as to no. 7064, not Sch. Bip.—Costa Rica: in thickets on the banks of the Rio Virilla, San José, *Ad. Tonduz*, January, 1896, no. 9859 (also no. 7064 of the exsiccatae, of Mr. J. D. Smith).

This species differs from *L. asclepiadeum*, Sch. Bip., in its more ample inflorescence, larger and more obtuse involucral scales, as well as in the nature of the pubescence. It differs from *L. polyanthum*, Klatt, still more conspicuously in its short pubescence of a stiffish character, which remains even to maturity upon the upper surface of the leaves. In *L. polyanthum* the leaves are covered above by a delicate arachnoid fugacious pubescence.

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2. ALLEN, G. M. — The Heredity of Coat Color in Mice. pp. 59-163. July, 1904. \$1.25.

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Presented by B. L. Robinson, February 10, 1904. Received February 27, 1904.

I. — REVISION OF THE GENUS SABAZIA.

B. L. ROBINSON AND J. M. GREENMAN.

Sabazia is a small and exclusively American genus of the *Helianthoideae*. It is chiefly Mexican in its distribution, although one of its species ranges as far south as Ecuador. It is circumscribed here as by Bentham and Hooker, f., Gen. Pl. ii. 194, and by Hoffmann in Engl. & Prantl, Nat. Pflanzenf. iv. Ab. 5, 228, 233, the leading characteristics and literature of the genus being as follows: —

SABAZIA, Cass. (Name of obscure origin.) — Heads 1 to many, 6 mm. to 4 cm. in diameter (including the rays); involucral scales ovate, mostly obtuse, subequal, 2-3-seriate; disk convex or conical, chaff-bearing. Flowers all fertile. Corollas of the disk-flowers cream-colored to light yellow, shortly 5-toothed; ligules of the ray-flowers 2 to 20 mm. long, white to (externally) deep purple, 3-toothed. Achenes narrowly obovate, 4-5-angled, rounded at the summit; pappus none or of a few minute caducous awns. — Branching annual or perennial herbs, leafy-stemmed and often decumbent. Leaves opposite, ovate, entire or serrate. — Dict. Sci. Nat. xlvi. 480 (1827); DC. Prodr. v. 496; Hemsl. Biol. Cent.-Am. Bot. ii. 160. *Baziassa*, Steud. Nom. ed. 2, i. 192 (1840). *Sabbazia*, Steud. l. c. ii. 489 (1841). — A genus of plants which are without doubt rather nearly related, but which still may not have had a very recent common origin. In habit the species approach on the one hand *Jaegeria* and on the other *Tridax* and *Galinsoga*.

* Annuals.

+ Achenes hispidulous.

1. *S. urticaefolia*, DC. Hispid-pubescent throughout, glandular about the inflorescence: heads several to many, small, (including the 5 short roseate rays) only 6 mm. in diameter. — Prodr. v. 497 (1836); Hemsl. Biol. Cent.-Am. Bot. ii. 161. *Galinsoga urticaefolia*, Benth. in

Oerst. Vidensk. Meddel. 1852, 102. *Wiborgia urticaefolia*, HBK. Nov. Gen. et Spec. iv. 257, t. 389 (1820). — SOUTH MEXICO: plains of Quilo, *Jurgensen*, no. 260, acc. to Hemsl. l. c. NICARAGUA: Grenada, *Oersted*. COSTA RICA: San José, *Oersted*, *Tonduz*, no. 10,143 (hb. Gr.); pastures at Copey, *Tonduz*, no. 11,757 (hb. Gr.). ECUADOR: *Humboldt & Bonpland*, *Couthouy* (hb. Gr.).

+ + Achenes glabrous throughout.

2. *S. microglossa*, DC. Leafy-stemmed, hirsute-pubescent, branching: peduncles glabrous; heads numerous, small, 6 mm. in diameter: rays 5, white or roseate, scarcely exceeding the involucre. — Prodr. v. 497 (1836), including the var. PUBERULA, with pubescent peduncles (the prevailing form); Hemsl. l. c. 160. *Baziassa microglossa*, Steud. Nom. ed. 2, i. 192 (1840). — CHIHUAHUA: humid places, *Pilares*, *Hartman*, no. 747 (hb. Gr.); near St. Julian, alt. 2150 to 2460 m., *Nelson*, no. 4922 (hb. Gr.). COAHUILA: near Saltillo, *Palmer*, no. 790, in part (coll. of 1898). SAN LUIS POTOSI: 22° N. Lat., alt. 1850 to 2469 m., *Parry & Palmer*, with no. 492 (hb. Gr.). STATE OF MEXICO: mountains, St. Augustin, *Berlandier* (hb. Gr.); Pedrigal, *Pringle*, no. 7345 (hb. Gr.); on walls, *Pringle*, nos. 7903, 8231 (both in hb. Gr.).

3. *S. humilis*, CASS. Suberect, 3 dm. high or more often branching from the base and widely spreading, pubescent: heads few to many, 1.4 cm. broad including the conspicuous well exerted externally roseate-purple rays: disk-flowers numerous, pale yellow. — Dict. Sci. Nat. xlv. 481 (1827); DC. Prodr. v. 496; Hemsl. l. c. ii. 160. *Eclipta humilis*, HBK. Nov. Gen. et Spec. iv. 264, t. 394 (1820). *Baziassa humilis*, Steud. Nom. ed. 2, i. 192 (1840). — MICHOACAN: near Ario and Patzenaro, alt. 1850 m., *Humboldt & Bonpland*. STATE OF MEXICO: fields near San Nicolas, *Bourgeau*, no. 958 (hb. Gr.); valley of Toluca, *Berlandier*, no. 1215 (hb. Gr.); moist meadows, Nevado de Toluca, alt. 3080 m., *Pringle*, no. 4245 (hb. Gr.); in mountains, *Schaffner*, no. 296 (hb. Gr.).

* * Perennials.

+ Stem prostrate, strongly repent.

4. *S. sarmentosa*, LESS. Stem elongated, 6 dm. or more in length, rooting at the lower nodes, the internodes 2 to 8 cm. long: leaves ovate, acute, 3 to 4 cm. long, half as broad, hirsute on both sides, narrowed to slender petioles: heads solitary, terminal, long-peduncled, 2.2 cm. broad including the rays; peduncles densely appressed-pubescent and more or less glandular: rays mostly 8, about 7 mm. long. — Linnaea, v. 148

(1830); DC. Prodr. v. 496; Hemsl. l. c. 160. *Baziasa sarmentosa*. Steud. l. c. — VERA CRUZ (?): "Serro Colorado," *Schiede*, no. 324 (hb. Roy. Bot. Mus. Berlin, tracing and fragment in hb. Gr.). OAXACA: northwest slope of Mt. Zempoaltepec, alt. 2460 to 3080 m., *Nelson*, no. 680 (hb. Gr.).

+ + Stem erect or merely decumbent, not repent.

5. *S. Liebmannii*, KLATT. Decumbent, 3 to 4 dm. high; stem subappressed-pubescent, branching; branches mostly simple, curved-ascending, bearing at the summit solitary long-peduncled showy heads: leaves lanceolate or elliptic-ovate, 3-nerved, acute, remotely glandular-toothed: heads 2.7 cm. broad (including the rays); involucreal scales broadly elliptical, obtuse, the inner subscarious, erubescens: rays rather large, internally white, externally purplish with deep violet veins: achenes of both the ray- and disk-flowers entirely glabrous. — *Leopoldina*, xxiii. 90 (1887). *Tridax Liebmannii*, Sch. Bip. acc. to Klatt, l. c. — MEXICO: without exact locality, *Liebmann*, no. 694 (hb. Copenhagen, tracing in hb. Gr.). OAXACA: Sierra de San Felipe, alt. 3080 m., *Pringle*, no. 4921 (hb. Gr.), alt. 1800 m., *Conzatti & González*, no. 395 (hb. Gr.), alt. 2900 to 3100 m., *Nelson*, no. 1126 (hb. Gr.).

Var. *heterocarpa*, n. var. Achenes of the disk-flowers pubescent, of the ray-flowers glabrous: leaves slightly more elliptic-ovate and less distinctly narrowed to a petiole. — *Calea multiradiata*, Seaton, Proc. Am. Acad. xxviii. 120 (1893), in part. *Sabazia* sp., Robinson & Greenman, Proc. Am. Acad. xxxii. 22 (1897). — VERA CRUZ: pine woods, Mt. Orizaba, alt. 3050 m., *Seaton*, no. 167, in part (hb. Gr.).

6. *S. michoacana*, ROBINSON. Similar in habit to the preceding, but erect from a short thickish lignescent rootstock; pubescence of the stem rather coarse and stiff, widely spreading: lower leaves cuneately narrowed to slender petioles: involucreal bracts strongly ciliated, sometimes pubescent on the dorsal surface: heads much as in the preceding: achenes of the disk-flowers pubescent. — Proc. Am. Acad. xxvii. 173 (1892); F. N. Williams, Bull. Herb. Boiss. ser. 2, ii. 1020, as to Pringle's no. 4099, but not as to no. 4921, nor as to *Abasoloa*.¹ —

¹ Mr. F. N. Williams, l. c. 1019-1021, expresses the opinion that *Sabazia michoacana*, Robinson, represented by Pringle's nos. 4099 and 4921, is the long uncertain *Abasoloa Taboarda*, La Llave & Lex. With this view we find it impossible to agree. Notwithstanding some vagueness in the original description of *Abasoloa* (La Llave & Lex, Nov. Veg. Desc. fasc. 1, 11, 1824), enough is said to show clearly that it cannot have related in anywise to *Sabazia michoacana*. In the first place the

MICHOACAN: mountains near Patzcuaro, *Pringle*, nos. 4099, 4264 (both in hb. Gr.).

EXCLUDED SPECIES.

S. OCCIDENTALIS, DC. Prodr. v. 497 (1836), is a clerical error for *Siegesbeckia occidentalis*, Walt. (not L.), i. e. *Verbesina occidentalis*, Walt. Fl. Car. 213.

S. GLABRA, Wats. Proc. Am. Acad. xxiii. 277 (1888), is *Jaegeria petiolaris*, Robinson, Proc. Am. Acad. xxxv. 316 (1900).

S. PORTORICENSIS, DC. Prodr. v. 497 (1836), is a clerical error for *Siegesbeckia portoricensis*, Bert.

S. SUBNUDA, Robinson & Seaton, Proc. Am. Acad. xxviii. 108 (1893), is unquestionably the long unidentified *Selloa plantaginea*, HBK. Nov. Gen. et Spec. iv. 266, t. 394 (1820). The genus *Selloa* appears from this new material to be very close to *Sabazia*, but it may be distinguished by its filiform chaff and acaulescent habit, as well as by the presence of a pappus of 2 to 6 filiform awns so caducous as to have escaped detection in the original examination of Mr. Pringle's plant.

II. REVISION OF THE MEXICAN AND CENTRAL AMERICAN SPECIES OF TRIXIS.

B. L. ROBINSON AND J. M. GREENMAN.

TRIXIS, P. BROWNE. (Name from τριξός, threefold, from the three-cleft corollas.) The Mexican and Central American species are shrubs (except *T. michuacana*) with alternate to ovate-oblong rarely linear entire or dentate pinnately veined leaves and loosely paniculate to densely corymbose rarely thyrsoïd or subsolitary heads; involucre mostly double, of 1 to 5 unequal linear to ovate more or less foliaceous outer

disk-flowers are said to be 4-toothed, while they are 5-toothed in the *Sabazia*; the leaves are described as linear-lanceolate, although in the *Sabazia* they are ovate or ovate-lanceolate; the rays are said to be numerous and capillary, a mode of description which surely no one would apply to the some ten flat elliptic-oblong conspicuously toothed rays of the *Sabazia*; the involucre is said to be equal, while in the *Sabazia* the scales are very unequal. It seems to us much more likely that Baillon was right in referring *Abasoloa* to *Eclipta* with which in essentials the description corresponds far better. It should be remarked that Pringle's no. 4921 has on re-examination proved to be *Sabazia Liebmannii*, Klatt.

bracts and 5 to 10 equal erect linear-oblong scales: corollas yellow, strongly bilabiate, the upper erect lip 2-cleft, the lower spreading, 3-toothed or subentire: anthers sagittate and bicaudate at the base: achenes cylindrical or slightly flask-shaped, slender, finely papillose, the summit more or less expanded into a circular disk bearing copious simple roughish white or tawny pappus-bristles. — Hist. Jamaic. 312 (1756); Lag. Amen. Nat. i. 35; La Llav. & Lex. Nov. Veg. Desc. fasc. 1, 27; Spreng. Syst. iii. 501; D. Don, Trans. Linn. Soc. xvi. 186, 297; DC. Prodr. vii. pt. 1, 67; Benth. & Hook. f. Gen. ii. 501; Hemsl. Biol. Cent.-Am. Bot. ii. 257; Hoffm. in Engl. & Prantl, Nat. Pflanzenf. iv. Abt. 5, 350; Hook. f. & Jacks. Ind. Kew. ii. 1130, which see for generic synonymy. *Perdicium*, L. Pl. Afr. Rar. 22 (1762), in part. About 35 species, ranging from Arizona to Brazil and Chili.

§ 1. Inflorescence an elongated conical thyrsus: herbaceous.

1. *T. michuacana*, LA LLAV. & LEX. Viscid-resinous and with a heavy odor; root fibrous, yellowish; stem simple, tomentose, 1 dm. high, erect: leaves sessile, punctate, villous below, the floral gradually reduced: heads borne in a large conic-oblong thyrsus; outer bracts of the involucre 5, ample, ovate, the inner involucre prismatic, of 8 erect scales. — Nov. Veg. Desc. fasc. 1, 28 (1824); DC. Prodr. vii. pt. 1, 68; Hemsl. Biol. Cent.-Am. Bot. ii. 258. — MICHUACAN: near Vallisoleto, flowering in January, *Lexarza*. If the above (compiled) description is correct, this is a marked species, not yet rediscovered.

§ 2. Inflorescence corymbose-paniculate: shrubs or undershrubs.

* Leaves sessile by a clasping shortly decurrent base.

2. *T. decurrens*, DC. Stems several, sparingly branched toward the summit: leaves crowded, ovate-lanceolate, acutely acuminate, entire: heads terminal, subsolitary; outer involucre of 5 ovate-lanceolate bracts, the inner of 8 scales: corollas yellow. — Prodr. vii. pt. 1, 68 (1838), whence the foregoing description; Hemsl. Biol. Cent.-Am. Bot. ii. 258; A. DC. Calques des Dess. t. 515. *Perdicium decurrens*, Sessé & Mociño, acc. to DC. l. c. (1838), & Pl. Nov. Hisp. ed. 2, 130. — MORELOS: Ayacapixtla, flowering in November, *Sessé & Mociño*.

** Stem provided at least at some stages of its development with broad and conspicuous herbaceous wings.

+ Outer bracts of the involucre lanceolate, much shorter than the inner; the latter glandular.

3. *T. mexicana*, LA LLAV. & LEX. A meter or more high: leaves lanceolate, 5 to 13 cm. long, 1 to 4 cm. broad, acuminate, acute, entire

or denticulate, narrowed below to a somewhat petiole-like base, decurrent upon the stem, sparingly pubescent above, tomentulose and glandular-atomiferous beneath, at length somewhat glabrate: inflorescence loose; heads 2 cm. high, about 20-flowered. — Nov. Veg. Desc. fasc. 1, 27 (1824), not Sessé & Mociño. — MICHUACAN: near Vallisoletum, flowering in October and November, *Lexarza*. GUERRERO: vicinity of Acapulco, *Palmer*, no. 144 (hb. Gr.).

+ + Outer bracts of the involucre elliptical or spatulate, two-thirds as long as the inner; the latter glandless.

4. *T. pterocaulis*, n. sp. Stems much branched; ultimate branchlets subappressed-pubescent: leaves thin, ovate to ovate-lanceolate, 3 to 10 cm. long, 1.5 to 4 cm. broad, acute, mucronate, entire or denticulate, sessile and decurrent upon the stem or narrowed to a short petiole-like base, glabrous or nearly so above, sparingly pubescent beneath: inflorescence loose and comparatively few-headed; heads 1.7 to 2 cm. high, 12–14-flowered; bracts of the proper (inner) involucre 8, linear-oblong, obtusish or abruptly pointed at the tip, appressed-pubescent. — COLIMA: Manzanillo, December, 1890, *Palmer*, no. 897 (hb. Gr.).

+ + + Outer bracts of the involucre 5, very large, ovate-lanceolate, copiously glandular.

5. *T. alata*, D. DON. Stems erect, rigid, branching; branches terete, foliaceous-winged: leaves oblong-ovate, 5 to 8 cm. long, 2.5 to 4 cm. broad, acute, mucronate, denticulate, papillose-setose on both surfaces: bracts of the outer involucre 2.5 to 4 cm. long, about 12 mm. broad, longer than the proper involucre: heads 24-flowered. — Trans. Linn. Soc. xvi. 192; DC. Prodr. vii. pt. 1, 68; Hemsl. Biol. Cent.-Am. Bot. ii. 258. — MEXICO: without locality, *Sessé & Mociño*.

* * * Leaves sessile or narrowed to a shortly petioled base: stem wingless (sometimes very narrowly and inconspicuously winged in *T. rugulosa*).

+ Bracts of the outer involucre 5, large, foliaceous, ovate, usually exceeding the inner.

6. *T. longifolia*, D. DON. Stems erect, leafy; branches striate, subappressed tawny-pubescent: leaves crowded, sessile or sessile, lanceolate, 3 to 8 cm. long, 1 to 2 cm. broad, acute or acuminate, entire to shallowly dentate, sparingly pubescent above, more or less appressed-villose beneath, somewhat glabrate, usually conduplicate: inflorescence dense, many-headed, conspicuously glandular; heads large, 2 to 2.5 cm. high, 18–20-flowered. — Trans. Linn. Soc. xvi. 191 (1838); DC. Prodr.

vii. pt. 1, 68; Hemsl. Biol. Cent.-Am. Bot. ii. 258. *T. obvallata*, Hook. & Arn. Bot. Beech. Voy. 300, t. 65 (1840); Walp. Rep. ii. 682; Seem. Bot. Herald. 314; Rose, Contr. U. S. Nat. Herb. i. 106, 338. *T. conferta*, Benth. Pl. Hartw. 289 (1848); Walp. Ann. ii. 950. *Perdicium longifolium*, Sessé and Mociño, acc. to Don, l. c. — MEXICO: without special locality, *Sessé & Mociño*; between San Luis Potosi and Tampico, *Palmer*, no. 1121 (coll. of 1878-1879); Sierra Madre, northwest Mexico, *Seemann* (hb. Gr.). SONORA: Alamos, *Palmer*, no. 290 (hb. Gr.). GUANAJAUTO: Guanajauto, *Berlandier*, no. 1327 (hb. Gr.); Leon and Guanajuato, *Hartweg*, no. 1609 (hb. Kew, acc. to Hemsl., l. c.). JALISCO: hills near Guadalajara, *Pringle*, nos. 2173, 2431 (both in hb. Gr.); *Dugès*, MM. (hb. Gr.). COLIMA: *Palmer*, no. 1235 (hb. Gr.). GUERRERO: Acapulco, *Hinds*.

∪ **Var. sericea**, n. var. Stem 6 to 9 dm. high: upper leaves (the only ones shown in the specimen at hand) densely and permanently silvery-sericeous beneath. — ? *T. involucrata*, Don. Trans. Linn. Soc. xvi. 193 (1838). — HIDALGO: hills near Tula, alt. 2300 m., *Pringle*, no. 8051 (hb. Gr.).

Var. platyphylla, n. var. Leaves large, obovate, flat, entire or nearly so, sparingly soft-pubescent beneath, 1 dm. long, 3.5 to 4 cm. broad, sharply acuminate: inflorescence more open than in either of the other forms; the bracts subtending its branches ovate, glanduliferous. — GUERRERO: near Acapulco, *Palmer*, no. 522, October, 1894 to March, 1895 (hb. Gr.).

+ + Outer bracts of the involucre linear to narrowly ovate, mostly much shorter than the inner.

↔ Inner bracts of the involucre 5; flowers 5 to 7.

7. *T. oligantha*, n. sp. Shrub; stems covered with a brown or grayish brown bark, at first pubescent, later glabrate: leaves lanceolate, 3 to 9 cm. long, 7 to 25 mm. broad, acuminate, mucronately acute, entire or mucronulate-denticulate, narrowed below into a subpetiolate base, at first pubescent above, later more or less glabrate, appressed-sericeous-tomentose beneath: heads 12 to 18 mm. high, 5-7-flowered, disposed in rather close clusters borne in a corymbose panicle; outer bracts of the involucre lanceolate or lance-ovate, sometimes nearly or quite equalling the lance-linear acuminate appressed-pubescent inner scales, the latter 10 to 12 mm. long. — OAXACA: Monte Alban, 27 November, 1894, *Pringle*, no. 5826; Cerro de San Felipe, alt. 1700 m., 29 March, 1896, *Conzatti & González*, no. 70.

→ → Inner bracts of the involucre 8; flowers 10 to 25.

= Leaves strongly discoloured, silvery-sericeous beneath.

8. *T. hyposericea*, Wats. Slender branching shrub with smooth light brown terete branchlets and narrowly lanceolate entire attenuate-acuminate willow-like leaves 4 to 6 cm. long, 6 mm. broad, green, slightly rugose, and inconspicuously villous above, white and silky-villous beneath: pedicels slender, finely appressed-pubescent; heads small, 1.4 cm. long; outer involucre bracts small, lanceolate, green, 3 to 4 mm. long, the inner about 1 cm. long. — Proc. Am. Acad. xxv. 157 (1890). — JALISCO: in a barranca near Guadalajara, *Pringle*, no. 1741 (hb. Gr.).

9. *T. Pringlei*, n. sp. Shrub; stems below covered with a light gray cortex, glabrous; branchlets subappressed-tomentulose and sericeous: leaves lanceolate, 3 to 7 cm. long, 6 to 12 mm. broad, acuminate, acute, entire, revolute-margined, narrowed below into a subpetiolate base, subhirtellous above, silvery-tomentulose and sericeous beneath: inflorescence loose; heads 15 to 18 mm. high, 12–15-flowered; inner scales of the involucre about 1 cm. in length and as well as the outer glandular-puberulent. — OAXACA: Tomellin Cañon, alt. 925 m., 22 December, 1894, *Pringle*, no. 5894 (hb. Gr.).

10. *T. Haenkei*, Sch. Bip. Shrub; stems covered with a brown cortex, at first sericeous-tomentulose, later glabrate: leaves lanceolate to lance-oblong, 3 to 12 cm. long, 1 to 3.5 cm. broad, acuminate, acute, entire or denticulate, subsessile or narrowed at the base to a short petiole (8 mm. or less in length), at first pubescent above but soon glabrate, silky-tomentulose beneath: inflorescence dense; heads 1.5 to 2 cm. high, 12–14-flowered; inner bracts of the involucre 8, about 14 mm. in length, appressed-pubescent often with gland-tipped hairs intermixed, usually longer than the outer bracts. — Sch. Bip. in Seem. Bot. Herald, 314 (1852–57); Hemsl. Biol. Cent.-Am. Bot. ii. 258; Mueller, Ann. v. 314. *T. angustifolia*, Vasey & Rose, Contr. U. S. Nat. Herb. i. 73 (1790), not DC. — MEXICO: without locality, *Liebmann*, no. 404 (fragment and tracing in hb. Gr.); in the Sierra Nevada of northwestern Mexico, *Seemann* (hb. Gr.). JALISCO: roadside between Mascota and San Sebastian, *Nelson*, no. 4068. LOWER CALIFORNIA, La Paz, *Palmer*, no. 7 (coll. of 1890).

= = Leaves tomentulose beneath.

> 11. *T. rugulosa*, n. sp. Shrub, 10 to 16 dm. high; branches light brown, sometimes inconspicuously winged, the wings narrow, scarcely herbaceous, decurrent in pairs from the base of the petiole: leaves

lanceolate, 3 to 8 cm. long, 7 to 17 mm. broad, acuminate, acute, entire, narrowed at the base, dark green, sparingly pubescent and rugose above, paler and finely tomentose beneath: inflorescence an open flat-topped panicle; pedicels appressed-pubescent; bracts of the outer involucre 7 to 8 mm. long, the inner narrowly oblong, obtusish, 10 to 12 mm. long; heads 1.5 to 2 cm. high, about 18-flowered. MEXICO: without locality, *Gregg*, no. 840 (hb. Gr.). GUANAJUATO: alt. 2100 m., *C. C. Deam*, no. 175 (hb. Gr.). QUERETARO: in the plains near the city, *Berlandier*, no. 1292 (hb. Gr.); between Queretaro and Mexico, *Berlandier*, no. 1228 (hb. Gr.).

7 12. *T. angustifolia*, DC. Shrub, about 1 m. high, fasciculately branched, grayish green: leaves linear or lance-linear, attenuate at each end, 3 to rarely 9 cm. long, usually about 4 (rarely as much as 15) mm. broad, hirsute-tomentose beneath, mostly erect or appressed, the uppermost shorter but otherwise similar; margins strongly revolute: heads about 2 cm. long, subsolitary or aggregated into fascicles; scales of the inner involucre 8, lance-linear, attenuate. — Prodr. vii. pt. 1, 69 (1838); Hemsl. l. c. 258; Gray, Syn. Fl. i. pt. 2, 409, in part. *T. rosmarini-folia*, Nees, Linnaea, xx. 699 (1847); Walp. Ann. i. 460. — MEXICO: without further locality, *Gregg*, no. 566; in the Sierra Nevada of north-west Mexico, *Seemann*, no. 2046 (hb. Gr.). DURANGO: shady hillsides near the city, alt. 1850 m., *Palmer*, no. 30, *Nelson*, no. 4599. ZACATECAS: hills about the city, *Pringle*, no. 180. SAN LUIS POTOSI: *Berlandier*, nos. 1284, 1353 (both in hb. Gr.), alt. 1800 to 2500 m., *Parry & Palmer*, no. 549 (hb. Gr.), *Schaffner*, no. 285 (hb. Gr.); Penasco, *C. & E. Seler*, no. 1138.

= = = Leaves glandular-dotted beneath.

13. *T. californica*, KELLOGG. A much branched shrub, 0.3 to 1 m. or more in height; branches and branchlets appressed-puberulent, glabrate: leaves lanceolate, 2.5 to 10 cm. long, 0.5 to 2 cm. broad, acute or acuminate, entire or mucronulate-dentate, sessile or narrowed below to a subpetiolate base, sparingly appressed-puberulent on both surfaces to nearly or quite glabrous, densely glandular-atomiferous beneath, usually pale green: heads 1.5 to 2 cm. high, commonly 12-14-flowered; inner involucre scales 8 to 10 in number, 10 to 15 mm. in length, thickened and somewhat obtusely keeled at the base, slightly exceeding the lance-linear to subobovate outer bracts, glandular-pubescent with a few sub-appressed non-glandular hairs intermixed. — Proc. Calif. Acad. ii. 182. fig. 53 (1862). *T. suffruticosa*, Wats. Bot. Calif. ii. 459 (1880).

T. angustifolia, Gray, Pl. Wright, i. 128 (1852), & ii. 102 (as to nos. 413 & 1299), also Syn. Fl. i. pt. 2, 409, in part, not DC. *T. angustifolia*, var. *latiuscula*, Gray, l. c. 410. *T. frutescens*, Gray, Bot. Mex. Bound. 103 (1859), vars.; not Sch. Bip. in Seem. Bot. Herald, 314; not P. Browne. — CALIFORNIA: San Diego County, Tantillas Cañon, Palmer (coll. of 1875); Colorado Desert, Lemmon & Purry, no. 1185, Wright, no. 196; Agua Caliente, Parish, no. 353 (hb. Gr.). LOWER CALIFORNIA: Cedros Island, Veatch, Greene (hb. Gr.), Palmer, no. 694 (hb. Gr.), Anthony, nos. 49, 318 (both in hb. Gr.); Island of San Pedro Martin, Palmer, no. 408 (hb. Gr.); Magdalena Island, Brandegee (hb. Gr.); Cañons Cantillas, Orcutt, no. 1102. ARIZONA: rocky cañons of the Santa Catalina Mountains, Pringle (hb. Gr.); Camp Grant, Palmer, no. 143 (hb. Gr.); Tempe, Ganong & Blaschka (hb. Gr.); without locality, Lemmon (hb. Gr.); Tucson, Greene, no. 1099 (hb. Gr.); Grand Cañon, Gray (hb. Gr.). NEW MEXICO: Manyos Cañon, Greene, no. 101 (hb. Gr.); Bear Mountains, Rusby, no. 203 (hb. Gr.); Organ Mountains, Wootton, no. 107 (hb. Gr.). TEXAS: western part, Havard, no. 74 (hb. Gr.). SONORA: ravines near Santa Cruz, Wright, no. 1299 (hb. Gr.). CHIHUAHUA: among rocks, Bachimba, Thurber, no. 830 (hb. Gr.); hills near the city, Pringle, no. 30 (hb. Gr.); Santa Eulalia Mountains, Pringle, no. 525 (hb. Gr.); near Lake Santa Maria, Nelson, no. 6407 (hb. Gr.). COAHUILA: Soledad, Palmer, no. 2089 (hb. Gr.); Parras, Palmer, no. 745 (hb. Gr.); Torreon, Palmer, no. 786 (hb. Gr.). SAN LUIS POTOSI: near Opito, Gregg (hb. Gr.).

14. *T. silvatica*, n. sp. Branching shrub with light brown branchlets; cortex tending to exfoliate: leaves thin, ovate-oblong, acuminate, cuneate at the sessile base, sharply but rather finely dentate, green, slightly pubescent and obscurely glandular above, scarcely paler, finely pubescent and distinctly glandular-atomiferous beneath, 5 to 8 cm. long, 2 to 3 cm. broad: heads few or many at the ends of the branches in rounded corymbose panicles, about 12-flowered, 2 cm. long in fruit; outer involucrel bracts thin, lanceolate or oblanceolate, acuminate, glandular-atomiferous, 12 to 15 mm. long, 3 to 5 mm. broad, the inner 8, linear, short-acuminate, about 12 mm. long, glandular-pubescent: mature achenes 7 to 9 mm. long; pappus slightly tawny, about 8 mm. long. — OAXACA: in dry wooded gorges on the River Tehuantepec, C. & E. Seler, no. 1633 (hb. Gr.); without locality, Liebmann, no. 405 (hb. Gr.). — Distinguished from the preceding species by its thinner larger leaves, the spreading villous pubescence of the inflorescence, and by the shorter pappus.

= = = = Leaves smoothish, finely reticulate-veiny beneath.

15. *T. frutescens*, P. Br. Shrub, much branched, 1 to 1.5 m. high; branchlets glabrous or sparingly appressed-pubescent: leaves narrowly lanceolate to lance-ovate, 3 to 10 cm. long, 1 to 3.5 cm. broad, more or less acuminate and mucronate, subentire to distinctly dentate, sessile or narrowed into a subpetiolate base, glabrous or nearly so on both surfaces: inflorescence a many-headed somewhat leafy corymbose panicle; heads 1.5 to 2 cm. high, usually about 12-flowered; inner involucre scales 8 (or rarely 10) in number, 10 to 12 mm. long, the outer linear or lance-linear, usually half to two-thirds as long as the inner, rarely quite as long. — P. Br. acc. to Spreng. Syst. iii. 501 (1826); DC. Prodr. vii. pt. 1, 68; Hemsl. l. c. 258; Less. Linnaea, v. 33; Benth. Pl. Hartw. 88; Klatt, Bull. Soc. Bot. Belg. xxxv. pt. 1, 293. *T. radiale*, Lag. acc. Hook. f. & Jacks. Ind. Kew. ii. 1131, but Lagasca seems never to have employed the combination, although he referred the Linnaean species to *Trixis*, as had P. Browne many years before (Hist. Jam. 312). *T. laevigata*, Lag. acc. to Spreng. Syst. iii. 501 (1826). *T. divaricata*, Klatt, Bull. Soc. Bot. Belg. xxxi. pt. 1, 215 (1892) not Spreng. *Perdicium radiale*, L. Sp. ed. 2, 1248 (1763); Lag. Amen. Nat. i. 36; Lam. Ill. t. 677, f. 2. *P. laevigatum*, Berg. Act. Holm. 228, t. 7 (1772); Lam. Dict. v. 179, & Ill. t. 677, f. 1. *Inula Trixis*, L. Amoen. Acad. v. 406 (1760). *Tenorea Berteri*, Colla, Hort. Ripul. 137 (1824). *T. calyculata*, Bert. acc. to Colla, l. c. *Prenanthes fruticosa*, Willd. acc. to Less. Linnaea, v. 33 (1830) & DC. Prodr. vii. pt. 1, 69. — TAMAU-LIPAS: near Matamoros, *Berlandier*, nos. 690, 2100 (both in hb. Gr.), and near Victoria, *Berlandier*, nos. 810, 2230 (both in hb. Gr.); near Jimenez, *Nelson*, no. 6660 (hb. Gr., hb. U. S. Nat. Mus.). The last five numbers represent a form with the outer accessory involucre bracts equaling the inner proper involucre. SAN LUIS POTOSI: alt. 1850 to 2500 m., *Parry & Palmer*, no. 550 (hb. Gr.); limestone hills, Las Palmas, alt. 120 to 160 m., *Pringle*, nos. 5766, 8005 (both in hb. Gr.). TEPIC: Santiago and Tepic, *Lamb*, no. 552. VERA CRUZ: Valley of Cordova, *Bourgeau*, no. 2035 (hb. Gr.); Mirador, *Sartorius* (hb. Gr.); near the city of Vera Cruz, *Pringle*, no. 5771 (hb. Gr.), *Linden*, no. 1208 (hb. Gr.). OAXACA: between San Carlos and San Bartolo, alt. 1000 to 1500 m., *Nelson*, no. 2567 (hb. Gr.); on wooded slopes of the Tehuantepec below Tolopan, growing under trees, *C. & E. Seler*, no. 1702 (hb. Gr.). CHIAPAS: between Tonala and Tuxtla in mountain woods near Cuesta San Fernando, *C. & E. Seler*, no. 1932 (hb. Gr.):

Barranca de Consoquitla, *Liebmann*, no. 108 (hb. Gr.). GUATEMALA: Valley of Guatemala, *Hartweg* (hb. Gr.); alt. 1550 m., *J. D. Smith*, no. 2363 (hb. Gr.); Volcan de Fuego, alt. 1550 m., *J. D. Smith*, no. 2856 (hb. Gr.); Canizal alt. 1550 m., *Heyde & Lux*, no. 4202 of *J. D. Smith's* distrib. (hb. Gr.). YUCATAN: Merida, *Valdez*, no. 10; without locality, *Gaumer*, no. 397. HONDURAS: San Pedro Sula, alt. 250 m., *Thieme*, no. 5236 of *J. D. Smith's* distrib. (hb. Gr.); Gulf of Fonseca, *Sinclair* (hb. Gr.). COSTA RICA: Cartago, *Cooper*, no. 5810 of *J. D. Smith's* distrib.; in woods near Terraba, alt. 260 m., *Pittier*, no. 3705 (hb. Gr.). PANAMA: Veraguas, *Seemann* (hb. Gr.).

➤ 16. *T. Wrightii*, n. sp. A much-branched shrub; branchlets sub-appressed-pubescent: leaves lanceolate, 1.5 to 7 cm. long, 0.5 to 2 cm. broad, entire or inconspicuously denticulate, narrowed below into a sessile or subsessile base, more or less decurrent on the stem, thickish, appressed-puberulent on both surfaces to essentially glabrous, reticulate-veiny beneath: heads about 1.5 cm. high, loosely disposed in corymbose panicles, 11-13-flowered; bracts of the outer involucre spatulate to obovate, 5 to 10 mm. long, 2 to 6 mm. broad; inner involucre of 8 appressed-pubescent scales 10 to 11 mm. in length. — SINALOA: near Mazatlan, January, 1889, *W. G. Wright*, no. 1224 (hb. Gr.), December, 1894, *Lamb*, no. 248 (hb. Gr.). TRES MARIAS ISLANDS: Maria Madre Island, 3 to 25 May, 1897, *Nelson*, no. 4191 (hb. Gr.).

III. — RÉVISION OF THE MEXICAN AND CENTRAL AMERICAN SPECIES OF HIERACIUM.

B. L. ROBINSON AND J. M. GREENMAN.

THROUGH a lack of accurate knowledge of the Mexican Hawkweeds there has been for many years a tendency to crowd unlike forms into certain of the older and vaguely characterized species. Some years ago the writers made a preliminary revision of the Mexican and Central American species of this genus, but from the uncertainty which still obscured the exact application of some of the earlier specific names, it seemed best to withhold the paper from publication pending further investigation. Of late, however, it has been possible to gain considerable new light on the subject, first from numerous specimens, tracings, drawings, and authentic fragments obtained by the Gray Herbarium through the purchase of the collection of the late Dr. F. W. Klatt, and second

1888 on W. G. Wright's specimen
note:
= 348 in
Hb. MBG

from some recently secured tracings and fragments of Lessing's species preserved in the Royal Botanical Museum, at Berlin. From these new sources and a very full suite of excellent modern specimens collected by Messrs. Pringle, Palmer, Nelson, L. C. Smith, Conzatti, González, Rose, Pittier, Brandegee, and others, it is now possible to offer the following synopsis with a reasonable confidence that it will prove a useful basis for further work in its particular field. For the sake of comparison a few species, which are at present known only in the southwestern United States but are likely to extend within the boundaries of Mexico, are here included.

HIERACIUM, TOURN. (Name from *ιεράξ*, a hawk.) — A large and in Europe exceedingly difficult genus. The Mexican and Central American species erect perennial herbs with scapiform or leafy stems, alternate lance-linear to oblong or obovate, dentate or entire pinnately veined leaves and corymbose or paniculate heads; involucrel bracts unequal, narrow, unaltered after anthesis, usually pubescent to bristly hirsute dorsally; corollas orange to lemon yellow, greenish white or rarely flesh-colored; achenes slender and cylindrical or attenuate from near the base toward the summit; pappus copious, bright white to sordid, tawny, or rufous, of simple subequal bristles. — Inst. 469, t. 267 (1700); L. Syst. (1735), & Spec. 799 (1753); Fries, Symbol. Hierac. (1848), & Epicrisis Hierac. (1862); Sch. Bip. Ueber die Hieracien Amerika's, Bonplandia, ix. 172 (1861); Benth. & Hook. f. Gen. Pl. ii. 516 (1873); Hemsl. Biol. Cent.-Am. Bot. ii. 259 (1881); Arvet-Touvet, Spicilegium Hierac. (1881), Rev. des Épervières & Elerchus, Ann. Conserv. Genève. i. 68 (1897); Gray, Proc. Am. Acad. xix. 65 (1884), & Syn. Fl. i. pt. 2, 424 (1884); Peter in Engl. & Prantl, Nat. Pflanzenf. iv. Ab. 5, 375 (1894); Hook. f. & Jacks. Ind. Kew. i. 1149 (1893), which see for generic synonymy.

* Pubescence of the leaves scanty to very copious, sometimes silky or hirsute, but not woolly or matted.

† Achenes fully 5 mm. in length, conspicuously tapering almost from the base to the summit.

1. **H. Fendleri**, SCH. BIP. Stems 1 to 3, erect, 26 to 52 cm. high, hirsute with long fine widely spreading or slightly reflexed bristles, or glabrate: basal leaves 3 to 14, oblanceolate to obovate, acute to rounded and apiculate at the apex, cuspidate-serrulate, attenuate below, 5 to 12 cm. long, 17 to 60 mm. broad, covered on both surfaces and at the margin with long sparse hairs (bronze color in dried specimens); cauline leaves

1 or 2, much smaller, lance-oblong, acute: heads 3 to 40, rather large: inner scales of the involucre 10 to 12 mm. long: achenes at length reddish black; pappus sordid white. — *Bonplandia*, ix. 173 (1861); Gray, Proc. Am. Acad. xix. 69, & Syn. Fl. i. pt. 2, 429, including the poorly marked var. *discolor*. *H. nigrocollinum*, Wats. Proc. Am. Acad. xxv. 133 (1890). *Crepis ambigua*, Gray, Pl. Fendl. 114 (1848), & Pl. Wright, ii. 106 (not i. 129). — NEW MEXICO: banks of Santa Fe Creek, *Fendler*, no. 488 (hb. Gr.); Organ Mountains, *Wright*, no. 1427 (hb. Gr.); Mogollon Mountains, *G. R. Vasey*. ARIZONA: Santa Rita Mountains, alt. 1825 to 2450 m., *Pringle* (hb. Gr.); Tanner's Cañon near Ft. Huachuca, *Lemmon*, no. 2804 (hb. Gr.); Willow Spring, *Palmer*, no. 532 (hb. Gr.); vicinity of Flagstaff, *MacDougal*, no. 19 (hb. Gr.). CHIHUAHUA: Sierra Madre, *Pringle*, no. 1536 (hb. Gr.); pine forest near Chuchuichupa, *Hartman*, no. 698 (hb. Gr.); near Colonia Garcia, *Townsend & Barber*, no. 23 (hb. Gr.). LOWER CALIFORNIA: La Chuparosa, *Brandege* (hb. Gr.). Extending northward to Dakota.

2. *H. brevopilum*, GREENE. Stem erect, 47 cm. high, leafy only near the base, pilose with slender spreading or slightly reflexed hairs: leaves narrowly oblong, rounded to acute at the apex, remotely and obscurely glandular-denticulate, pilose upon both surfaces: heads about 8, subracemose; peduncles and long narrow involucre scales glandular-hispid: corollas greenish yellow: achenes dark red; pappus white or nearly so. — Bull. Torr. Club, ix. 64 (1882). *H. Fendleri*, var. *mogollense*, Gray, Proc. Am. Acad. xix. 69 (1884), & Syn. Fl. i. pt. 2, 429. *H. erythrospermum*, Greene acc. to Gray, ll. cc. — NEW MEXICO: Mogollon Mountains, *Rusby* (hb. Gr.).

3. *H. prionophilum*, n. sp. Stem stout, erect, green, striate, 12 dm. high, leafy, covered with long spreading hairs (tawny in dried specimens): basal leaves wanting at anthesis, the cauline about 7, thin, oblong-lanceolate, acutish, strongly dentate, sparsely hirsute upon both surfaces, scarcely paler beneath, 10 to 18 cm. long, 2 to 5 cm. broad, the uppermost reduced, caudate-attenuate: corymbose panicle about 50-headed; its branches curved upwards, tapering; pedicels slender, spreading, tomentulose and covered with minute spreading dark glandular bristles: corollas greenish white: achenes reddish black; pappus bright white. — CHIHUAHUA: shaded ledges, Arroyo Aucho, Sierra Madre, *Pringle*, no. 1314 (hb. Gr.). SAN LUIS POTOSI: alt. 1825 to 2450 m., *Parry & Palmer*, no. 551 (hb. Gr.).

+ + Achenes 3.5 to 4.5 mm. long, columnar or very gradually attenuate toward the summit.

+ → Cauline leaves none, the basal rosulate, very short.

4. *H. junceum*, FRIES. Stem filiform, 13 to 22 cm. high, loosely 1-several-branched: basal leaves sessile, obovate, hirsute upon both surfaces, obtuse: heads 3 to 5, few-flowered, on elongated flocculent-pubescent peduncles; involucre slender, the inner scales elongated, linear, with a few dorsal glanduliferous hairs: achenes long and slender, brownish black, not conspicuously attenuate; pappus reddish white. — Symbol. Hierac. 144 (1848), & Epicris. Hierac. 149; Hemsl. Biol. Cent.-Am. Bot. ii. 259. — OAXACA: in pine woods, Cambre de Ixlepec, alt. 3300 m., *Liebmann* (sketch in hb. Gr.).

Var. *angustifolium*, FRIES. Leaves narrower: achenes more evidently attenuated. — Epicris. Hierac. 149 (1862). — "Sierra de Moucayo" (hb. Martius, acc. to Fries, l. c.). Not seen.

+ → Cauline leaves present, lance-linear, entire, 12 times as long as wide.

= Peduncles glabrous or sparingly hispid.

5. *H. carneum*, GREENE. Stem nearly or quite glabrous from the base, glaucous, branched from the middle: basal leaves elliptical, sessile, thickish, densely covered with long white hairs (rufous in dried specimens); stem-leaves long and relatively narrow, acute, nearly or quite glabrous: involucre scales green and glabrous: corollas deep flesh-colored. — Bot. Gaz. vi. 184 (1881); Gray, Proc. Am. Acad. xix. 69, & Syn. Fl. i. pt. 2, 430. — NEW MEXICO: oak woods, south base of Pinos Altos Mountains, *Greene* (hb. Gr.).

Var. *chihuahuense*, n. var. Basal leaves attenuate below to a narrow petiole-like base; lower cauline leaves, peduncles, and involucre scales sparingly pubescent: corollas white. — CHIHUAHUA: foothills of the Sierra Madre, *Pringle*, no. 1315 (hb. Gr.); near Colonia Garcia in the Sierra Madre, *Nelson*, no. 6192 (hb. U. S. Nat. Mus.).

= = Peduncles tomentulose.

6. *H. prionobium*, n. sp. Stems 1 to 3, erect, 6 to 8 dm. high, covered below with rather copious spreading or slightly deflexed hairs: basal leaves spatulate or oblanceolate, 15 to 20 cm. long, 10 to 25 mm. wide, obscurely denticulate, rounded at the apex, erect, hairy on both surfaces; the cauline leaves lance-linear, sessile, acute, essentially entire, 6 to 20 cm long, 3 to 15 mm. broad, sparingly pubescent: heads about 12, in an open loose corymbose panicle; peduncles curved-ascending, 1

to 3 cm. long, finely tomentulose and setulose; heads narrowly campanulate, about 30-flowered; scales of the involucre about 14, linear, acute, nigrescent, dorsally hirtellous and glanduliferous, the inner 8 mm. long: corollas yellow: achenes reddish brown, very slightly attenuate, 4 mm. long; pappus pure white. — CHIHUAHUA: shaded slopes of the Sierra Madre, 18 September, 1887, *Pringle*, no. 1313 (hb. Gr.), distributed as *H. Schultzii*; ? near Colonia Garcia, alt. 2,280 m., *Townsend & Barber*, no. 254 (hb. Gr.), distributed as *H. Rusbyi*, immature and doubtful; in the Sierra Madre, *Nelson*, no. 6128 (hb. U. S. Nat. Mus.).

++ ++ ++ Cauline leaves oblong, broadly cordate at the sessile clasping base, 2 to 8 times as long as broad.

7. *H. crepidispermum*, FRIES. Stem usually solitary, erect, 3 to 5 dm. high, covered with long slender widely spreading hairs (becoming bronze color after drying): basal leaves narrowly obovate, 4 to 13 cm. long, 15 to 35 mm. broad, rounded, or obtuse at the apex, cuspidate-denticulate, loosely villous on both surfaces, especially upon the midnerve beneath; cauline leaves 3 to 8, oblong, acute, 2 to 4 cm. broad, cordate-clasping at the often but slightly narrowed base: heads 7 to 40, at first crowded, later in an open corymb; peduncles tomentulose and covered with short dark glandular bristles: achenes reddish black, 3.5 to 4 mm. long, slightly attenuated toward the base as well as toward the summit; pappus bright white. — Symb. Hierac. 146 (1848), & Epicris. Hierac. 152; Wats. Proc. Am. Acad. xviii. 110; Gray, Proc. Am. Acad. xix. 70; Hemsl. Biol. Cent.-Am. Bot. ii. 259. *Crepis stenotheca*, Fries, Symb. Hierac. 146 (1848). *Heteropleura crepidisperma*, Sch. Bip. Flora, xlv. 435 (1862). *H. tolucanum*, Arv.-Touv. Ann. Conserv. Genève. i. 92 (1897). — COAHUILA: east and south of Saltillo, *Palmer*, no. 758 (coll. of 1880), hb. Gr. DURANGO: Real del Monte, *Ehrenberg*, acc. to Sch. Bip., l. c. TERRITORY OF TEPIC: near Santa Teresa, *Rose*, nos. 3405, 2080 in part (hb. U. S. Nat. Mus.). STATE OF MEXICO: hillsides, valley of Toluca, *Pringle*, no. 4183 (hb. Gr.); *Holway*, no. 3204 (hb. Gr.); pine woods, Eslava, valley of Mexico, alt. 2400 m., *Pringle*, no. 9364 (hb. Gr.). PUEBLA: pine woods, Chinantla, *Liebmann* (type, sketch in hb. Gr.); hills near Amozoc, alt. 2700 m., *Pringle*, no. 9360 (hb. Gr.). MORELOS: Popocatepec, alt. 2700 m., *Schaffner*, acc. to Sch. Bip., l. c. VERA CRUZ: Mt. Orizaba, alt. 3000 m., *Seaton*, no. 181 (hb. Gr.); Mirador, *Liebmann*, no. 447 (sketch in hb. Gr.). OAXACA: Sierra de las Cruces, alt. 2560 m., *Schaffner*, acc. to Sch. Bip., l. c.; west slope of Mt. Zempoaltepec, alt. 2325 to 2420 m., *Nelson*, no. 567 (hb. Gr.).

The material at hand shows conclusively the inconstancy of the characters upon which *H. tolucanum* was founded.

8. *H. Lemmoni*, GRAY. Habit, stature, and foliage as in the preceding; inflorescence thyrsoidal; peduncles tomentulose, without dark hairs — Proc. Am. Acad. xix. 70 (1883), & Syn. Fl. i. pt. 2, 430. — ARIZONA: Bear Spring, Cave Cañon, *Lemmon*, no. 2803 (hb. Gr.); Santa Rita Mountains, *Pringle* (hb. Gr.). Doubtfully distinct from the preceding.

9. *H. Rosei*, n. sp. Perennial, about 5 dm. tall, branched from below the middle; stem purple, densely spreading-hirsute with long grayish slightly deflexed hairs: leaves about 5, chiefly cauline, 5 to 6 cm. long, about half as broad, ovate-oblong, obtuse, undulate and (often obsoletely) cuspidate-denticulate, sparsely villous, somewhat paler beneath: panicle lax, the lower branches long and naked from the axils of ovate-oblong obtuse foliaceous bracts; pedicels filiform, pale-tomentulose, hispidulous; heads about fifty; involucre narrowly campanulate, 8 to 9 mm. long, nigrescent, externally subappressed-pubescent: achenes purplish black, slender, slightly tapering upwards, 4 to 4.5 mm. long; pappus white, becoming sordid. — TEPIC: in the Sierra Madre between Santa Gertrudis and Santa Teresa, 8 August, 1897, *Dr. J. N. Rose*, no. 2080, in part (hb. U. S. Nat. Mus., tracing and fragments in hb. Gr.). Readily distinguished from the related species by its short and broad leaves.

+++ Achenes 2 to 3 mm. long.

→ Stems decidedly leafy; leaves large (8 to 12 cm. long).

10. *H. Rusbyi*, GREENE. Stem erect, 3-4-leaved, 6 dm. high, covered to the middle with spreading villous pubescence, nearly glabrous above; leaves lance-oblong, nearly entire, villous upon both surfaces, acute, the cauline sessile by broad amplexicaul base: branches of the loosely corymbose inflorescence minutely flocculent-tomentose, neither they nor the pale bracts (12 to 14 in number) of the narrow cylindrical involucre hispid: heads about 23-flowered. — NEW MEXICO: Mogollan Mountains, *Rusby* (hb. Gr.). CHIHUAHUA: about 64 km. from Guadalupe y Calvo, alt. 2450 m., *Nelson*, no. 4816 (hb. U. S. Nat. Mus.), Mt. Mohinora, *Nelson*, no. 4897 (hb. U. S. Nat. Mus.).

11. *H. Wrightii*, n. comb. Stem tall and stout, fistulose, 4 to 9 dm. high, very hirsute to the summit, 5-9-leaved; caudex stout, comose: basal leaves oblanceolate, narrowed to a long petiolar base, glaucescent, obsoletely glandular-denticulate, villous-hirsute upon both surfaces; cauline leaves lance-oblong, attenuate: panicle many-headed; the peduncles

somewhat rigid, hispidulous; involucre campanulate, in fruit nearly 1 cm. broad, the scales tomentulose and covered with long spreading tawny or darker colored glandular setae: corollas yellow: achenes columnar, nearly black, striate, glabrous, 2 to 2.5 mm. long; pappus bright white or slightly tawny. — *H. Rusbyi*, var. *Wrightii*, Gray, Proc. Am. Acad. xix. 68 (1883), & Syn. Fl. i. pt. 2, 428. *Crepis ambigua*, Gray, Pl. Wright, i. 129 (1852), not of Pl. Fendl. *H. mexicanum*, Gray, Proc. Am. Acad. xix. 70 (1883), in part, not Less. *H. mexicanum*, var. *niveopappum*, Gray in Wats. Proc. Am. Acad. xviii. 110 (1883). — WESTERN TEXAS: between the Limpio and Rio Grande rivers, *Wright* (hb. Gr.). COAHUILA: Sierra Madre south of Saltillo, *Palmer*, no. 757 (coll. of 1880), hb. Gr., doubtful. CHIHUAHUA: hills near Chihuahua, *Pringle*, nos. 592, 771 (both in hb. Gr.). LOWER CALIFORNIA: Saucito, *Brandege* (hb. Gr.). SAN LUIS POTOSI: in shady places near the city, *Schaffner*, nos. 287, 288 (both in hb. Gr.); *Parry & Palmer*, nos. 552, 553 (in both hb. Gr.). DURANGO: among hills, *Palmer*, no. 653 (coll. of 1896), hb. Gr.

12. *H. abscissum*, LESS. Stem 5 to 9 dm. high, hirsute, especially below the middle: basal leaves oblanceolate, obtuse and mucronate or acute, slightly paler beneath, including the long gradually narrowed petiolar portion 17 cm. in length, hairy upon both surfaces, rarely subglabrous, cuspidate-denticulate to subsinuate-dentate; cauline leaves about 4, thin, oblong-lanceolate, the lower attenuate at the base, the upper somewhat cordate-clasping: inflorescence at first thyrsoidal but at length open and 3 to 4 dm. long; heads small, about 26-flowered, slender-peduncled: achenes 2 mm. long; pappus sordid. — *Linnaea*, v. 132 (1830); *Fries*, Symbol. Hierac. 148 (where the achenes are incorrectly described as elongated), & *Epicris*. Hierac. 150 (excluding the indefinite references to plants of the southern United States); Gray, Proc. Am. Acad. xix. 70, & Syn. Fl. i. pt. 2, 430; *Hemsl.* Biol. Cent.-Am. Bot. ii. 259. *H. strigosum*, Don, Trans. Linn. Soc. xvi. 175 (1830), ex char.; *Arv.-Touv.* Spicileg. Hierac. 7. *H. Schaffneri*, Sch. Bip. acc. to *Arv. Touv.* l. c. *H. thyrsoides spectabile*, *Fries*, Symbol. Hierac. 141 (1848). *H. Friesii*, Sch. Bip. Bonplandia, ix. 174, 326 (1861), not Hart. *H. Schultzii*, *Fries*, *Epicris*. Hierac. 150 (1862). — NUEVO LEON: on the Sierra Madre, *Pringle*, nos. 2205, 2838 (both in hb. Gr.). SAN LUIS POTOSI: grassy hillsides, Las Canvas, *Pringle*, no. 5077 (hb. Gr.). TERRITORY OF TEPIC: between Dolores and Santa Gertrudis, *Rose* (hb. U. S. Nat. Mus.). HIDALGO: Real del Monte, *Coulter* (hb. Gr.). STATE OF MEXICO: near Tacubaya, *Schaffner*,

no. 66 (hb. Gr.); pine woods near Eslava, alt. 2420 m., *Pringle*, no. 9363 (hb. Gr.). MICHOACAN: hills, Patzcuaro, *Pringle*, no. 5270 (hb. Gr.). MORELOS: mountain woods above Cuernavaca, alt. 2260 m., *Pringle*, no. 8053 (hb. Gr.). VERA CRUZ: near Orizaba, *Bourgeau*, no. 2800 (hb. Gr.); Volcano Tuxtla, alt. 600 to 1450 m., *Nelson*, no. 462 (hb. Gr.); Orizaba, *Botteri*, no. 144 (hb. Gr.). PUEBLA: Mount Popocatepetl, alt. 3000 m., *Schaffner*, no. 68 (hb. Gr.). OAXACA: Sierra de San Felipe, alt. 6000 m., *Conzatti & González*, no. 695 (hb. Gr.); Sierra de San Felipe del Agua, alt. 695 m., *Conzatti & González*, no. 401, in part (hb. Gr.); Oaxaca, *Conzatti & González*, alt. 525 m., no. 1004 (hb. Gr.). CHIAPAS: *Ghiesbreght*, nos. 20, 574 (in both hb. Gr.); near San Cristobal, alt. 2100 to 2660 m., *Nelson*, no. 3225 (hb. U. S. Nat. Mus.). GUATEMALA: Department of Santa Rosa, alt. 750 m., *Heyde & Lux*, no. 3784 (of J. D. Smith's distrib.).

13. *H. anthurum*, FRIES. Very tall; stem-leaves linear, the lower attenuate into a petiole, the upper sessile: inflorescence becoming 6 dm. long; involucre very hirsute with dark glandular hairs; pappus reddish. — Symbol. Hierac. 153 (1848), & Epicris. Hierac. 157; Hemsl. Biol. Cent.-Am. Bot. ii. 259. — OAXACA: Sierra de Zempoaltepec, *Liebmann*. Not seen; characters compiled.

↔ ↔ Stem-leaves 0 to 3, rarely over 7 cm. long.

14. *H. comatum*, FRIES. Leafy and sericeous at the base; stem leafy and strongly hirsute near the base, 4 to 6 dm. high, subglabrous above: leaves oblong-lanceolate, hirsute upon both surfaces, thickish, much paler and glaucous beneath; the lower cauline and radical obtuse or rounded, cuspidate-denticulate, the upper lance-linear, attenuate: heads loosely paniculate, small; peduncles spreading, filiform, canescent-tomentulose, finely glandular-pubescent. — Symbol. Hierac. 148 (1848), including var. *irregulare*, a much branched narrow-leaved form, & Epicris. Hierac. 152; Hemsl. Biol. Cent.-Am. Bot. ii. 259. — PUEBLA: in pine woods at Chinantla, alt. 2100 to 2400 m., *Liebmann* (sketch in hb. Gr.); near Calchicomula, *Rose & Hay*, no. 5806 (hb. U. S. Nat. Mus.). OAXACA: Sierra de San Felipe, grassy wooded slopes, alt. 2400 m., *Pringle*, no. 4701 (hb. Gr.), dry ridges under pines, alt. 2560 to 3000 m., *Pringle*, no. 4708 (hb. Gr.), alt. 2860 to 3300 m., *Nelson*, no. 1077 (hb. U. S. Nat. Mus.); Sierra de San Felipe del Agua, alt. 2300 m., *Conzatti & González*, no. 401, in part (hb. Gr.); west slope of Mount Zempoaltepec, alt. 2300 to 2410 m., *Nelson*, no. 593 (hb. Gr.).

15. *H. oaxacatum*, n. sp. Caudex hairy at the oblique summit,

elongated, sending off tough simple roots; stem simple, 2 to 5 dm. high, flexuous, covered throughout with long spreading hairs: basal leaves 2 to 3, oblong-lanceolate, rounded and apiculate at the apex, narrowed at the base, 3 to 5 cm. long, 10 to 16 mm. broad, hirsute upon both surfaces, paler beneath, glandular-denticulate: petioles nearly as long; cauline leaves about 3, somewhat remote, oblong or oblanceolate, obtusish to acute, denticulate, somewhat narrowed toward the sub-clasping base: heads about 3; peduncles densely tomentose and bristly with glandular hairs; involucrel scales dark colored, attenuate, glandular-pubescent, in fruit 1 cm. long: corollas apparently white or very light yellow: achenes reddish black, columnar, 3 mm. long; pappus in dried specimens sordid white.— STATE OF MEXICO: valley of Mexico, *Bourgeau*, no. 384 (hb. Gr.), *Schaffner*, no. 309 (hb. Gr.). OAXACA: Sierra de San Felipe, alt. 3000 m., *Pringle*, no. 4715 (hb. Gr.), type. Distinguished from the preceding by its fewer larger heads, and by the stem, which is setose to the summit with hairs 2 mm. long.

16. *H. mexicanum*, LESS. Stems 1 to several, slender, 2 to 5 dm. high, flexuous, sometimes branched, more or less hairy toward the base, glabrous (to the unassisted vision) above or very finely tomentulose, never setose; caudex woolly-tufted at its summit: leaves essentially confined to a basal rosette, thickish, oblong-lanceolate, obtuse to acute, including the narrowed petiolar base 3 to 7 cm. long, 1 to 1.5 cm. broad, more or less villous-pubescent upon both surfaces, much paler beneath, glandular-denticulate; cauline leaves none or 1 or 2, much reduced, oblong-linear, acute: heads 3 to 10 to (rarely) 26, narrow, about 20-flowered; involucrel scales dark colored, narrow, from smoothish to tomentulose and minutely bristly-glandular: achenes 2 to 3 mm. long.— *Linnaea*, v. 133 (1830); *Fries*, *Symbol. Hierac.* 139, & *Epicris. Hierac.* 149; *Gray*, *Proc. Am. Acad.* xix. 70, in part; *Hemsl. Biol. Cent.-Am. Bot.* ii. 260. ? *H. Lagopus*, *Don*, *Trans. Linn. Soc.* xvi. 176 (1830); *Fries*, *Epicris. Hierac.* 143. *H. niveopappum*, *Fries*, *Symbol. Hierac.* 139 (1848). *H. thyrsoides plebejum*, *Fries*, *Symbol. Hierac.* 142 (1848). *H. praemorsiforme*, *Sch. Bip. Bonplandia*, ix. 174, 327 (1861). *H. multicaule*, *Schaffner* acc. to *Sch. Bip. Bonplandia*, ix. 173 (1861); *Fries*, *Epicris. Hierac.* 149 (1862). *H. orizubaeum*, *Arv.-Touv. Spicileg. Hierac.* 17 (1881), ex char. *H. intybiformia*, *Arv.-Touv. Ann. Conserv. Genève.* 95 (1897). — JALISCO: between Huejuquilla and Mesquitec, *Rose* (hb. U. S. Nat. Mus.). STATE OF MEXICO: San Angel, alt. 2440 m., *Schaffner* (hb. Gr.); Sierra de las Cruces, alt. 2600 m., *Schaffner*, *Pringle*, no. 5322 (hb. Gr.); dry pine woods Nevada de

Toluca, alt. 2900 m., *Pringle*, no. 4284 (hb. Gr.). PUEBLA : Popocatepetl, *Schaffner*, no. 67 (hb. Gr.). VERA CRUZ : Mt. Orizaba, *Schiede*, no. 285 (hb. Gr.), type; alt. 3950 m., *Liebmann* (sketch in hb. Gr.); alt. 3050 m., *Galeotti*, no. 2173 (hb. Gr.); *Seaton*, no. 182 (hb. Gr.); *Rose & Hay*, nos. 5750, 5751 (hb. U. S. Nat. Mus.). GUERRERO : between Tixtla and Chilpancingo, alt. 1820 to 2140 m., *Nelson* (hb. U. S. Nat. Mus.); top of Sierra Madre near Chilpancingo, alt. 2750 to 3180 m., *Nelson*, no. 2192 (hb. U. S. Nat. Mus.). OAXACA : summit of Mt. Zempoaltepec, alt. 3475 m., *Nelson*, no. 634 (hb. U. S. Nat. Mus.).

17. *H. irasuense*, BENTH. Near *H. mexicanum* but with a stem less tall and seldom branched, covered throughout by a dark bristly glandular pubescence as well as by a fine short and sordid tomentum : leaves longer, 3 to 13 cm. in length, 1 to 2 cm. broad, subentire or conspicuously glandular-dentate : heads 10 to 15, crowded. — Benth. in *Oerst. Vidensk. Meddel.* 1852, p. 113 ; *Fries, Epicris. Hierac.* 144. Referred by *Hemsl. l. c.* 259 to *H. lagopus*, Don. — COSTA RICA : on the Volcano Irazu, alt. 2925 m., *Oersted* ; also at Laguna del Reventado, alt. 2300 m., 1 January, 1901, *H. Pittier*, no. 14,074 (hb. Gr.).

* * Pubescence on both surfaces of the leaves long, truly woolly, of matted or felted hairs.

18. *H. Pringlei*, GRAY. Stem 34 to 68 cm. high, woolly toward the base : leaves chiefly basal, rosulate and decumbent upon the ground, obovate to oblanceolate, 7 to 10 cm. long, 20 to 35 mm. wide, obscurely cuspidate-denticulate : heads 12 to 18, in an open corymb ; involucre in fruit 1 cm. long, involved in close wool through which short light-colored bristles protrude : achenes columnar, reddish brown, 3 mm. long ; pappus essentially white. — *Proc. Am. Acad.* xix. 69 (1883), & *Syn. Fl. i. pt. 2*, 429 ; *Arv.-Touv. Ann. Conserv. Genève.* i. 96. — SOUTHERN ARIZONA : Santa Rita Mountains, 6 May, 1881, *Pringle*, no. 314 (hb. Gr.), 2 June, 1884, *Pringle* (hb. Gr.), *Lemmon*, no. 369 (hb. Gr.). To be expected in Mexico.

19. *H. jaliscense*, n. sp. Root of strong dark brown fibres ; stem subflexuous, 48 to 72 cm. high, simple to the corymbosely branched inflorescence, glabrate above, lanate toward the base, the hairs long, white, widely spreading or somewhat reflexed, matted : basal leaves 2 to 5, oblanceolate, 5 to 15 cm. long, 1.5 to 3 cm. wide, erect, cuspidate-denticulate, rounded or obtuse, often apiculate at the apex ; cauline leaves 1 to 3, lanceolate to linear : heads about 10 ; peduncles bristly

with pale stipitate glands; involucre 8 to 10 mm. long; inner scales narrowly linear, attenuate, glandular, bristly chiefly near the midrib, scarcely at all woolly: achenes columnar, striate, reddish brown, 3 mm. long; pappus slightly tawny. — JALISCO: near Guadalajara, gravelly banks, *Pringle*, no. 5133 (hb. Gr.), hillsides, *Pringle*, no. 2990 (hb. Gr.), dry gravelly banks, *Pringle*, no. 4461 (hb. Gr.). TERRITORY OF TEPIC: between Dolores and Santa Gertrudis, *Rose*, no. 2044 (hb. U. S. Nat. Mus.). STATE OF MEXICO: Sierra de Ajusco, alt. 2440 m., *Pringle*, no. 7211 (hb. Gr.).

Var. *Ghiesbreghtii*, n. var. Pedicels and involucreal scales covered with close wool (tawny in dried specimens) as well as stipitate glands: habit, etc., of the typical form. — CHIAPAS: growing in the plains, cool region, *Ghiesbreght*, no. 573 (hb. Gr.).

DOUBTFUL SPECIES.

H. STUPOSUM Fries. Leafy at base, the summit of the caudex woolly; stem 1 to 1.2 dm. high, almost naked, branched, slightly scabrous: radical leaves densely rosulate, petiolate, lanceolate, repand-dentate; the cauline reduced: inflorescence thyrsoidal, clothed with white floccose pubescence; involucre soft-villous: achenes narrowed downward; pappus white. — Vet. Acad. Förh. 1856, p. 146, & *Epicris. Hierac.* 148; *Hemsl. Biol. Cent.-Am. Bot.* ii. 260. — MEXICO: *Ehrenberg*.

H. FRIGIDUM, Wedd. *Chloris*, And. i. 225 (1855); *Klatt in Engl. Jahrb.* viii. 52. — *Klatt*, l. c., ascribes this South American species to Guatemala, a report based upon *Lehmann's* no. 1526, which is not now in the *Klatt Herbarium*. No specimen from north of Panama has been seen by the writers, which corresponds with the South American plant.

IV. — SYNOPSIS OF THE MEXICAN AND CENTRAL AMERICAN SPECIES OF ALNUS.

By M. L. FERNALD.

SEVERAL Mexican and Central American Alders of very diverse characters have been generally called *A. acuminata* and *A. jorullensis*. This disposition of the forms has been most unsatisfactory, and the following synopsis is offered as a partial solution of the difficulties presented by them.

* Mature strobiles 2 cm. or more long (rarely shorter in *A. oblongifolia* and *A. glabrata*).

← Petioles pubescent.

↔ Leaves ovate to obovate, rounded at base.

A. acuminata, HBK. Bark of branches ashy brown, smooth: buds pubescent: leaves short-acuminate, finely and doubly serrate-dentate, 0.5 to 1.5 dm. long, 0.4 to 1 dm. broad, subcoriaceous, sparingly pilose on the midrib above, more abundantly so on the midrib and nerves beneath; petiole about 1 to 1.5 cm. long: peduncles stout, glabrous or minutely puberulent: staminate aments becoming 1 dm. or more long; the ashy-brown strobiles 3 or 4, sessile or short-pedicelled, ovoid-oblong, 2.2 to 2.6 cm. long, about 1.5 cm. thick: nutlet lanceolate, 4 mm. long, 1.75 mm. broad, bordered by an equally broad coriaceous wing. — Nov. Gen. & Sp. ii. 20; Regel in DC. Prodr. xvi, pt. 2, 183. Described from the Andes of Peru, this species has been made to include practically all the forms of South America, Mexico, California and New Mexico. From the original description, however, the species appears to be a well marked plant represented in the Gray Herbarium from Guatemala and Bolivia. GUATEMALA, San Lucas, Dept. Zacatepequez, alt. 1700 m., April, 1890 (*J. D. Smith*, no. 2188): BOLIVIA (*Bang*, no. 1893).

↔ ↔ Leaves oblong-lanceolate or elliptic, subcuneate at base.

A. oblongifolia, TORR. Bark of branches reddish brown, smooth; of the branchlets puberulous or glabrate: buds glabrous: leaves acute, sharply double-serrate, 0.5 to 1.5 cm. long, 3 to 6.5 cm. broad, more or less glandular-dotted, coriaceous, pilose or glabrate above, paler and more or less pilose on the prominent veins beneath; petioles slender, 1 to 2.5 cm. long: peduncles puberulent or glabrate: staminate aments becoming 1 dm. long; the brown or slightly ferruginous strobiles 3 to 5, pedicelled, sub-cylindric, when mature about 2 cm. long, 1 cm. thick: nutlet obovate, 3 mm. long, 2 mm. broad, with a narrow submembranaceous wing. — Bot. Mex. Bound. 204. *A. serrulata*, γ *oblongifolia*, Regel, l. c. 188. *A. acuminata*, Sargent, Silva, ix. 79, t. 457, in part, not HBK. — NEW MEXICO, banks of the Mimbres and near Santa Barbara, tree 9.23 m. high (*Charles Wright*, no. 1864): CALIFORNIA, San Bernardino, "tree 80 feet high, 2-3 feet in diameter," 1876 (*C. C. Parry & J. G. Lemmon*). SONORA, Huchuerachi, alt. 1230 m., Dec., 1890 (*C. V. Hartman*, no. 322, *F. E. Lloyd*, no. 464).

+- Petioles glabrous.

++ Leaves pilose on the nerves beneath.

A. arguta, SPACH. Bark of the branches and branchlets brown, glabrous: buds short-stalked, glabrous: leaves ovate or obovate, acute or bluntish, rounded or somewhat narrowed at base, finely but sharply double-serrate, 0.4 to 1 dm. long, 3 to 7.5 cm. broad, sparingly glandular-dotted, but glabrate above, paler beneath and pilose especially along the nerves; petiole slender, 1 to 2.5 cm. long: peduncles slender, glabrate; staminate aments 4 to 7 in terminal panicles (becoming about 1 dm. long): the dark reddish-brown strobiles 3 or 4, sessile, sub-cylindric, when mature 2 to 3 cm. long, about 1 cm. thick: the cuneate obovate or oblong nutlet 2.5 cm. long, 1.5 mm. broad, somewhat broader than the coriaceous wing. — Ann. Sci. Nat. ser. 2, xv. 205. *A. acuminata*, a *genuina*, Hemsl. Biol. Cent.-Am. Bot. iii. 165, not Regel. *A. jorullensis*, var. *castaneaeifolia*, Hemsl. l. c. 166, not Regel. *Betula arguta*, Schlecht. Linnaea, vii. 139. — VERA CRUZ, Mt. Orizaba, April 10, 1867 (*Bilimek*, no. 404), without date (*Botteri*, no. 857); alt. 3400 m., Aug., 1891 (*H. E. Seaton*, no. 231). Originally described from VERA CRUZ and TAMAULIPAS.

++ ++ Leaves glabrous, or at most only slightly pubescent when young.

A. glabrata, n. sp. Bark of the branches brown, glabrous: buds short-stalked, sparingly puberulent or glabrous: leaves oblong-lanceolate or elliptic, long-acuminate, narrowed or slightly rounded at base, coarsely and doubly serrate-dentate especially above, paler and dull beneath, the yellowish or brownish nerves prominent; petiole to 1 to 3.5 cm. long: peduncles thickish, glutinous; staminate aments 3 or 4, becoming 7 or 8 cm. long; the dark brown or blackish strobiles oblong or cylindric, sessile or short-stalked, in maturity 1.8 to 2.8 cm. long, 9.5 to 14 mm. thick: nutlets oblong to oblong-lanceolate, 3 to 5 mm. long, 1.5 to 2 mm. broad, with slightly narrower coriaceous wings. — *A. acuminata*, Sargent, l. c., in part, not HBK. — GUANAJUATO, Mt. San Nicholas, April, 1882, and Santa Rosa, April, 1901 (*A. Dugès*): QUERETARO, between Mexico and Queretaro, November, 1827 (*Berlandier*, no. 1294): HIDALGO, Dublan, December 4, 1902 (*C. G. Pringle*, no. 11,179): MEXICO, Valley of Mexico, June 1, 1865-66 (*Bourgeau*, no. 244), Dec. 9, 1892 (*C. G. Pringle*, no. 4361); near Tizapan, alt. 2300 m., Jan. 30, 1899 (*C. G. Pringle*, no. 8022): OAXACA, Valley of Oaxaca, alt. 1570 to 1786 m., Sept. 8, 1894 (*E. W. Nelson*, no. 1254); near Huajuapam, alt. 1725 to 2000 m., Nov. 16, 1894 (*E. W. Nelson*, no. 1976); Coyula

de Cuyamecalco, alt. 2155 m., Apr. 24, 1895 (*L. C. Smith*, no. 495). Said to be a large tree.

* * Mature strobiles less than 2 cm. long (exceptional plants of *A. oblongifolia* and *A. glabrata* may be looked for here).

+ Mature leaves ferrugineous-velutinous beneath.

A. ferruginea, HBK. Branches brown, the younger parts more or less pubescent: buds very pubescent: leaves ovate, acuminate at tip, rounded or narrowed at base, coarsely and doubly serrate, 0.5 to 1.5 dm. long, 3.5 to 8 cm. broad, dull green and minutely pilose above; petiole thickish, 1 to 2 cm. long: peduncles villous or glabrate, the staminate aments becoming 1.5 dm. long: the dark brown short-oblong strobiles sessile or short-stalked, in maturity 1.5 to 1.9 cm. long, about 1 cm. thick: nutlets cuneate-obovate, 3 mm. long, 2 mm. wide, with narrower coriaceous wings. — HBK. l. c. 21. *A. acuminata*, δ *ferruginea*, Regel, l. c. 184; Hemsl. l. c. 165. — Described from Colombia. Extending into Central America and Southern Mexico. CHIAPAS (*Ghiesbreght*, no. 160): GUATEMALA, Coban, Alta Verapaz, alt. 1488 m., Feb. 1886 (*H. von Tuerckheim* in *Exsicc.* J. D. Smith, no. 351).

+ + Mature leaves merely pilose on the nerves beneath.

A. jorullensis, HBK. Branches reddish brown, smooth, the younger parts puberulent or glabrate: buds pruinose: leaves oblong or oblong-obovate, thick, mostly 7 to 13 cm. long, 2.5 to 5.5 cm. wide, rounded or acute at tip, subcuneate or rounded at the subentire base, crenate-serrate toward the tip, glaucous and sublucid above, brownish beneath and closely pruinose with glandular or waxy atoms, the prominent nerves more or less pilose; petioles thickish, 3 to 10 mm. long, pubescent or glabrate: peduncles thick, pruinose or glabrate; staminate aments 3 or 4, becoming 6 cm. long; the reddish-brown strobiles 3 or 4, sessile or subsessile, oblong-ovoid, 1 to 1.8 cm. long, barely 1 cm. thick: nutlets cuneate-obovate to suborbicular, 2.5 mm. long, 2 to 2.5 mm. broad, with narrow membranaceous wings. — HBK. l. c. 20; Regel, l. c.; Hemsl. l. c. 166, in part. *A. acuminata*, Sargent, l. c. in part, not HBK. Sierra Madre of Central and West-Central Mexico. Described from Volcan de Jorullo, Michoacan. MICHOACAN, mountains near Patzcuaro, Dec. 21, 1891 (*C. G. Pringle*, no. 5057); Sierra Madre, without locality (*Seemann*): MEXICO, foothill of Mt. Ixtaccihautl, Jan. 5, 1899 (*C. C. Deam*, no. 130).

Var. *exigua*, n. var. Leaves short-oblong, 2 to 4 cm. long, 1 to

2.4 cm. broad, the nerves conspicuously pilose beneath; petioles 2 to 4 mm. long, pilose: strobiles globose or short-oblong, about 1 cm. long. — GUANAJUATO, mountains of Santa Rosa, April, 1901 (*A. Dugès.*)

V. — DIAGNOSES AND SYNONYMY OF MEXICAN AND CENTRAL AMERICAN SPERMATOPHYTES.

By J. M. GREENMAN.

Echeandia Pringlei, n. sp. Roots fascicled, tuberiform; the tuberous portion 1 to 2 cm. long, 5 to 7 mm. in diameter: leaves chiefly radical, 1 to 4 dm. long, 2 mm. broad, about 9-nerved, glabrous on both surfaces, more or less involute, hirtellous-ciliolate-margined, firm in texture, yellowish in the dried state, sometimes falcate; the fibrous portion of the bases of the older leaves persistent around the base of the scapiform stem: scape simple or branched, 2.5 to 4 dm. high, bearing 1 to 3 leaf-like bracts: floral bracts lance-ovate, acute, scarious: flowers two in the axil of each bract; pedicels 5 to 10 mm. long, jointed below the middle: perianth white; divisions lanceolate, about 1 cm. long, 1.5 to 2.5 mm. broad, acute, 3-nerved: stamens nearly or quite as long as the perianth-divisions; anthers united into a tube 6.5 to 8 mm. in length: capsule oblong, 6 mm. long, transversely nerved. — MEXICO. State of Jalisco: Etzatlan, collection of 1903, *C. G. Pringle*, no. 11,852 (hb. Gr.).

Sisyrinchium macrophyllum, n. sp. Erect, 4 to 6 dm. high, glabrous throughout: roots long, fleshy, almost tuberous: stems narrowly winged, leafless to the first fork, branched above into a several-headed inflorescence: leaves lance-attenuate, 5 to 6 dm. long, 1 to 5 cm. broad, acute, prominently nerved, narrowly subcartilaginous-margined: bracts of stem and inflorescence lance-acuminate, 8 cm. or less long: peduncles in fruiting specimens 5 to 8 cm. in length; spathes 2-5-flowered; valves lanceolate, 3 to 3.5 cm. long, acute, the outer slightly shorter than the inner: capsules oblong, triangular, 1.2 to 2 cm. long, one half as broad, glabrous: seeds subspherical, 2 mm. in diameter. — MEXICO. State of San Luis Potosi: Alvarez, 28 September to 3 October, 1902, *Dr. Edward Palmer*, no. 205 (hb. Gr. and hb. U. S. Nat. Mus.).

Phoradendron Palmeri, n. sp. Pubescent throughout; younger parts subtomentose: stem and branches terete: leaves narrowly oblong or oblong-spatulate, 1 to 3.5 cm. long, 3 to 8 mm. broad, obtuse, entire, narrowed below into a subpetiolate base: spikes of fertile flowers solitary,

sessile or short-pedunculate, 2-3-jointed, in anthesis 3 to 6 mm. long, 7-13-flowered: flowers 3-merous, fruiting spikes 1.5 to 2 cm. long, on peduncles 2 to 6 mm. in length: berry oblong, 3 to 4 mm. long, hirtellous-puberulent. — MEXICO. State of San Luis Potosi: Alvarez, 5 to 10 September, 1902, *Dr. Edward Palmer*, no. 119 (hb. Gr. and hb. U. S. Nat. Mus.).

In general appearance this species resembles *Phoradendron brachytachyum*, D. Oliv., but differs in the denser tomentum, the longer and pedunculate fruiting spikes, and finally by the more oblong pubescent fruit.

Echites Smithii, n. sp. Stem terete, closely and evenly puberulent: leaves opposite, short-petiolate, oblong-lanceolate, 3 to 6 cm. long, 1 to 2.5 cm. broad, acute, entire, subcordate at the base, dark green and glabrous or slightly hirtellous-puberulent above especially near the margins, paler and glabrous beneath, bearing 2 small glands on the upper surface of the blade at its junction with the petiole; midrib and the 5 to 7 pairs of lateral nerves rather prominent beneath; petioles 2 to 4 mm. long, puberulent: inflorescence usually supra-axillary, racemose, few (1-3)-flowered, shorter than the leaves; peduncles 5 mm. or less in length; bracts lance-linear, 4 to 5 mm. long, acute, often purplish; pedicels 5 to 8 mm. long and as well as the peduncles puberulent: calyx deeply 5-parted, persistent; lobes lanceolate, acute, 4 to 5 mm. long, green or slightly purplish-tinged: glands 2 to 4, opposite each sepal: corolla salverform, yellow or yellowish white, glabrous; tube 10 to 12 mm. high; lobes oblique, about 8 mm. in length: stamens included; anthers blunt, 2.5 mm. long: immature follicles pubescent: disk deeply 5-lobed. — MEXICO. State of Oaxaca: Salomá, altitude 1981 m., 9 August, 1895, *Albert L. Smith*, no. 672 (hb. Gr.); Huancilla-Nochixtlan (Nochistlan), alt. 2000 m., June, 1901, *C. Conzatti & V. González*, no. 1198 (hb. Gr.).

MANDEVILLA OAXACANA, Hemsley, *Biol. Cent.-Am. Bot.* ii. 316. To this species should be referred specimens collected by Mr. C. G. Pringle on dry ledges of foothills above the city of Oaxaca, Mexico, at an altitude of 1830 m., 29 May, 1895, no. 4662 (hb. Gr.). This number of Mr. Pringle's *exsiccatae* was erroneously determined as *Echites secundiflora*, A. DC., under which name it was distributed. Hereto may also be referred specimens secured by Señor C. Conzatti on hills of the San Felipe del Agua, Oaxaca, altitude 1800 m., 1 September, 1895, no. 578 (hb. Gr.).

The species is apparently common about the City of Oaxaca, and is

well characterized by the tubular-funnelform corolla. In all other characters it agrees well with the genus *Echites*.

Gonolobus calcicola, n. sp. Stems twining, ligneous at the base, hirtellous-puberulent, the younger parts also hirsute with spreading or somewhat reflexed hairs: leaves petiolate, ovate, 2 to 6 cm. long, 1 to 3 cm. broad, acute or acuminate, entire, hirtellous-pubescent above, granulose beneath and often scattered-hirsute especially on the prominent midrib and nerves, revolute-margined; petioles 10 to 22 mm. long, hirtellous-pubescent: inflorescence in axillary congested several-flowered cymes; peduncles shorter than the petioles: flowers medium-size: calyx deeply 5-parted; divisions lance-elliptic, 6 to 7 mm. long, 2 to 3 mm. broad, acute, ciliate, externally hirsutish pubescent: corolla dark brownish-purple, about 2 cm. in diameter, externally minutely puberulent, upper or inner surface corrugated-verrucose, bearing a few scattered whitish hairs: crown 5-lobed; lobes fleshy, unequally papillose or somewhat warty: fruit not seen. — MEXICO. State of Morelos: limestone hills, Jojutla, near Cuernavaca, 30 August, 1902, C. G. Pringle, no. 11,367 (hb. Gr.).

In general habit *G. calcicola* suggests *G. congestus*, Decne., but the smaller narrower leaves, fewer larger flowers, and the lobed crown serve to separate readily the two species.

NAMA UNDULATUM, HBK., var. MACRANTHUM, Choisy, Hydrol. 18, t. 2, f. 1; DC. Prodr. x. 182; Gray, Proc. Am. Acad. x. 330; Hemsl. Biol. Cent.-Am. Bot. ii. 364. *N. Berlandieri*, Gray, l. c. viii. 282. Specimens belonging to this interesting variety have been secured by Mr. E. W. Nelson at Montemorelos, State of Nuevo Leon, no. 6697. Although the variety has been generally understood as having merely sessile and amplexicaul leaves, yet the specimens now at hand, from Mr. Nelson, show very distinctly that the leaves are not only sessile and amplexicaul, but more or less decurrent on the stem. Moreover a careful examination of Berlandier's nos. 699, 2116 (hb. Gr.) show some of the leaves to be decurrent. The plant is a well-marked variety, and further material, especially complete specimens, may prove it to be specifically distinct.

Cynoglossum Pringlei, n. sp. Stems leafy to the inflorescence, striate, hirsute-pubescent: stem leaves sessile, semiamplexicaul, oblong-lanceolate, 3 to 12 cm. long, 1 to 4 cm. broad, acute, entire, dark green above, paler beneath, hirsute-pubescent on both surfaces: inflorescence compound, many-flowered, more or less bracteate: pedicels 0.5 to 2 cm. long, recurved at least in the later stages, appressed-pubescent: calyx

5 parted, glabrous except at the very base; lobes 3 to 5 mm. long, subrotund, imbricated: style 1.5 to 2 mm. long, persistent: corolla not seen: nutlets broadly ovate or subrotund, dorso-ventrally compressed, 10 to 12 mm. long, nearly or quite as broad, glochidiate-hispid on the upper or outer surface, smooth beneath; scar triangular-ovate. — MEXICO. State of Mexico: Fultenango Cañon, altitude 2500 m., 9 October, 1902, *C. G. Pringle*, no. 11,350 (hb. Gr.): "Morelia (Michuacán) et de Moro Leon (Guanajuato)," *A. Dugès* (hb. Gr., collection of 1893).

Lithospermum Nelsonii, n. sp. An herbaceous perennial: stems erect from a ligneous base, 2.5 to 4.5 dm. high, sparingly branched above, pubescent with spreading hirsute hairs intermixed with a sub-appressed puberulence: lower stem-leaves oblanceolate, 3 to 7 cm. long, 8 to 18 mm. broad, obtuse or submucronate-acute, narrowed below into a winged sub-petiolate base, hirsute-hispid on both surfaces, more or less 3-nerved; upper stem-leaves sessile, oblong-lanceolate: flowers on short pedicels, disposed in the axils of the uppermost leaves forming a leafy-bracteate scorpioid raceme: calyx deeply 5-parted; divisions linear, about one half as long as the tube of the corolla, acute, hirsute-pubescent: corolla salverform, white or pale yellow; tube 13 to 14 mm. long, externally appressed puberulent, within glabrous below, papillose-puberulent above, bearing in the throat opposite the lobes 5 conspicuous folds; lobes subrotund, 4 to 5 mm. long and broad: stamens inserted high on the corolla-tube, included: style persistent: nutlets white, ovate, 3 mm. long, acute, slightly crested on the back toward the summit. — MEXICO: State of Nuevo Leon: Cerro la Silla, near Monterey, 20 March, 1902, *E. W. Nelson*, no. 6682 (hb. Gr., and hb. U. S. Nat. Mus.).

CAPRARIA MEXICANA, Moric. in DC. Prodr. x. 429. Specimens collected by Mr. E. W. Nelson at Soto la Mariana, State of Tamaulipas, no. 6643 (hb. Gr., and U. S. Nat. Mus.), agree in all details with the original description of the above species. Although *C. mexicana* has been considered by some authors to be identical with the widely distributed species *C. biflora*, L., yet on account of its glabrous character throughout, the uniformly narrow-lanceolate acuminate leaves, the long anthers, and the more acute corolla-lobes, it seems to the writer well worthy of specific rank. In addition to Mr. Nelson's no. 6643, the following specimens may be referred to *C. mexicana*, Moric: en route from San Luis Potosi to Tampico, December, 1878, to February, 1879, *Dr. E. W. Palmer*, no. 1125 (hb. Gr.); Wartenberg, near Tantoyuca, prov. Huasteca, State of Vera Cruz, *L. C. Ervendberg*, no. 184 (hb. Gr.).

STEMODIA SCHOTTII, Holzinger, Cont. U. S. Nat. Herb. i. 286. Imperfect specimens collected by Dr. Edward Palmer between the Frio and the Nueces Rivers on the road to Lerios, Texas, and distributed under no. 1053 (hb. Gr.), were referred by Dr. Watson, Proc. Am. Acad. xviii. 130, to *Stemodia durantifolia*, Swartz; but a careful examination of Dr. Palmer's specimen in the light of additional material shows very clearly that the plant should be referred to the above well characterized species, *Stemodia Schottii*, Holzinger. Strong and vigorous specimens of this species were secured by Mr. E. W. Nelson between San Fernando and Jimenez, State of Tamaulipas, Mexico, 26-27 February, 1902, no. 6619 (hb. Gr., and hb. U. S. Nat. Mus.). These two collections extend the geographical range of *S. Schottii* from Rio Grande, where it was first found through the Valley of the Rio Grande nearly to the Gulf of Mexico.

Dyschoriste Pringlei, n. sp. Stems several, 1 to 2 dm. in length, erect or ascending from a ligneous perennial base, densely hirsute-pubescent or subtomentose: leaves lance-elliptic to slightly obovate, 1.5 to 4 cm. long, 0.5 to 1.6 cm. broad, obtuse or acute, entire, narrowed below to a subpetiolate base, sparingly hirsute-pubescent on both surfaces: flowers crowded in the axils of the upper leaves forming a subcapitate leafy inflorescence: calyx 13 to 14 mm. long, densely pubescent with white flaccid-hirsute hairs, divided to somewhat below the middle; divisions lance-attenuate: corolla tubular-campanulate, 3 to 4 cm. long, externally pubescent, more or less purplish-maculate at least in the dried state: stamens adnate to the corolla for about one half its length; anthers rather conspicuously calcarate: ovary glabrous; style pubescent: mature capsule not seen. — MEXICO. State of Jalisco: deep cañons near Guadalajara, 1 July, 1889, *C. G. Pringle*, no. 2907 (hb. Gr.), distributed as "*Calophanes capitatus*, Oerst.;" Rio Blanco, near Guadalajara, 22 July, 1902, *C. G. Pringle*, no. 11,313 (hb. Gr.).

Justicia (Dianthera) Canbyi, n. sp. Stems 3 dm. or more high, sparingly branched, subterete, slightly furrowed, hirsute-pubescent in lines from node to node or not infrequently over essentially the entire surface: leaves petiolate, ovate, 1.5 to 5 cm. long, 1 to 3 cm. broad, acute, entire, revolute-margined, cuneate to subcordate at the base, dark green above, pale beneath, usually glabrous on both surfaces except for hirsute hairs along the midrib, occasionally with a few scattered hairs over either surface; petioles 5 mm. or less in length, ciliate: flowers on axillary or terminal spikes more or less paniculately disposed; bracts and bracteoles small, subulate, shorter than the calyx: calyx 3 mm.

long, deeply 5-parted, puberulent; the posterior segment much smaller than the other segments: corolla, 2-lipped, purple; tube slender, cylindrical, 22 mm. long, externally pubescent; upper or posterior lip sub-erect, entire, acute; lower or anterior lip deeply 3-lobed, spreading: capsule 12 mm. long, pubescent: seeds verrucose. — MEXICO. State of Tamaulipas: Soto la Marina, 2 March, 1902. *E. W. Nelson*, no. 6650 (hb. Gr., and hb. U. S. Nat. Mus.). State of Nuevo Leon: near Monterey, 19 March, 1900, *William M. Canby*, no. 187 (hb. Gr.). State of Hidalgo: Zimapan, *Th. Coulter*, no. 1213 (hb. Gr.). This number of the Coulter collection was referred by Hemsley, *Biol. Cent.-Am. Bot.* ii. 516, to *Siphonoglossa pilosella*, Torr., from which species it is certainly distinct. From the shape of the corolla the species here described might very well pass as a *Siphonoglossa*, but the character of the inflorescence and the absence of a spur or any appendage on the lower anther-cell place it rather with *Justicia* (*Dianthera*). In general appearance *Justicia* (*Dianthera*) *Canbyi* is not unlike certain *Rhinacanthi* of the Old World.

RANDIA OBCORDATA, Watson, *Proc. Am. Acad.* xxiv. 53. The only recorded station for this species is the original locality, namely, on high mesas near Guaymas, State of Sonora, Mexico. Its occurrence at Manzanillo, State of Colima, where excellent fruiting specimens were secured by Dr. Edward Palmer, 2 to 18 March, 1891, no. 801 (hb. Gr., and hb. U. S. Nat. Mus.) indicates that the species has a rather extended distribution along the west coast of Mexico.

CRUSEA SUBULATA, Gray, var. *leiocarpa*, n. var. Carpels 2 mm. long, glabrous: habit and other characters of the species. — MEXICO. State of San Luis Potosi: Alvarez, 28 September to 3 October, 1902, *Dr. Edward Palmer*, no. 147 (hb. Gr., and hb. U. S. Nat. Mus.).

Stevia vernicosa, n. sp. Shrub, 1 m. or less high: stem branched; branchlets terete, often verrucose, glabrous or somewhat pubescent towards the inflorescence, reddish: leaves opposite, lance-elliptic to oblanceolate, 1.5 to 4.5 cm. long, 4 to 8 mm. broad, obtuse, rather closely serrulate or crenate-serrulate, narrowed below to a subpetiolate base, glabrous, glandular-punctate and glutinous: heads about 12 mm. high, 5-flowered, disposed in dense cymules terminating the stem and branches: involucre 6 to 8 mm. high; bracts of the involucre 5, lanceolate, acute or obtuse, glutinous: pappus of 1 to 5 setae nearly or quite equalling the corolla-tube, and of 5 minute scales: corollas white: mature achenes 4 to 4.5 mm. long, puberulent. — MEXICO. State of Morelos: on dry ledges, Sierra de Tepoxtlan, altitude 2310 m., 15 March, 1899, *C. G.*

Pringle, no. 7698 (hb. Gr.), distributed as "*Stevia salicifolia*, Cav." State of Mexico: Mt. Ixtaccihautl, altitude 3350 to 3650 m., 1903, *C. A. Purpus*, no. 185 (hb. Gr. and hb. Brandegee). Mr. Pringle's specimen above cited was referred to *S. salicifolia*, Cav. to which species *S. vernicosa* is evidently related, but from which it differs in having smaller closely instead of remotely serrulate leaves; moreover, the leaves are not attenuate at both ends, and the lateral veins are barely visible instead of conspicuous as in typical *S. salicifolia*.

Carphochaete Schaffneri, n. sp. An herbaceous perennial: stems usually several from a ligneous base, 3 to 4.5 dm. high, glabrous or puberulent: leaves opposite, sessile, subamplexicaul, linear-lanceolate, 1 to 4 cm. long, 1 to 3.5 mm. broad, acute, entire, glabrous, glandular-punctate: inflorescence loosely corymbose: heads 2.5 to 3 cm. long, 4-flowered: involucre 1.3 to 1.5 cm. high; bracts of the involucre lanceolate and acute to lanceolate more or less abruptly narrowed at the apex and submucronate-acute, externally as well as the peduncles glandular-hirtellous: pappus of 6 to 8 elongated linear-lanceolate 1-nerved paleaceous aristae and 2 to 5 short oblong obtuse pales: corollas 1.5 to 1.7 cm. long, white with a purplish throat, glabrous: achenes 10 to 12 mm. long, minutely hirtellous. — MEXICO. State of San Luis Potosi: Valley of San Luis Potosi, September, 1876, *Dr. J. G. Schaffner*, no. 241 (hb. Gr.), distributed as "An *Stevia triflora*, DC.;" region of San Luis Potosi, altitude 1850 to 2465 m., *Parry & Palmer*, no. 329 (hb. Gr.). The number here cited from Parry & Palmer's collection was referred by Hemsley, *Biol. Cent.-Am. Bot.* ii. 108, to *Carphochaete Grahamsi*, A. Gr. from which species *C. Schaffneri* is easily distinguished by the narrower acute leaves and the more lanceolate glandular-hirtellous unciliated involucre bracts.

Brickellia megalodonta, n. sp. Stem terete, green or purplish, pubescent: leaves opposite, petiolate, triangular-ovate to triangular-lanceolate, 3 to 7 cm. long, 1.5 to 5 cm. broad, acuminate, acute, unequally and coarse dentate, subcordate to somewhat cuneate at the base, 3-nerved, olive-green and sparingly pubescent above, paler and pubescent on the nerves beneath: inflorescence a terminal somewhat leafy paniculate cyme; peduncles 2.5 cm. or less in length, pilose-pubescent and with glandular hairs intermixed: heads 12 to 13 mm. high, about 15-flowered: involucre bracts imbricated, 4-5-seriate, lance-acuminate, gradually narrowed to the tip, conspicuously nerved, pale-green, often tinged with purple; the outer bracts shorter than the inner: pappus silvery white, slightly shorter than the yellowish-green corolla: mature

achenes 4 mm. long, pubescent. — MEXICO. State of Jalisco: Guadalajara, 22 September, 1903, *E. W. D. Holway*, no. 5022 (hb. Gr.).

In general appearance this species resembles *B. Coulteri*, and *B. brachiata*, Gray. From the former it differs in having constantly larger leaves and longer petioles, in the pubescence of peduncles, etc.; from the latter species it differs conspicuously in the lance-attenuate involucre bracts, which are gradually narrowed to the tip, not abruptly contracted at the apex and mucronate.

Barroetea sessilifolia, n. sp. Annual: stem erect, about 8 dm. high, usually much-branched, terete, hirsutish-pubescent with spreading or subappressed hairs; branches arcuate-ascending: leaves opposite, sessile, ovate, 1.5 to 5 cm. long, 1 to 4 cm. broad, subulate-dentate, hirsute-pubescent on both surfaces, especially on the midrib and veins beneath, 3-nerved from the base: inflorescence a loose panicle: heads about 1 cm. high: involucre 4-5-seriate; bracts of the involucre lanceolate, subulate-acuminate, glabrous, conspicuously nerved, pale-green, scarious-margined: mature achenes 3 to 3.5 mm. long, dorso-ventrally compressed, the outer surface 3-4-nerved, the inner 1-2-nerved, dull brown, slightly pubescent on the nerves. — MEXICO. State of Morelos: limestone hills near Yantepec, altitude 1220 m., 21 October, 1902, *C. G. Pringle*, no. 9865 (hb. Gr.), distributed as "*Brickellia diffusa*, Gray." State of Guerrero: vicinity of Acapulco, October, 1894 to March, 1895, *Dr. Edward Palmer*, no. 625 (hb. Gr.), originally determined as "*Barroetea subuligera*, Gray."

BARROETEA SUBULIGERA, Gray, var. *latisquama*, n. var. Habit and foliage of the species: heads 30-35-flowered; involucre bracts lanceolate to lance-oblong, mostly abruptly contracted at the apex and terminated by a mucro, more or less tinged with purple: achenes 3 mm. long, ciliate, sparingly pubescent on both surfaces. — MEXICO. State of Jalisco: on dry rocky mountains near Etzatlan, 27 October, 1903, *C. G. Pringle*, no. 8773 (hb. Gr.).

Gutierrezia argyrocarpa, n. sp. Suffruticose: stem much-branched, striate, hirtellous-puberulent: leaves linear to linear-spatulate, 1 to 1.5 cm. long, 1 to 2.5 mm. broad, obtusish, entire, glabrous on both surfaces: heads numerous, 4 to 5 mm. high, sessile or pedunculate, terminating the branches in cymose inflorescences: involucre campanulate, 3-seriate; bracts of the involucre narrowly oblong, appressed, herbaceous-tipped, the outer shorter: receptacle convex, not elongated: ray-flowers mostly 6; pappus of the ray-flowers similar to that of the flowers of the disk but shorter; rays pale yellow: disk-flowers about 12: achenes densely appressed-sericeous; pappus of 12 or more unequal somewhat lacerated

scales nearly or quite as long as the achene. — MEXICO. State of Hidalgo: on chalk bluffs of Tula, altitude 2075 m., 20 September, 1902, *C. G. Pringle*, no. 11,361 (hb. Gr.).

The habit and general appearance of *G. argyrocarpa* is like *G. Berlandieri*, Gray, from which, however, it differs by the longer pappus, fewer ray-flowers, and by the more densely pubescent achenes. From *G. eriocarpa*, Gray, it differs in having fewer flowers in the head, a merely convex not high conical receptacle, and by the strongly appressed pubescence of the achene.

Erigeron irazuense, n. sp. Suffrutescent: stems erect or ascending, 1 to 2 dm. high, pilose-pubescent, purplish: leaves spatulate to oblanceolate, 1 to 3.5 cm. long, 3 to 8 mm. broad, apiculate-acute, sparingly mucronate-dentate in the upper half, gradually narrowed below the middle to a winged subpetiolar base, pilose-hirsute on both surfaces: heads few, 10 to 12 mm. high, terminating the stem and branches on 3 cm. or less long pubescent peduncles: involucre 2-3-seriate, pubescent; bracts of the involucre lance-attenuate, equalling or slightly exceeding the numerous flowers of the disk, more or less purplish; the outer bracts somewhat shorter than the inner: ray-flowers 3-seriate; rays narrow, white or roseate: achenes pubescent. — COSTA RICA. "Endroits humides," La Playita, altitude, 3300 m., Volcan Irazu, 31 January, 1900, *H. Pittier*, no. 14,075 (hb. Gr., and hb. Physico-Geogr. Cost. Ri.).

DIPLOSTEPHIUM SCHULTZII, Wedd. *Chloris Andina*, i. 204. *D. rupestre*, Klatt, Bull. Soc. Bot. Belg. xxxi. pt. 1, 197, reprint, p. 15, not Wedd. The late Professor Klatt referred Pittier's no. 178, collected on the summit of Mount Irazu, Costa Rica, 30 March, 1888, to *Diplostephium rupestre*, Wedd. A careful study of the specimen under this number in the Gray Herbarium shows that it is identical rather with *D. Schultzii*, Wedd. To this species is also to be referred Pittier's no. 14,072 (hb. Gr., and hb. Inst. Physico.-Geogr. Cost. Ri.). As far as known to the writer *D. Schultzii* has not been hitherto recorded from North America.

Baccharis glandulosa, n. sp. Glandular-pubescent throughout: stems caespitose from a perennial root, erect, 0.5 to 1 m. high, striate, reddish-brown: leaves alternate, sessile, amplexicaul, lanceolate, 5 to 8 cm. long, 1 to 1.5 cm. broad, acute, mucronate-denticulate, dark green above, paler beneath: inflorescence a terminal leafy paniculate cyme: heads of the pistillate plant about 1 cm. high with many (100-120) pistillate flowers surrounding 8 to 15 hermaphrodite flowers in the centre of the head; involucre campanulate; bracts of the involucre unequal, 4-5-seriate, linear-attenuate, more or less purplish, the outer shorter than the

inner; pappus white, about 5 mm. in length: achenes slightly puberulent: heads of the staminate plant also about 1 cm. high, many (60-70)-flowered; involucreal characters similar to those of the pistillate plant. — MEXICO. Federal District: Serrania de Ajusco, altitude, 2885 m., 7 December, 1903, *C. G. Pringle*, no. 8782 (hb. Gr.).

Baccharis oaxacana, n. sp. An herbaceous perennial, often stoloniferous, freely rooting at the suffruticose base: stems erect or ascending, 2 to 5 dm. in height, sparingly branched above, terete, more or less glandular-pubescent: leaves alternate, sessile, oblong-obovate, 2 to 7.5 cm. long, 1 to 3 cm. broad, mucronate, shallowly dentate or mucronate-denticulate, narrowed below the middle to a broadly winged subpetiolate auriculate-amplexicaul base, glandular-hirtellous, paler and somewhat villous-pubescent beneath especially on the midrib and lateral nerves: inflorescence a terminal corymbose cyme; peduncles short-stipitate-glandular: heads of the pistillate plant about 1 cm. high, many (70-75)-flowered; involucre campanulate, glandular-puberulent to essentially glabrous; bracts of the involucre unequal, linear-lanceolate, shorter than the flowers, deeply tinged with purple; flowers either all pistillate or sometimes with a few (2-4) perfect (?) flowers in the centre of the head; pappus white or slightly tawny, 5 to 6 mm. long; achenes glabrous or inconspicuously puberulent: heads of the staminate plant about 8 mm. high, 60-70-flowered, the outer cycle not infrequently consisting of 5 pistillate flowers; involucreal bracts sub-4-seriate, narrowly lanceolate, acute, purplish and slightly glandular-puberulent. — MEXICO. State of Oaxaca: Sierra de San Felipe, altitude 2895 m., 13 December, 1895, *C. G. Pringle*, no. 6257 (hb. Gr.), distributed as *Baccharis hieraciifolia*, Hemsl.; in the same locality, 3 August, 1894, *C. G. Pringle*, no. 5669 (hb. Gr.).

This species is most nearly related to *B. hieraciifolia*, Hemsl., to which Mr. Pringle's specimens were referred by the writer. A more thorough study in the light of additional material shows very clearly that *B. oaxacana* differs constantly from *B. hieraciifolia* in having the leaves sessile oblong-obovate and auriculate-amplexicaul, not ovate-lanceolate and acuminate at both ends. *B. oaxacana*, as well as the preceding species, *B. glandulosa*, Greenm., may be regarded as somewhat intermediate between *Conyza* and *Baccharis*, as they are not distinctly dioecious. The sexes are, however, sufficiently differentiated to warrant both being placed definitely in the genus *Baccharis*.

Desmanthodium fruticosum, n. sp. Shrub, 1 to 1.5 m. in height: branches terete, striate, reddish-brown: leaves opposite, ovate, 4 to 8 cm.

long, 2 to 4.5 cm. broad, acuminate, acute, shallowly dentate, narrowed below into a subpetiolate base, 3-nerved, dark green and essentially glabrous above, paler and crisp-pubescent on the conspicuously anastomosing veins and somewhat ferruginous-pubescent on the midrib and nerves beneath: inflorescence corymbose, and as well as the younger branches ferruginous-pubescent in decussating lines: heads in glomerules 5 to 6 mm. high and nearly or quite as broad, disposed in a terminal crowded corymb; bracts of the glomerule and of the involucre brownish, glabrous or nearly so: achenes oblanceolate, about 2 mm. long, black and glabrous. — MEXICO. State of Jalisco: Zapotlan, 9 October, 1903, *E. W. D. Holway*, no. 5137 (hb. Gr.).

CLIBADIUM PITTIERI, Greenm., forma *phrixium*, n. form. Stem pubescent with spreading hirsute-hispid hairs: foliar characters and details of the head the same as the species. — COSTA RICA. "Confluent du Puerto Viejo et du Sarapiquí," January, 1893, *P. Biolley*, no. 7399 (hb. Gr., and hb. Inst. Physico.-Geogr. Cost. Ri.); "Buissons à Tuis," altitude 650 m., December, 1897, *Ad. Tonduz*, no. 11,479 (hb. Gr., and hb. Inst. Physico.-Geogr. Cost. Ri.).

Rumfordia aragonensis, n. sp. Stem erect, striate, glabrous or slightly pubescent: leaves opposite, detoid-ovate to ovate-lanceolate, 7 to 22 cm. long, 2.5 to 11 cm. broad, acuminate, acute, mucronate-denticulate, abruptly narrowed below the middle into a winged petiole continuous about the stem, thin or membranous, 3-nerved, sparingly puberulent on both surfaces: inflorescence a terminal corymbose cyme: heads about 12 mm. high, radiate: involucre 2-seriate; outer bracts of the involucre foliaceous, ovate and acute to ovate-lanceolate and acuminate-acute, glabrous or essentially so; inner bracts of the involucre lanceolate, somewhat navicular, stipitate-glandular, more or less closely surrounding the glabrous ray-achenes: ray-flowers sub-biseriate, fertile; rays small, linear-oblong, the expanded portion about 5 mm. long, 1 mm. broad, obtuse or rarely toothed, usually 2-nerved: disk-flowers 20 to 30: achenes obovate, glabrous, one half shorter than the pales of the receptacle. — COSTA RICA. "Broussailles près d'Aragon," Turrialba, altitude 620 m., 2 January, 1899, *H. Pittier*, no. 13,246. In general aspect *R. aragonensis* resembles *R. polymnioides*, Greenm., but is readily distinguished from it by the absence of pilose hairs on the stem and in the inflorescence, the smaller fewer-flowered heads, the shorter pales of the receptacle, and the narrowed fewer-nerved barely dentate rays.

Sclerocarpus sessilifolius, n. sp. Stems ascending, 3 dm. or more

long, sparingly branched, striate, hirsute-hispidulous: leaves mostly opposite, sessile or essentially so, ovate to ovate-lanceolate, 2 to 5 cm. long, 1 to 2 cm. broad, acute, remotely few-dentate, dark green and hirsute-hispid above, paler and almost soft-hirsute beneath, cuneate to subcordate at the base, 3-nerved, often reflexed: heads large, 1.5 to 2 cm. high, including the rays 4 to 5 cm. in diameter, terminating the stem on naked 8–15 cm. long peduncles: involucre biseriate; bracts of the involucre unequal, foliaceous, lance-linear to narrowly oblanceolate, 6 to 12 mm. long, hirsute-pubescent: ray-flowers about 15, conspicuous, neutral; rays lemon-yellow, 1.5 to 2 cm. long, one half as broad: disk-flowers numerous: corollas deeply 5-toothed; teeth pubescent on the upper or inner surface with long black hairs: pappus reduced to an inconspicuous crown, often bearing one or two larger squamellae: achenes glabrous. — MEXICO. State of Sinaloa: foothills of the Sierra Madre, between Rosario and Colomas, 13 July, 1897, *Dr. J. N. Rose*, no. 1629 (hb. Gr., and hb. U. S. Nat. Mus.); near Colomas, 20 July, 1897, *Dr. J. N. Rose*, no. 3224 (hb. Gr., and hb. U. S. Nat. Mus.).

Aspilia Rosei, n. sp. Suffruticose, hirsute-hispid throughout: stems as seen 1.5 to 2.5 dm. high, branched: leaves opposite, linear to lanceolate, 1 to 5 cm. long, 2 to 10 mm. broad, acute, entire or inconspicuously denticulate, strongly revolute-margined, sessile or narrowed below into a short petiole, appressed-tuberculate-hispid above, rather sparingly hirsute-pubescent and prominently nerved beneath: heads about 1 cm. high, 1.5 to 2 cm. broad including the rays, terminating the stem and branches: peduncles 0.5 to 4 cm. in length: involucre 2-seriate; outer bracts of the involucre foliaceous, lanceolate or slightly spatulate, 8 to 10 mm. long, acute or acutish, externally hirsute-pubescent, equaling or more often slightly exceeding the inner oblong obtuse strongly ciliate involucre bracts: ray-flowers 6 to 8, neutral; rays pale yellow: disk-flowers about 20: pappus of both ray- and disk-flowers a lacerated crown of united scales, often with a short awn on the inner angle of the disk-achenes. — MEXICO. Territory of Tepic: in the Sierra Madre, between Santa Gertrudis and Santa Teresa, 8 August, 1897, *Dr. J. N. Rose*, no. 2111 (hb. Gr., and hb. U. S. Nat. Mus.). State of Durango: 13 August, 1897, *Dr. J. N. Rose*, no. 2245 (hb. Gr., and hb. U. S. Nat. Mus.).

Aspilia purpurea, n. sp. An herbaceous perennial, hirsute-pubescent throughout with appressed or somewhat spreading hairs: stems several, erect, or ascending from a woody base, about 3 dm. in length, branched above: leaves opposite, sessile or nearly so, elliptic-

lanceolate to oblong-obovate, 2 to 5 cm. long, 0.5 to 2 cm. broad, acute, dentate to subentire, green above, slightly paler beneath: heads 10 to 12 mm. high, including the rays 3 to 4 cm. in diameter, terminating the stem and branches on long mostly naked peduncles: involucre narrowly campanulate, 2-3-seriate; the outer involucre bracts herbaceous, lanceolate, acute, usually exceeding the inner; the inner bracts of the involucre oblong, ciliate, often purplish: ray-flowers commonly 6, neutral; rays, including the short tube, 12 to 18 mm. long, 5 to 9 mm. broad, dark purple: disk-flowers about 20; pappus lacerate-crowniform with an occasional short awn on the inner angle of the achene, persistent: mature achenes slightly obovate, 3 to 4 mm. long, hirsute-pubescent with upwardly subappressed hairs. — MEXICO. State of Chiapas: Valley of Jiquipilas, altitude 650 to 850 m., 16 to 18 August, 1895, *E. W. Nelson*, no. 2924 (hb. Gr., and hb. U. S. Nat. Mus.).

Aspilia xylopoda, n. sp. An herbaceous perennial: stems several from a stout ligneous base, erect, 4 dm. or more high, simple below, branched above, hirsute-hispid with spreading hairs intermixed with a hirtellous puberulence, green and striate, purplish above: leaves opposite, lanceolate to lance-oblong, 3 to 8 cm. long, 0.8 to 2.5 cm. broad, acute, entire or remotely denticulate, narrowed at the base into a short petiole, tuberculate-hispid above, hirsute-pubescent beneath: heads 10 to 12 mm. high, including the rays 1.5 to 2 cm. in-diameter: involucre 2-seriate; outer bracts of the involucre herbaceous, lanceolate, 12 mm. in length, acute, pubescent on both surfaces; inner involucre bracts oblong, slightly shorter than the outer, obtusish, externally pubescent, long-ciliate, purplish: ray-flowers 8, neutral; rays purple: disk-flowers 20 to 30: pappus a short lacerated crown of united scales: immature achenes pubescent. — MEXICO. State of Durango: 13 August, 1897, *Dr. J. N. Rose*, no. 2260 (hb. Gr., and hb. U. S. Nat. Mus.); also same locality and date, *Dr. J. N. Rose*, no. 2245 in part (hb. Gr., and hb. U. S. Nat. Mus.).

The species here proposed is related to *Aspilia purpurea*, Greenman, from which, however, it is readily separated by the longer leaves, and the spreading pubescence on the stem.

Viguiera morelensis, n. sp. Stem erect, branched above, upwardly appressed hirsute-hispid, also finely puberulent, reddish-brown: leaves alternate, lanceolate, 3 to 7 cm. long, 1 to 2.5 cm. broad, acuminate, acute, dentate to subentire, revolute-margined, narrowed below into a subpetiolate base, 3-nerved, appressed-hirsute and somewhat rugose above, hirsute-pubescent beneath especially on the conspicuously

reticulated veins: heads 10 to 12 mm. high, about 3 cm. in diameter, terminating the stem and branches in a paniculate cyme: involucre campanulate, 3-4-seriate; bracts of the involucre lanceolate, acute, herbaceous-tipped and more or less squarrose, externally hispid-pubescent, ciliate: ray-flowers orange-yellow, 12 to 14: disk-flowers numerous; pappus of two caducous aristæ with minute intermediate scales: achenes somewhat compressed laterally, oblique, 2 to 2.5 mm. long, black, glabrous. — MEXICO. State of Morelos: near Cuernavaca, 12 November, 1902, *C. G. Pringle*, no. 11,295 (hb. Gr.).

The rather strongly compressed achenes of the species here described suggests at first a generic affinity with *Encelia*, but the whole habit of the plant is that of a *Viguiera*; and, moreover, its specific relationship seems to be with *V. Palmeri*, Gray, and *V. urticiformis*, Hemsl. From both of these species *V. morelensis* differs in having alternate leaves, and in having somewhat squarrose but not attenuated involueral bracts.

Perymenium (?) *calvum*, n. sp. An herbaceous perennial: stems erect from a ligneous base, slender, about 1.5 dm. high, upwardly strigillose, purplish: leaves opposite, sessile, broadly ovate to ovate-lanceolate, 1.5 to 2.5 cm. long, 0.8 to 1.6 cm. broad, mucronate-acute, shallowly dentate, appressed-hispidulous on both surfaces, slightly paler beneath: peduncles long and slender, 6 to 9 cm. in length, appressed-hispidulous: heads about 1 cm. high, radiate: involucre 2-seriate; bracts of the involucre oblong-lanceolate, 8 to 9 mm. long, somewhat acuminate, acute, strigillose: ray-flowers 5 to 7, fertile; rays yellow: disk-flowers several: achenes of both ray- and disk-flowers bald, glabrous, those of the disk laterally compressed and sub-4-angled. — MEXICO. State of Sinaloa: in the foothills of the Sierra Madre, near Colomas, 14 July, 1897, *Dr. J. N. Rose*, no. 3225 (hb. Gr., and hb. U. S. Nat. Mus.). Notwithstanding the lack of pappus the plant here described is placed for the present at least in the genus *Perymenium*. In general habit it resembles *P. tenellum*, Gray.

Helianthella iostephanoides, n. sp. An herbaceous perennial: stems 5 to 7 dm. high, erect, simple below, branched above, striate, reddish-brown, hirsute-pubescent with spreading or subappressed usually jointed hairs: leaves chiefly basal, oblong to lance-oblong, 1 to 1.5 cm. long, 2 to 4 cm. broad, obtuse or acute, remotely denticulate, slightly sinuate, narrowed below into a winged petiole, sparingly hirsute-pubescent on both surfaces, subtrinerviate from near the base; stem-leaves few, remote and smaller: heads few, 1.5 cm. high, including the rays 3.5 to 4 cm. in diameter, disposed on long bractless pubescent peduncles 8 to 18

cm. in length: involucre bracts 2-seriate, lanceolate, 12 to 15 mm. long, 3 to 5 mm. broad, acute, densely hirsute-pubescent: ray-flowers about 13; rays yellow, 1.5 to 2 cm. long, 7 to 10 mm. broad, 3-dentate: disk-flowers numerous: pappus of two aristae with intermediate lacerated and more or less united squamellae: achenes laterally compressed, slightly pubescent, ciliate along the inner margin. — MEXICO. State of Zacatecas: in the Sierra Madre, 18 August, 1897, *Dr. J. N. Rose*, no. 2391 (hb. Gr., and hb. U. S. Nat. Mus.).

Zexmenia Rosei, n. sp. An herbaceous perennial: roots tuberiform: stem erect, 3 to 4 dm. high from a ligneous base, sparingly branched below, simple above, densely pubescent with spreading villous hairs with which is intermixed a fine puberulence: leaves confined chiefly to the lower part of the stem, opposite, short-petiolate, oblong-lanceolate to somewhat oblanceolate, 6 to 18 cm. long, 2 to 5.5 cm. broad, acute or obtuse, rather sparingly dentate, dark green and tuberculate-hispid above, paler and prominently reticulate-nerved and densely villous-pubescent beneath especially on the anastomosing veins: inflorescence a few-headed close terminal cyme, subtended by 2 to 4 well developed leaves or foliaceous bracts: heads about 12 mm. high, radiate: involucre campanulate; bracts of the involucre 2-3-seriate, the outer foliaceous, oblong or oblanceolate, obtuse, villous-pubescent, the inner thinner, stramineous below, purplish and ciliate towards the apex: ray-flowers fertile; rays including the tubular portion 12 to 15 mm. long, 4 to 6 mm. broad, deep purple: disk-flowers numerous: pappus of both ray- and disk-flowers much-reduced, consisting of a crown of minute scales: achenes of both ray- and disk-flowers narrowly winged, glabrous. — MEXICO. Territory of Tepic: between Pedro Paulo and San Blacisto, 4 August, 1897, *Dr. J. N. Rose*, no. 1987 (hb. Gr., and hb. U. S. Nat. Mus.).

OTOPAPPUS EPALEACEUS, Hemsl., var. (?) *Pringlei*, n. var. Habit and foliar characters of the species: stem above and the ultimate branches pubescent with spreading or reflexed subvillous hairs: heads exclusive of the rays 12 to 16 mm. in diameter; inner involucre bracts lanceolate, acutish; rays short, pale-yellow; pappus of 2 unequal awns with intermediate scales which are 0.5 to 0.75 mm. in length: mature achenes 4 mm. long, glabrous, longitudinally 3-ribbed on both surfaces. — MEXICO. State of Morelos: near Cuernavaca, altitude 1585 m., 12 September, 1896, *C. G. Pringle*, no. 6521 (hb. Gr.), distributed as *Otopappus acuminatus*, Watson. State of Guerrero: Iguala, 3 November, 1902, *E. W. D. Holway*, no. 5313 (hb. Gr.).

Verbesina (Platypteris) Tonduzii, n. sp. Stem brownish, striate,

glabrous or sparingly pubescent, narrowly winged: leaves opposite, simple, ovate, 5 to 14 cm. long, 2.5 to 6 cm. broad, acuminate, sharply and unequally sinuate-dentate, abruptly contracted below the middle and then gradually narrowed to the insertion of the petiole, hispid-pubescent on both surfaces or merely hispidulous beneath: heads relatively few, on 3 to 8 cm. long peduncles, discoid, 12 to 15 mm. high, 1.5 to 2.5 cm. in diameter, many-flowered: involucre campanulate; bracts of the involucre 3-4-seriate, lanceolate, obtuse or obtusish, rather thick, densely puberulent: corollas in the dried state somewhat reddish: mature achenes broadly winged, 5 to 7 mm. long, nearly or quite as broad, glabrous or somewhat verrucose. — *V. Fraseri*, Klatt, Bull. Soc. Bot. Belg. xxxi. pt. 1, 205 (reprint 23) in part, not Hemsl. *V. crocata*, Rob. & Greenm. Proc. Am. Acad. xxxiv. 537 in part, not Less. — COSTA RICA. "Dans les buissons à las Vueltas, Tucurrique," altitude 635 m., November, 1898. *Tonduz*, no. 12,765 (hb. Gr.); "haie à Turrialba," altitude 200 m., 6 May, 1891, *Pittier*, no. 4136 (hb. Gr.): "broussailles à Buenos Aires," January, 1892, *Pittier*, no. 4905 (hb. Gr.). Most nearly related to *V. crocata*, Less. with which species it has been confused, but from which it is readily separated by the fewer seriated involucre, shorter and more obtuse bracts of the involucre, simple and undivided leaves, and narrowly winged petiole gradually narrowed to the base.

GARCILLASSA RIVULARIS, Poepp. Nov. Gen. & Sp. iii. 46, t. 251. With this species the writer identifies the following: COSTA RICA. "Bois de la vallée du Rio Tuis," altitude 600 m., November, 1893, *Ad. Tonduz*, no. 8096 (hb. Gr., and hb. Inst. Physico.-Geogr. Cost. Ri.); "broussailles à Tuis," altitude 650 m., November, 1897, *Ad. Tonduz*, no. 11,482 (hb. Gr., and hb. Inst. Physico.-Geogr. Cost. Ri.). Mr. *Tonduz's* specimens agree in every detail with the original description and illustration above cited. The genus is, as far as known, monotypic, and does not seem to have been hitherto recorded as occurring north of the Isthmus of Panama.

Coreopsis cuneifolia, n. sp. Suffruticose: stem covered with a grayish bark, di- or trichotomously branched; branchlets at first upwardly subappressed-pubescent, later glabrate except at the nodes: leaves opposite, simple at least as far as seen, cuneate or oblanceolate-cuneate, 1.5 to 3.5 cm. long, 6 to 12 mm. broad, acute, dentate in the upper half with usually 7 to 9 spreading mucronate teeth, cuneate and entire below, narrowed into a subpetiolate base, glabrous on both surfaces or sparingly pubescent beneath, glandular-punctate: heads

pedunculate, about 1 cm. high, 1.5 to 2 cm. broad, terminating the stem and branches and either solitary or in few-headed paniculate-cymes: outer involucre bracts few, herbaceous, slightly spreading; inner bracts of the involucre oblong, 6 mm. long, 2 to 2.5 mm. broad, obtuse: ray-flowers few, five or six, fertile; rays with a short sparingly pubescent tube and a broad-oblong expanded portion, 6 mm. long and nearly as broad: disk-flowers about 12; achenes, as well as those of the ray-flowers, oblong, strongly obcompressed, destitute of pappus, glabrous. — MEXICO. State of Durango: 16 August, 1897, *Dr. J. N. Rose*, no. 2344 (hb. Gr., and hb. U. S. Nat. Mus.). State of Jalisco: on dry rocky mountains near Etzatlan, 2 October, 1903, *C. G. Pringle*, no. 8781 (hb. Gr.).

In habit *Coreopsis cuneifolia* suggests *C. petrophiloides*, Rob. & Greenm., from which it is amply distinct in the character of the foliage, the pubescent branches, and in the glabrous epappose achenes. In the technical characters of the head *C. cuneifolia* is more nearly related to *C. mexicana*, Hemsl. (*Electra mexicana*, DC.), but is readily separated by the cuneate or oblanceolate-cuneate leaves, by the pubescent branchlets, etc.

LEPTOSYNE ARIZONICA, Gray, var. *filiformis*, n. var. Glabrous throughout: leaves 3-5-parted; segments filiform, 8 cm. or less in length. — MEXICO. State of Sinaloa: Sierra de Choix, 80 km. N. E. of Choix, 15 October, 1898, *E. A. Goldman*, no. 258 (hb. Gr., and hb. U. S. Nat. Mus.). Aside from the filiform attenuated leaf-segments no important characters are observed separating the variety from typical representatives of the species.

LEPTOSYNE PINNATA, Rob., var. *integrifolia*, n. var. Leaves simple, undivided, entire or crenulate: pappus evident, coroniform, often of several short unequal more or less lacerated scales. — MEXICO. State of Durango: near el Salto, 12 July, 1898, *E. W. Nelson*, no. 4580. Mr. Nelson's plant at first glance seems very different from the type-specimen of *Leptosyne pinnata*; but aside from the characters enumerated, namely, the entirety of the leaves and the fairly well developed pappus, there are no further differences.

BIDENS LUDENS, Gray, Proc. Am. Acad. xxi. 390. This species was founded on Pringle's no. 293 collected on hills and plains near the City of Chihuahua, Mexico, in October of 1885. The printed label accompanying this plant in the Gray Herbarium bears the name "*Leptosyne Arizonicus*, Gray." The unfortunate confusion of names probably resulted either in reporting the collection or in printing the labels. The

plant, however, is unquestionably a *Bidens*, and the correction of the label may now be definitely made.

Perityle Rosei, n. sp. Stems erect, 1 to 2 dm. high from a ligneous base, more or less striate, puberulent: leaves opposite, or the uppermost alternate, petiolate, ovate-triangular, frequently somewhat halberd-shaped, 1 to 3 cm. long, 0.5 to 2 cm. broad, acute or rounded at the apex, entire or subentire, subtruncate at the base and decurrent on the petiole, puberulent on both surfaces: heads about 6 mm. high, on peduncles 3 cm. or less in length, many-flowered, radiate: involucre of about 24 lanceolate acute bracts, and as well as the peduncles pubescent: ray-flowers about 13; rays white: disk-flowers 50 to 60: pappus of both both ray- and disk-flowers of two slender subequal setae, which are nearly or quite as long as the achene, and of intermediate more or less united erose scales: mature achenes about 2.5 mm. long, subcartilaginously margined and ciliated, glabrous on both surfaces. — MEXICO. State of Jalisco: in the Sierra Madre, west of Bolaños, 15–17 September, 1897, Dr. J. N. Rose, no. 2947 (hb. Gr., and hb. U. S. Nat. Mus.).

GALEANA HASTATA, La Llave. Although this species was well described by La Llave in 1824, nevertheless by subsequent authors it seems to have been little understood, and somewhat traditionally treated as an herbaceous monotype of doubtful affinity. Kunth in 1820 referred specimens secured by Humboldt and Bonpland at Valladolid, Mexico, to the Linnaean genus *Unxia*. Lessing in 1832, recognizing the discrepancy between the Mexican annual and typical *Unxia*, apparently unaware of the already published *Galeana*, founded a new genus, *Chlamysperma*, on the Humboldt and Bonpland plant, and established the binomial *Chlamysperma pratense*. Later, in 1873, Bentham and Hooker referred the *Chlamysperma pratense*, Less. to *Villanova*, a genus with pinnatisect leaves and different technical characters of the head; and at the same time retained *Galeana* of La Llave as a distinct genus. Hemsley in the *Biologia Centrali-Americana*, and Hoffmann in Engler and Prantl's *Natürlichen Pflanzenfamilien* follow the course of Bentham and Hooker. There are in the Gray Herbarium several specimens, which were identified by Dr. Gray with *Galeana hastata*, and which too correspond in every detail with the careful characterization of La Llave. These specimens, together with a part of the original plant on which Lessing based his new genus *Chlamysperma*, as well as a considerable suite of recently collected material, have been examined by the writer, and there can be no doubt but that they all represent one and the same species, as in every essential morphological character there is exact

correspondence. The synonymy and citation of specimens are as follows :

GALEANA HASTATA, La Llave in La Llav. & Lex. Nov. Veg. Descr. i. 12 (1824); DC. Prodr. vii. pt. 1, 257; Benth. & Hook. Gen. Pl. ii. 406; Hemsl. Biol. Cent.-Am. Bot. ii. 215. *Unxia pratensis*, HBK. Nov. Gen. & Sp. iv. 279, t. 401 (1820). *Chlamysperma pratense*, Less. Syn. Comp. 256 (1832). *C. arenarioides*, Hook. & Arn. Bot. Beech. Voy. 300, t. 64 (1840). *Villanova pratensis*, Benth. & Hook. l. c. 405 (1873); Hemsl. l. c. 213; Hoffm. in Engler & Prantl, Nat. Pflanzenf. iv. Ab. 5, 259. — MEXICO. San José del Coral, *La Llave*. Capula and Valladolid, *Humboldt & Bonpland*. State of Vera Cruz: Cordillera of Vera Cruz, altitude 915 m., *Galeotti*, no. 2198 (hb. Gr.). State of Jalisco: without locality, *Beechey*; near Guadalajara, July, 1886, *Palmer*, no. 263 (hb. Gr.); barranca near Guadalajara, 1 November, 1888, *Pringle*, no. 2177 (hb. Gr.); hills near Guadalajara, 8 October, 1889, *Pringle*, no. 2330 (hb. Gr.); between Colotlan and Bolaños, 7 to 9 September, 1897, *Dr. J. N. Rose*, no. 3673 (hb. Gr., and hb. U. S. Nat. Mus.). State of Colima: Volcan de Colima, altitude 1220 m., 1840, *Galeotti*, no. 2449 (hb. Gr.); Manzanillo, 1863, *Xantus*, no. 330 (hb. Gr.). State of Morelos: Cuernavaca, 3 January, 1900, *Chas. C. Deam*, no. 8 (hb. Gr.); Cuernavaca, 6 July, 1900, *Chas. C. Deam*, no. 55 (hb. Gr.). State of Chiapas: Valley of Jiquipilas, altitude 600 to 850 m., 16 to 18 August, 1895, *E. W. Nelson*, no. 2931 (hb. Gr., and hb. U. S. Nat. Mus.). GUATEMALA. Department of Santa Rosa: Santa Rosa, altitude 915 m., July, 1892, *Heyde & Lux*, no. 3364 (hb. Gr.), exsiccatae of John Donnell Smith.

HYMENOTHRIX GLANDULOSA, Watson, var. *Nelsonii*, n. var. With habit and general characters of the species but much less glandular-pubescent: bracts of the involucre often purplish-tinged on the margins: pappus usually of 12 narrowly oblong-obovate or slightly spatulate scales about 1.5 mm. in length, fully twice longer than in the species, obtuse; midnerve not excurrent. — MEXICO. State of Chihuahua: in the Sierra Madre near Colonia Garcia, 1-20 August, 1899, *E. W. Nelson*, no. 6210 (hb. Gr., and hb. U. S. Nat. Mus.).

BAHIA GLANDULOSA, Greenm., Proc. Am. Acad. xxxix. 116 (1903). To this species is to be referred specimens secured by Dr. J. N. Rose near Plateado, State of Zacatecas, Mexico, 3 September, 1897, no. 2772 (hb. Gr., and hb. U. S. Nat. Mus.). This collection extends the geographical range of the species considerably southward and eastward from the hitherto recorded localities.

Tagetes Hartwegii, n. sp. An erect herbaceous perennial, glab-

rous throughout: stem 8 to 9 dm. high from a ligneous base, striate, purplish: leaves bipinnately parted, 2 to 8 cm. long, 1.5 to 6.5 cm. broad; segments linear-lanceolate, acute, subequally serrate-dentate, often setigerous, bearing a single row of glands on either half of the blade at the base of the teeth: heads about 1.5 cm. high, including the rays 2.5 to 3.5 cm. in diameter, terminating the stem and branches on long slender 0.5 to 1 dm. long peduncles: involucre subcampanulate, 10 to 12 mm. high, 6 to 8 mm. in diameter, 8-dentate; teeth obtuse, slightly pubescent: ray-flowers 8; pappus of 1 to 5 narrow unequal paleaceous awns not exceeding the involucre; tube about 5 mm. in length, pubescent; rays subobovate to oblong-cuneate, 1.2 to 1.5 cm. long, 7 to 11 mm. broad, emarginate, deep orange-yellow: disk-flowers 35 to 45; pappus much-reduced or quite obsolete; corollas deeply 5-toothed with the tube pubescent below, glabrous above, and the teeth pubescent on the inside especially along the margins: achenes 6 mm. long, glabrous. — *T. peduncularis*, Benth., Pl. Hartw. 17 (1839), not Lag. — MEXICO. State of Jalisco: in pine woods, Bolaños, 1837, *Hartweg*, no. 118 (hb. Gr.); Sierra Madre, west of Bolaños, 16 September, 1897, *Dr. J. N. Rose*, no. 3722 (hb. Gr., and hb. U. S. Nat. Mus.). Hartweg's number above cited was referred doubtfully by Mr. Bentham to *Tagetes peduncularis*, Lag.; but the excellent specimens secured by Dr. Rose, which are identical with the Hartweg plant in the Gray Herbarium, show very clearly that the two species have but a superficial resemblance. The single row of submarginal leaf-glands, the 8-dentate involucre, the numerous flowers, and finally the usually epappiferous character of the disk-flowers render *T. Hartwegii* an easily recognizable species, readily distinguished from *T. peduncularis*, Lag., with which it has been confused.

Tagetes jaliscensis, n. sp. An erect glabrous annual 3 to 4.5 dm. in height: stem simple and terete below, branched and striate or angulate-striate above, green or somewhat purplish: leaves opposite below, alternate above, 3 to 10 cm. long, 1.5 to 4 cm. broad, deeply pinnatisect with 9 to 15 narrowly lanceolate acute subincised-dentate segments and with 4 to 8 smaller setiferous segments at the base; the punctate glands more or less scattered in the leaf-lamina: heads corymbosely disposed on 2 to 4 cm. long upwardly thickened peduncles: involucre slightly fusiform, 1.5 to 1.7 cm. high: ray-flowers 5; tube 8 to 9 mm. long, inconspicuously puberulent; rays cuneate-oblong, 5 to 6 mm. long, and nearly or quite as broad, emarginate, deep orange: disk-flowers about 12; corollas tubular, rather deeply 5-lobed; lobes pubescent and, as well as the upper portion of the tube, colored like the rays: pappus of both ray- and

disk-flowers of 2 anterior lance-attenuate paleaceous aristae 8 to 10 mm. in length, and of 3 posterior more or less coalescent pales less than one-half the length of the outer or anterior ones, at maturity grayish purple: mature achenes 8 to 9 mm. long, puberulent. — MEXICO. State of Jalisco: on dry rocky mountains above Etzatlan, altitude 610 to 915 m., 2 October, 1903, *C. G. Pringle*, no. 8768 (hb. Gr.).

HYMENATHERUM AUREUM, Gray, Proc. Am. Acad. xix. 42 (1883); Syn. Fl. i. pt. 2, 359. The following specimens are identified with this species: MEXICO. State of Chihuahua: Colonia Diaz, 20–21 September, 1899, *E. W. Nelson*, no. 6446 (hb. Gr., and hb. U. S. Nat. Mus.). Although *H. aureum* is well known from Texas to Colorado, it seems not to have been hitherto recorded from Mexico.

Porophyllum Holwayanum, n. sp. Shrub 1 to 1.5 m. high, glabrous throughout: stem covered with a brownish cortex: leaves alternate, petiolate, elliptic-oblong, 1.5 to 5 cm. long, 7 to 22 mm. broad, rounded and submucronate at the apex, crenate-margined, narrowed at the base into a slender 5 to 12 mm. long petiole; glands chiefly marginal, from 5 to 12 on each half of the blade, and a single gland terminating the midnerve: heads numerous, about 2 cm. long, nodding on slender 1 to 1.5 cm. long peduncles, disposed in a terminal leafy panicle: involucre cylindrical, 16 to 17 mm. long, green or slightly purplish; bracts of the involucre 5, narrowly oblong, obtuse: flowers usually 14, exceeding the involucre; corolla with a slender tube about equalling the pappus, and a narrowly campanulate 5-toothed limb, yellowish-green or not infrequently slightly purplish-tinged at the base of the limb: anthers purplish: achenes puberulent, about 1 cm. in length. — MEXICO. State of Jalisco: Sayula, 8 October, 1903, *E. W. D. Holway*, no. 5130 (hb. Gr.); near Chapala, 5 October, 1903, *Rose & Painter*, no. 7652 (hb. Gray, and hb. U. S. Nat. Mus.). A species nearly related to *P. nutans*, Rob. & Greenm., but differing in the uniformly larger leaves, longer involucre and more numerous marginal leaf-glands.

➤ *Pectis* (§ *Pectothrix*) *Barberi*, n. sp. Annual, scapose, simple or branched from the base: leaves rosulate, oblanceolate, 1 to 2 cm. long, 2 to 5 mm. broad, obtuse or subsetiferous-mucronate, setiferous-ciliate at the narrowed base, otherwise entire, glabrous on both surfaces, paler beneath: glands of the leaves marginal: scape 0.5 to 1.5 dm. high, slender, minutely bracteate, bearing a single terminal head: heads 8 to 10 mm. high, including the rays 1 to 1.5 cm. in diameter: involucre narrowly campanulate, 5 to 6 mm. high, glabrous and purplish; bracts of the involucre usually 13, lanceolate or narrowly oblong, obtuse, scari-

ous-margined, obtusely keeled toward the base: ray-flowers about 13; pappus of 2 slender setae; tube 1.5 mm. long, puberulent; rays oblong, 5 to 6 mm. long, yellow; style-branches greenish: disk-flowers 40 to 45; pappus of 5 slender subequal setae and numerous shorter unequal setae, often purplish: mature achenes 3 mm. long, inconspicuously puberulent. — MEXICO. State of Chihuahua: in the Sierra Madre near Colonia Garcia, altitude 2285 m., 19 August, 1899, *Townsend & Barber*, no. 269 (hb. Gr.), distributed "*Pectis longipes*, Gray"; between Colonia Garcia and Pratt's Ranch, below Pacheco, 22 to 24 August, 1899, *E. W. Nelson*, no. 6269 (hb. Gr., and hb. U. S. Nat. Mus.).

P. longipes, Gray, to which the Townsend & Barber plant was referred is distinctly a perennial; its stems are ascending or erect, usually branched and more or less leafy; the leaves, moreover, are linear or linear-lanceolate. *P. Barberi* on the other hand is clearly an annual, with scapoid habit and rosulate oblanceolate leaves; it is one of the most clear cut species of the genus.

Pectis (§ *Eupectis*) *propetes*, n. sp. Low annual, usually prostrate and much-branched: stems puberulent in lines, purplish: leaves narrowly oblong to oblanceolate, 1 to 3.5 cm. long, 2 to 5 mm. broad, obtuse or mucronate-acute, entire, setiferous-ciliate toward the base, inconspicuously hirtellous-margined, pale green and glabrous on both surfaces: glands of the leaves scattered: heads 8 to 10 mm. high, on puberulent peduncles 4.5 cm. or less in length: involucre subcylindrical, 6 to 7.5 mm. high, glabrous; bracts of the involucre 5, oblong, obtuse or truncate at the apex, scarious-margined, obtusely keeled toward the base, green or slightly purplish: ray-flowers 5, conspicuous; pappus commonly of 2 lanceolate pales; rays including the tube 8 to 9 mm. long, yellow, in the early stages slightly tinged with purple on the under or outer surface: disk-flowers 20 to 25; pappus of 4 or 5 lance-acuminate pales about one-half as long as the subbilabiate corollas: achenes about 4 mm. long, pubescent. — MEXICO. State of Zacatecas: near San Juan Capistrano, 19 August, 1897, *Dr. J. N. Rose*, no. 2436 (hb. Gr., and hb. U. S. Nat. Mus.). In general aspect *Pectis propetes* resembles *P. prostrata*, but it is readily distinguished from it by the elongated peduncles and the conspicuous ray-flowers.

Pectis (§ *Pectothrix*) *puberula*, n. sp. A slender dichotomously branched annual, 1 to 2 dm. in height: stems puberulent, often purplish: leaves linear or linear-lanceolate, 1 to 3 cm. long, 4 mm. or less broad, acute, bearing 1 to 4 pairs of setae near the base, otherwise entire, glabrous on both surfaces, slightly hirtellous on the margins and on the

midrib beneath, provided with a row of submarginal glands on either half of the blade, more or less revolute-margined: peduncles slender, filiform, 4 cm. or less in length: heads small, about 6 mm. high: involucre 4 mm. high, glabrous; bracts of the involucre 8, linear, blunt, obtusely keeled: ray-flowers 8; pappus of 2 slender setae and a small intermediate anterior scale; rays including the tubular portion 4 mm. long: disk-flowers about 15; pappus of numerous slender unequal setae: mature achenes of both ray- and disk-flowers about 2.5 mm. in length, puberulent. — MEXICO. State of Sinaloa: Lodiago, 9 to 15 October, 1891, *Dr. Edward Palmer*, no. 1605 (hb. Gr., and hb. U. S. Nat. Mus.). In a natural sequence this species is to be placed near *P. papposa*, Gray, and *P. Palmeri*, Watson. From the former it is readily and easily separated by having the heads disposed on long slender peduncles instead of subfastigate; from the latter it differs in the smaller fewer-flowered heads, shorter involucre and more slender peduncles. *P. puberula* differs from both *P. papposa* and *P. Palmeri*, in having the stem and branches puberulent.

PECTIS SINALOENSIS, Fernald, var. **lancifolia**, n. var. Leaves sessile, lanceolate, 2.5 cm. or less long, 6 mm. or less broad, usually hirtellous-puberulent on the upper surface and on the midrib beneath, bearing 1 to 6 pairs of setae toward the base: peduncles 11 cm. or less in length: rays golden-yellow or before expansion slightly copper-colored externally, somewhat larger than in the type of the species. — MEXICO. Territory of Tepic: between Concepcion and Acaponeta, 29 July, 1897, *Dr. J. N. Rose*, no. 1893 (hb. Gr., and hb. U. S. Nat. Mus.).

Artemisia Pringlei, n. sp. Annual, or biennial (?), with a single erect stem, or sometimes several-stemmed from a common base, 4 to 8 dm. high, more or less white-tomentose throughout: lower leaves bitripinnately parted, 2 to 6 cm. long, 3 cm. or less broad, white-tomentose on both surfaces, later as well as the stem below somewhat glabrate; segments linear, obtusish, revolute-margined; upper leaves similar, becoming less parted and finally reduced to simple lance-attenuate entire bracts in the inflorescence: the terminal racemiform panicles 0.5 to 2.5 dm. in length, 1 to 2.5 cm. in diameter: heads in anthesis 3 to 4 mm. high, equally broad, nodding: involucre campanulate, subtriseriate, externally white-tomentose; bracts of the involucre oblong to oblong-ovate, obtuse or rounded at the apex, scarious-margined: flowers 30 to 35, about one-half of which, namely the outer ones, are pistillate, the others hermaphrodite: corollas short-stipitate-glandular: achenes epappose. — MEXICO. State of Chihuahua: plains near the City of Chihuahua,

11 September, 1885, *C. G. Pringle*, no. 625 (hb. Gr.), distributed as "*Artemisia Ludoviciana*, Nutt., var. ?"; near Lake Santa Maria, 7 September, 1899, *E. W. Nelson*, no. 6387 (hb. Gr., and hb. U. S. Nat. Mus.). This species is amply distinct from *A. Ludoviciana* both in the character of the foliage and the inflorescence.

CACALIA PELTATA, HBK., var. *Coulteri*, n. var. Lower leaves peltate, 7–10-lobed with rounded or subcircular sinuses: inflorescence 8 to 15 cm. in diameter, densely pubescent with jointed villous hairs: heads 12–16-flowered. — MEXICO. State of Vera Cruz: Real del Monte, *Th. Coulter*, no. 420 (hb. Gr.); Mt. Orizaba, August, 1891, *Henry E. Seaton*, without number (hb. Gr.). State of Mexico: Nevado de Toluca, 15 October, 1903, *Rose & Painter*, no. 7939 (hb. Gr., and hb. U. S. Nat. Mus.).

CIRSIUM OCHROCENTRUM, Gray, var. *durangense*, n. var. Leaves pinnatisect; divisions lance-linear, spine-tipped, at first arachnoid-tomentulose above but soon glabrate revealing the dark green surface and yellowish midvein, densely and permanently white-tomentulose beneath. — MEXICO. State of Durango: about the City of Durango, 1 August, 1898, *E. W. Nelson*, no. 4633 (hb. Gr., and hb. U. S. Nat. Mus.).

Onoseris silvatica, n. sp. An herbaceous perennial about 1 m. high: leaves alternate, chiefly basal, runcinate-pinnatifid, short-acuminate, acute, unequally sinuate-dentate, arachnoid-tomentulose above, densely white-tomentulose beneath; terminal segment large, triangular-sagittate, 1 to 3 dm. long, nearly or quite as broad, palmately nerved, cordate; lateral segments smaller, divaricate or somewhat reflexed, often reduced to a more or less continuous wing on the rhachis or petiole: inflorescence a naked loose paniculate cyme: peduncle or scape striate-angled, floccose-tomentulose: heads 2 to 2.5 cm. high, 40–45-flowered: involucre sub-campanulate, 2 cm. high, tomentulose; bracts of the involucre 4-seriate, the outer shorter: outer flowers of the head bilabiate, producing well-developed dark-red or purplish rays: inner or disk-flowers deeply and subequally 5-toothed: achenes appressed - sericeous - pubescent. — *O. paniculata*, Klatt, Bull. Soc. Bot. Belg. xxxi. pt. 1, 214, not [Moc. & Sessé] DC. — COSTA RICA. "Forêts des collines de Nicoya," January, 1900, *Ad. Tonduz*, no. 13,597 (hb. Gr.); "forêt de l'Alto del Rodeo," altitude 1100 m., 28 December, 1889, *Pittier*, no. 1622 (hb. Gr.); "tailles du Rodeo del Pacaca," altitude 900 m., 1–2 January, 1891, *Pittier*, no. 3312 (hb. Gr.). From *O. Isotypus*, Benth. & Hook. f. (*O. paniculata*, [Moc. & Sessé] DC.) this species is readily distinguished by having larger more numerous flowered

heads, longer involucre bracts, longer pappus and appressed-pubescent achenes.

• *Crepis Barberi*, n. sp. Perennial: stems scapoid, 5 to 7 dm. high, erect, simple below, branched above, glabrous or essentially so: leaves chiefly rosulate, narrowly oblanceolate, 6 to 15 cm. long, 1 to 2 cm. broad, subruncinate-pinnatifid, bearing lateral ascending to reflexed narrow elongated teeth, obtuse or obtusish, glabrous on both surfaces: heads 15 to 18 mm. high, including the rays about 3 cm. in diameter: involucre at the base, as well as the peduncles, more or less tomentulose; bracts of the involucre lanceolate, obtuse, blackish or dark green, scarious-margined: flowers numerous; rays yellow: achenes columnar, about 10-ribbed, glabrous. — MEXICO. State of Chihuahua: in the Sierra Madre, near Colonia Garcia, altitude 2285 m., *Townsend & Barber*, no. 206 (hb. Gr.); Sierra Madre, *E. W. Nelson*, no. 6107 (hb. Gr., and hb. U. S. Nat. Mus.). This species is most nearly allied to *C. runcinata*, Torr. & Gray.

VI. SOME NEW SPECIES OF MEXICAN AND NICARAGUAN DICOTYLEDONS.

By M. L. FERNALD.

Chlorophora mollis. Tree; the branches covered with greenish gray rough bark bearing many pale lenticels; young branchlets cinereous with soft fine pubescence: leaves ovate, subcordate at base, caudate-acuminate at tip, 3 to 7.5 cm. long, 2 to 4.5 cm. broad, finely crenate-serrate near the middle, and pilose on both surfaces, dull green above, cinereous beneath, the nerves strongly oblique (making an angle of 30° with the midrib); the slender cinereous petiole 6 to 8 mm. long: pistillate heads canescent-puberulent, 4.5 to 6 mm. in diameter, on slender canescent peduncles 2 or 3 mm. long. — OAXACA, Tomellin Cañon, June 23, 1899 (*Rose & Hough*, no. 4672). Differing markedly from the well known *C. tinctoria* in its soft cinereous pubescence, the very oblique nerves of the leaves and the smaller heads of pistillate flowers. Staminate aments not seen.

Cordia (Laxiflorae) chiapensis. Shrub with brown bark, pubescent with appressed tuberculate stiff hairs: leaves elliptic-lanceolate to ovate-lanceolate, 3 to 8 cm. long, 1 to 3.3 cm. broad, subentire or crenulate, or coarsely crenate-serrate toward the usually blunt-acuminate apex, entire

below and cuneate to a short (2 to 4 mm. long) petiole, scabrous above, more or less pilose-hispid beneath on the nerves: cymes subaxillary or terminal: peduncles 2 to 5 cm. long, pilose-hispid with mostly appressed hairs; primary branches mostly 3, more or less forked: calyx hemispherical, appressed-pubescent, becoming 4 mm. high, cleft half-way to base into deltoid awn-tipped lobes: corolla 6 or 7 mm. long, about equalled by the stamens: fruit ovate-oblong, 6 mm. long. — CHIAPAS, table-land about Ocuilapa, alt. 1045 to 1170 m., Aug. 21, 1895 (*E. W. Nelson*, no. 3003).

Salvia (*Micranthae*) *tehuacana*. Simple or branching annual 3 to 5 dm. high; the stems and petioles setulose with crisp spreading white hairs; the middle internodes 1 to 1.5 dm. long, the lower and upper much shorter: leaves broad-ovate, blunt, rounded at base, the primary ones 3 to 5 cm. long, coarsely short-dentate, sparingly pilose-setulose or glabrate above, glabrous beneath or with occasional hairs on the midrib; lower petioles equalling or exceeding the blades, the upper much shorter: racemes stiff, becoming 1 or 2 dm. long; rachis densely glandular-puberulent; the verticels 2–6-flowered, all becoming remote, the lowest finally 4 cm. apart; bracts caducous, ovate, 1 cm. long, strongly ciliate, the scarious body hardly equalling the subulate herbaceous awn: calyx campanulate, setulose, sparingly glandular, in anthesis 5 or 6 mm., in fruit 8 mm. long; the lobes ovate, blunt: corolla 1 cm. long, the slender white tube exerted; the smooth blue lip much exceeding the galea. — PUEBLA, thin soil of calcareous hills near Tehuacan, Aug. 1901 (*C. G. Pringle*, no. 8587). Nearest related apparently to *S. permixta*, Briquet (no. 15 of the writer's synopsis). Differing from that in its setulose stem, long awn-tipped bracts, and blunt calyx lobes. Superficially resembling *S. podadena*, Briquet (*S. ageratifolia*, Fernald, Proc. Am. Acad. xxxvi, 499), but quickly distinguished by the glandless hairs of the stem, the rounded not cordate more shallowly toothed leaves, the glandular-puberulent rachis and the blunt calyx-lobes.

Salvia (*Vulgares*) *molina*. Herbaceous, branching, nearly 1 m. high, the stem closely fine-puberulent, especially on the deeply sulcate decussating bands: leaves firm, 0.5 to 1 dm. long, rhombic-ovate, attenuate-acuminate, cuneate at base to a slender petiole 1 to 2 cm. long, coarsely but bluntly serrate, green above and minutely pubescent with short appressed hairs, cinereous beneath and closely fine-puberulent: primary racemes becoming 4 dm. long, the secondary ones much shorter; verticels 10–40-flowered, becoming subequally remote: bracts ovate-oblong, acuminate, pulverulent, caducous: pedicels 3 to 5 mm. long,

puberulent: calyx tubular-campanulate, puberulent, with flaring lips and rounded sinuses, in anthesis 6 or 7 mm. long, the lower lobes subulate-acuminate, the upper lobe acuminate: corolla 11 or 12 mm. long, the pale tube exserted, the blue lip hardly equalling the pilose galea: style pilose. — MEXICO, by streams, Zamora, alt. 1540 m., May 23, 1901, and July 25, 1902 (*C. G. Pringle*, nos. 8504, 11,124). Related to *S. jaliscana*, Briquet, and *S. fluviatilis*, Fernald (nos. 75 & 79 of the writer's Synopsis). From the former distinguished by its firmer more finely toothed leaves, its finer puberulence, its much more numerous flowers in more remote verticels, and the rounder, not acute, sinus of the calyx. From the latter species it is distinguished by the closely puberulent lower surface of the more prominently toothed and attenuate-acuminate leaves and its more numerous flowers in more remote verticels.

Salvia (Candicantes) fasciculata. Shrub with pale brown bark; the branches erect and rather rigid, the young parts granular-pruinose: leaves narrowly linear, strongly revolute, canescent beneath, glabrous and dark green above, 1 to 2.5 cm. long, approximate on the short branches and often with close axillary fascicles of shorter leaves: racemes terminating the branches and short branchlets, 1 to 3 cm. long; rachis puberulent, enlarged below the subremote (3 to 5 mm. apart) 2-flowered verticels: bracts persistent, ovate, 0.5 to 2 mm. long; pedicels 3 mm. long: calyx tubular-campanulate, in anthesis 4 mm. long, minutely pubescent with white stellate hairs, in fruit larger and glabrate; the tube thrice exceeding the ovate teeth; upper lip tridentate: corolla 8 mm. long, purplish, pilose, the galea about equalling the lip: stamens and style exserted, glabrous. — OAXACA, mountains above Oaxaca, alt. 2250 m., December, 1900 (*C. Conzatti & V. González*, no. 1151). Closely related to *S. Coulteri*, Fernald (no. 91 of the writer's Synopsis), from which it differs among other characters in its narrow leaves dark green and glabrous above, puberulent rachis, few flowers and glabrate calyx.

Salvia (Scorodoniae) pannosa. Branches very slender and minutely pilose-puberulent; the internodes mostly 4 or 5 cm. long: leaves from linear-oblong to elongate-deltoid, the primary ones 3 to 5 cm. long, 0.5 to 1.8 cm. broad at the truncate or barely subcordate base, the tip bluntish, the margin closely fine-crenate, sometimes irregularly so at base, dark green and rugulose above, white beneath with close felt-like indument of minute simple hairs; petioles almost filiform, 1 to 1.5 cm. long: raceme simple, terminal, becoming 1.5 dm. long: rachis glandular-puberulent: verticels 4–8-flowered, all becoming remote, the lowest 3.5 cm. apart; pedicels slender, 2 or 3 mm. long, glandular-puberulent:

bracts ovate, aristate, 3 mm. long, caducous: calyx cylindrical, bluish, glandular-puberulent, the tube five times exceeding the ovate acuminate lobes, in anthesis 6 mm. long: corolla 1.5 cm. long, the pale tube long-exserted; the deep-blue lip and the pilose galea subequal: style pilose. — PUEBLA, limestone hills near Tehuacan, alt. 1720 m., Aug. 23, 1901 (*C. G. Pringle*, no. 8593). Related to *S. alamosana*, Rose (no. 108 of the writer's Synopsis), but differing in its less branching habit, closer finer pubescence, slender petioles, more deltoid leaves and fewer flowers.

Salvia (Fulgentes) ancistrocarpha. Coarse erect herb; the stems closely glandular-puberulent above, and hispidulous especially upon the angles with short whitish flat trichomes: leaves ovate, cordate with closed sinus or subtruncate, acutish, closely crenate, scabrellous above, hispidulous on the nerves beneath, the primary ones 8 to 10 cm. long, 5 to 6 cm. broad at base: racemes elongate, the primary one becoming 4 dm. long: verticels 4–9-flowered, the lowest 2 or 3 cm. apart: bracts round-ovate, scarcely veiny, coarsely ciliate, tipped by a hook-like slender awn 4 or 5 mm. long, caducous: pedicels 2 or 3, becoming 6 mm. long: calyx tubular-campanulate, in anthesis 13 to 15 mm. long, in fruit pulverulent, hirtellus on the veins, the teeth acuminate: corolla pure red, 3 to 3.5 cm. long, the slightly pilose galea shorter than the broad lower lip: style glabrous. — MEXICO, Tultenango Cañon, Oct. 7, 1902 (*C. G. Pringle*, no. 8674). A gorgeous plant closely related to and somewhat suggesting *S. adenophora*, Fernald (no. 152 of the writer's Synopsis). Differing in its herbaceous stem, its harsh pubescence, its longer acuminate-toothed calyx, its larger nearly glabrous more vivid corolla, and in the smoother bracts with their peculiar claw- or hook-like appendages.

Salvia (Tubifloræ) Townsendii. Stems about 1 m. high, minutely pruinose-puberulent: leaves narrowly ovate or ovate-lanceolate, elongate-acuminate, about 1 dm. long, 2.5 to 3 cm. broad, dark green and glabrate above, pale and minutely pilose beneath, crenate, on puberulent petioles 1 to 2 cm. long: racemes 1 to 2.5 dm. long, closely flowered; the verticels 12–20-flowered, the lowest becoming 2 cm. apart, the upper crowded: pedicels 3 to 7 mm. long, ascending: calyx in anthesis 3 to 3.5 mm. long, strongly glandular-dotted, and minutely hispidulous on the nerves, the lobes very short and broad: corolla villous, deep purple-violet, 2.5 cm. long, the galea exceeding the drooping lip: stamens and style exserted, glabrous. — CHIHUAHUA, near Seven Star Mine, Sept. 16, 1899 (*C. H. T. Townsend & C. M. Barber*, no. 426). Nearly related to *S. michoacana*, Fernald (no. 187 of the writer's Synop-

sis), but distinguished by its closer cinereous puberulence, longer crenate (instead of sharply serrate) shorter-petioled leaves, and deeper-colored flowers.

→ **Acnistus Pringlei.** Branches stout, covered with a soft almost corky ashy brown bark: leaves elliptic-lanceolate or narrowly oblong, the principal ones 4 to 7.5 cm. long, slightly puberulent above, tomentulose and becoming glabrate beneath, on slender petioles 0.7 to 1.5 cm. long: flowers in crowded fascicles: pedicels 1 to 1.5 cm. long, slightly thickened above: calyx glabrous, at first campanulate, 2 or 3 mm. high, with ascending blunt lobes, later rotate and larger: corolla tubular-funnelform, straw-colored, 8 mm. long, with spreading or finally recurved bluish lobes: stamens and style much exserted: fruit pulpy, subglobose, pale, about 7 mm. in diameter. — MEXICO, wet meadows, Valley of Zamora, alt. 1540 m., May 25, 1901, and July 25, 1902 (*C. G. Pringle*, nos. 8509, 11,049). Near *A. Benthami*, Miers, but clearly differing in its much smaller flowers and shorter pedicels.

Castilleja patriotica. Simple or branched at base, 3 to 5.5 dm. high; stems pilose-hirsute throughout or glabrate: leaves scabrous but thin, hispidulous, 3 to 5 cm. long, linear-lanceolate, dilated below the 2 to 6 strongly divergent linear lobes: bracts similar but less cleft, sometimes entire: flowers loosely racemose; pedicels 1 cm. or less long: calyx tubular, 3 to 4 cm. long, pilose-puberulent, red, green, and whitish; corolla 4.5 to 5.25 cm. long, green and whitish, the back softly pubescent; the long-exserted galea 2.75 to 3 cm. long; lower lip green, about 3 mm. long, with lanceolate lobes: fruiting calyx somewhat enlarged: capsule oblong, acuminate, 1.5 cm. long. — CHIHUAHUA, Sierra Madre near Colonia Garcia, alt. 2310 m., July 20, 1899 (*C. H. T. Townsend & C. M. Barber*, no. 156); Cumbre, Aug.—Nov., 1885 (*Edw. Palmer*, no. 363); Mapula Mts., alt. 2200 m., Oct. 30, 1886, and cool slopes of the Sierra Madre, Sept. 16, 1887 (*C. G. Pringle*, nos. 1154, 1350). Related to *C. tenuiflora*, Benth., and *C. affinis*, Hook. & Arn. Differing from both in its much longer galea (distinctly exceeding the tube) and in its thinner divaricately cleft leaves.

Castilleja Pringlei. Dwarf rather tufted perennial, with many slender decumbent pilose stems 3 to 6 cm. high: lowest leaves crowded and bract-like, ovate, 3 to 4 mm. long; the upper 1.5 to 2 cm. long, lanceolate to oblong-lanceolate, pilose, simple or with deeply 3-lobed tips: bracts similar, the narrow lobes usually red-tinged: calyx tubular, 2.5 to 3.5 cm. long, straw-colored below, deep red above, densely pilose except at the puberulent tips, split equally before and behind one fourth

to the base, into oblong blunt shortly 2-cleft lobes: corolla slightly exerted, the narrow galea pilose, the somewhat cleft saccate lower lip about 1 mm. long. — HIDALGO, damp alpine meadows at 3080 m. altitude, Sierra de Pachuca, July 21, 1901, and Aug. 22 1902 (*C. G. Pringle*, nos. 9674, 8666, *Rose & Hay*, no. 5581); Mt. Popocatepetl, alt. 3630 m., Aug. 7 and 8, 1901 (*Rose & Hay*, no. 6022). A beautiful plant somewhat resembling *C. Schaffneri*, but with shorter stems, much larger red flowers, and densely pilose calyx.

Utricularia lobata. Scapes 2 to 5 cm. high, bearing 1 or 2 lance-subulate bracts, 1-2-flowered; bladder-bearing branches very short, basal or wanting; the scattered bladders barely 1 mm. long: leaves wanting or solitary and radical, narrowly spatulate, 3-nerved, 1 to 1.3 cm. long: pedicels at most 1 mm. long, subtended by 3 or 4 slightly longer subulate bracts: calyx of 2 elliptic-oblong lobes 3 to 4 mm. long: corolla violet with yellow centre, the upper lip erect, slightly dilated and subtruncate above, 3 or 4 mm. long; lower lip 7 to 9 mm. long, deeply 3-lobed, the middle lobe broad, more or less cut; spur subulate, arcuate, equalling or slightly exceeding the lower lip: fruit not seen. — MEXICO, springy soil, Sierra de las Cruces, alt. 3080 m., Sept. 2, 1901 (*C. G. Pringle*, no. 8607). Related to *U. resupinata*, B. D. Greene, but differing among other characters in its deeply lobed lip. From *U. verapazensis*, Morong, distinguished by its narrower longer leaf, and its much shorter pedicels subtended by subulate, not blunt, bracts.

Pectis erecta. Perennial, with a slender ligneous caudex: stems erect, simple or branching above, pulverulent, 8 to 15 cm. high: leaves linear, 1.5 to 3 cm. long, 1 to 2 mm. broad, pale green, firm, subulate-tipped, mostly ascending, with 2 to 4 irregular lines of pellucid dots beneath, and with 2 to 5 pairs of whitish cilia at base: peduncles filiform, erect, 3.5 to 6 cm. long, with 2 to 5 lance-attenuate bracts: heads 1 to 1.5 cm. broad, several-flowered; involucre turbinate, 5 to 6 mm. high, of 5 oblong or narrowly obovate blunt finely ciliate upwardly flattened bracts: rays oblong, 5 to 7 mm. long, yellow becoming crimson: ray-pappus of 2 or 3 elongate (4 or 5 mm. long) dark upwardly barbed aristiform pales more or less connate at base, with 4 to 8 much shorter unequal whitish attenuate pales: disk-pappus similar but the pales more numerous, the elongate dark ones 6 or 8: achenes slightly setulose. — NICARAGUA, Grenada, Department of Grenada, Feb. 28, 1903 (*C. F. Baker*, no. 2556). In habit resembling *Pectis diffusa*, Hook. & Arn. of the § *Pectothrix*, but with the pappus more nearly of *P. depressa*, Fernald, of the § *Eupectis*.

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BY J. R. JOHNSTON.

Presented by B. L. Robinson, February 8, 1905. Received February 4, 1905.

AS THERE will necessarily be a delay in the publication of a Flora of the Islands of Margarita and Coche which is in preparation by the writer, it seems advisable at this time to put on record the following new species. All localities not otherwise specified are on Margarita Island.

Bactris falcata, n. sp. Slender tree; trunk 10 m. high, armed; bark gray; rings of spines about 3 cm. apart; spines as much as 7 cm. long, irregularly arranged and numerous. leaves pinnate, 25 to 45 cm. long, falcate, abruptly caudate-acuminate, with cross veins inconspicuous and numerous; upper pinnae broadly lanceolate, narrowing little at the base, with about 8 main ribs; lower pinnae linear, narrowing at base, 3 cm. wide, with 1 main rib and 8 secondary and as many tertiary ones; rachis keeled on the upper side, convex below, slightly rufescent: peduncle and spathe densely clothed with black shining spines 2 cm. in length; peduncle recurved; spathe 15 cm. long: spadix racemosely branched, 1 dm. long; branches as much as 6 cm. in length, slender, numerous: calyx of the pistillate flower circular, 4 mm. in diameter; corolla circular, quite regular, 1 cm. broad; drupe yellowish red, about 2 cm. in diameter, a little broader than long, turbinate. — Rio Asuncion, in heavy woods near Juan Griego trail, *Johnston*, no. 220, July 16, 1903.

Renealmia lutea, n. sp. Plant 12 to 15 dm. high: leaves distichous, linear-lanceolate, 23 cm. long and 4 cm. wide; apex attenuate; base narrowing into a short petiole; vagina truncate at the top; surface more or less covered with fine white scales: inflorescence simply racemose; scape arising from base of stem; bracts of the scape sheathing, 12 cm. long; those subtending the flowers, 1- to 2-flowered; lower ones as much as 3 cm. long; tubular bractlet equalling the calyx, nearly 1 cm. long, externally pubescent at base and tip: calyx 3-lobed; lobes unequal,

broadly truncate, 5 to 7 mm. long: corolla 3-fid, 1 cm. long; lobes obovate, rounded at apex, concave; labellum rotund, shortly 5-lobed, possessing a long claw. — Rio Asuncion, in damp woods along Juan Griego trail, *Johnston*, no. 298, Aug. 12-15, 1903.

Elleanthus attenuatus, n. sp. Roots few, fleshy, fibrous, densely pubescent: stems 2 to 4, ascending, 6 to 9 dm. high, cylindrical; base covered with two or three sheathing leaves; lower stem naked or retaining the vaginas of old leaves; upper stem leafy: leaves glabrous, narrowly lanceolate, 15 to 20 cm. long and 3 to 4 cm. wide, with 9 to 11 veins, depressed above, plicate below, entire, long-acuminate; base cuneate, constricted, broadening into vagina; sheath cleft anteriorly, about 4.5 cm. long; uppermost leaves bractlike: inflorescence spicate, cylindrical, elongate, about 7 cm. long; rachis puberulent; bracts slightly exceeding pedicel, about 1 cm. long, two-thirds the length of the flower, lanceolate to ovate, acute or acutish, reddish, striate: lateral sepals triangular, lanceolate, acuminate; 1 posterior sepal narrowly lanceolate, acute: 2 lateral petals linear-lanceolate, acute, equalling other parts of perianth; labellum broadly ovate, 1 cm. long, obtuse; margin crenate, with 2 elongated separate callosities at base: all parts of plant sometimes minutely puberulent. — San Juan mt., in wet woods at the summit, alt. 640 m., *Miller & Johnston*, no. 270, July 30, 1901, and *Johnston*, no. 233, July 6, 1903. Allied to *E. furfuraceus*, Reichb. f., from which it differs in having larger, more attenuate, more ribbed leaves, and in its longer inflorescence.

Epidendrum Johnstoni, AMES, n. sp. "Plants 1 to 4 cm. high, diphyllous. Leaves narrowly elliptic-oblong, obtuse, sometimes stained or suffused with madder-purple, 2 to 4 cm. long, 6 to 10 mm. wide; raceme terminal, lax, shorter than the leaves, 2 to 4-flowered, subtended by a conduplicate sheath, 5 to 10 mm. long; lateral sepals elliptic, subacute, 9 mm. long, 4.5 mm. wide, upper sepal similar; petals narrowly elliptic, obtuse, 8 mm. long, 2 mm. wide; lip adnate to the column, 8.5 mm. long, 3-lobed, lobes subequal, the lateral ones semicircular; in front of the column two erect callosities which converge obscurely in a faintly tubercled hemispherical crest; column 4.5 mm. long, stained with madder-purple; flowers apparently greenish-yellow, suffused with madder-purple. — San Juan mt., alt. 600 m., *Johnston*, no. 236, July 2, 1903. Plants similar in habit to dwarf forms of *E. conopseum*, R. Br., to which species this one bears a slight resemblance. The main points of difference are in the hemispherical callous, in the length of the column, and in the broader segments of the perianth."

Peperomia Victoriana, var. *margaritana*, C. DC., var. nov.; “limbis quam in specie minoribus, usque ad 26 mm. longis et ad 17 mm. latis; caulibus, foliis, et spicis in sicco flavescentibus.” — Along the ledges of the cliffs, alt. 300 m., *Johnston*, no. 18, July 22, 1903.

Piper Johnstoni, C. DC., n. sp. (§ CARPUNYA) “foliis breviter petiolatis, ellipticis, basi aequilatera acutis, apice acuminatis, utrinque glabris, nervo centrali ultra $\frac{1}{2}$ longitudinis suae nervos adscendentes utrinque 4 mittente; petiolo glabro basi vaginante; pedunculo glabro; spica florente limbi dimidium vix aequante, tenui, apice obtusa; bractee pelta triangulari margine pedicelloque angusto hirsutis; antheris ovatis quam filamenta multo brevioribus; ovario ovato glabro; stigmatibus linearibus.

Ramuli glabri, graciles; spicigeri 2 mm. crassi, collenchymate subcontinuo libriformi; fasciculis intramedullaribus sub-2-seriatis, nempe 2 inter periphericos et alios intramedullares adjunctis. Limbi in sicco membranacei creberrime pellucido-punctulati, in specimine florente usque ad 19 cm. longi et ad $8\frac{3}{4}$ cm. lati, nervis arcuatis. Petioli 11 mm., pedunculi 6 mm. longi. Spicae florentes fere 9 cm. longae, 2 mm. crassae. Stamina 3 filamentis in sicco lacinosus. Stigmata 3, sessilia.” — Juan Griego trail, in damp woods, alt. 500 m. *J. R. Johnston*, no. 19, July 11, 1903. “Species *P. brachypodo* C. DC. Prodr. xvi. pt. 1, 327, proxima.”

Piper margaritanum, C. DC., n. sp. (§ STEFFENSIA) “foliis breviter petiolatis, oblongo-lanceolatis, basi leviter inaequilatera acutis, apice acute et sat longe acuminatis, supra sparsim pilosis, subtus ad nervos et nervulos hirsutis; nervo centrali usque ad $\frac{1}{3}$ longitudinis suae nervos adscendentes alternos utrinque 4 mittente; petiolo adpresse hirsuto, basi vaginante; pedunculo parce hirtello petiolum fere aequante; spica limbi dimidium vix aequante, apice obtusa; bractee pelta triangulari margine pedicelloque angusto hirsutis; bacca obpyramidato-trigona glabra; stigmatibus linearibus.

“Frutex 24 dm. altus, viridis, gracilis. Ramuli parce hirtelli, spiciferi vix 2 mm. crassi, collenchymate continuo zona interna libriformi, fasciculis intramedullaribus 1-seriatis, canali vacuo centrali. Limbi in sicco membranacei pellucido-punctulati, circiter 15 cm. longi, 4 cm. lati. Petioli sub limbo $5\frac{1}{2}$ mm., inter limbi latera $2\frac{1}{2}$ mm. longi. Spica baccifera fere 3 mm. crassa. Stamina 4. Baccae in sicco nigrae $\frac{3}{4}$ mm. longae. Stigmata 3, sessilia.”

San Juan mt., alt. 700 m. *Johnston*, no. 20, July 11, 1903. “Species *P. salicariaefolio* Kunth proxima.”

Coccoloba Ernstii, n. sp. Stem branching, wrinkled in dry speci-

men : leaf broadly oval, entire, 5.5 to 7 cm. wide and 7 to 9.5 cm. long, glabrous, membranous; veins subprominent, secondary veins inconspicuous and the reticulation scarcely visible; base truncate or rounded, shortly decurrent into petiole; apex shortly obtuse or acute; petiole glabrous, 2 to 2.5 cm. long; ochrea as much as 1 cm. long, oval, with an acute or split apex, glabrous; ochrea scar encircling the stem, conspicuous; leaf scar large or small, one-third way from base of ochrea, sometimes covered by a short spine: inflorescence racemose, a single ascending raceme to a node; lateral, 5 to 10 cm. long; peduncle short; rachis minutely puberulent; nodes of rachis with two minute bracts, 1- to 2-flowered; pedicel 1.5 mm. long: fruit lacking. — El Valle, South hill, *Johnston*, no. 250, Aug. 31, 1903. Probably allied to *C. Cruegeri*, Lindau.

Capparis collina, n. sp. (§ CYNOPHALLOPHORA.) Small tree: leaves alternate, green, paler beneath, glabrous, dull, narrowly elliptical or lanceolate, 6 to 9 cm. long, and 3 to 4.5 cm. wide, obtuse or rounded at the base, acute, blunt or rarely emarginate at the apex, membranous; upper surface smooth, lower with prominulous veins: inflorescence terminal, corymbose; bud globular: sepals 4, valvate, rotund, one-third the length of corolla: petals obovate, 1.5 cm. long: stamens between 50 and 60, exceeding the corolla scarcely twice: ovary 5 to 8 mm. long, cylindrical, truncate, on gynophore 3 to 4 cm. long: fruit smooth, long and slender, very slightly torulose, equalling or exceeding gynophore, 6 to 8 cm. long, 3 mm. wide. — Tree 5 m. high on hillside north of El Valle, *Johnston*, no. 10, July 15, 1903. This species differs from *C. cynophallophora*, L., in its leaves which are smaller, more narrow, and of a different shape; in its smaller flowers and slender, smooth fruit.

Calliandra panlosia, n. sp. Small tree, 3 to 5 m. high, branching copiously: leaves bipinnate, pinnae 4- to 5-jugate; pinnules 15 to 30 in number, 5 to 7 mm. long, 1.5 mm. wide, everywhere pilose, paler on the under side; petiole 4 to 8 cm. long; petiolules 3 to 5 cm. long; young stem and petioles rufescent; stipules geminate, lanceolate, 6 mm. long: inflorescence axillary, 2 to 3 peduncles of unequal length in each axil, at maturity about 2 cm. long: flowers shortly pedicellate: calyx 1 mm. long, pubescent: corolla 6 mm. in length, 5-dentate, appressed-pubescent: young fruit with reddish-brown pubescence, cylindrical. — Abundant on hills at altitude of 300 to 600 m., El Valle to Juan Griego, *Miller & Johnston*, no. 58, July 22, 1901, and *Johnston*, no. 27, July 2, 1903.

Caesalpinia acutifolia, n. sp. Tree 3 to 5 m. high: leaves bipinnate; pinnae 4 to 6 in number; pinnules 12 to 14 in number, nearly opposite, narrowly oval, 3 cm. long and 0.8 to 1.2 cm. wide, pellucid-

punctate, ciliate at the margin, obliquely obtuse at the base, acute or rarely obtuse at the apex, puberulent, paler on the under side; petiole 2.5 to 5 cm. long; petiolules 1.5 mm. long; inflorescence lateral; racemes simple, 6 to 10 cm. long; pedicels jointed beneath the calyx, as much as 8 mm. long; calyx yellowish-pubescent and covered with stipitate glands, 5-parted; 4 lobes, subequal, elliptical; the fifth (lower) lobe exceeding the others twice, 13 mm. in length, pectinate, concave in bud and capping the others: petals 5, glandular-punctate; 4 subequal, rotund, with a distinct claw nearly half as long as the blade; fifth (upper) petal narrow, edges incurved, 8 mm. long, reflexed, pubescent at the base: stamens 10, declined, inclosed in the corolla; filaments broad at the base: ovary stipitate, included within the corolla; stigma sessile, lower than the anthers: fruit unknown. — On the hillside, El Valle, *Johnston*, no. 33, Aug. 3, 1903.

Gliricidia lutea, n. sp. Shrub 9 to 15 dm. high, bark whitish: leaflets 5 in number, 2 to 4 cm. long and 0.6 to 1.5 cm. wide; narrowly elliptical, above glabrous, below glabrescent or when young sericeous, base and apex cuneate; petiole 4 cm. long, petiolule 2 mm. long, both rufescent: inflorescence racemose, precocious; pedicels 3 mm. long, geminate, equalling the yellowish-green calyx which has turbinate base and truncate, slightly 5-dentate margin: petals yellowish-white; standard orbicular, emarginate; base narrowing sharply, slightly pubescent on upper side above calyx and on lower side at apex, 1 cm. long; wings oblong, shortly auriculate, 11 mm. long; both wings and keel possessing long, slender claws: ovary stipitate, narrow, slightly compressed, 2-valved, pubescent; 3 to 5 reniform ovules; style terminal, recurved, glabrous; stigma minute: pod dry, flat, tipped with a short point, 3 cm. long, 1 cm. wide. — On dry hillside, El Valle, *Miller & Johnston*, no. 246, 1901, and *Johnston*, no. 34, Aug. 15, 1903.

The yellow corolla and few leaflets readily distinguish this species from the others of the genus, which have roseate corollas and many leaflets. These distinctions, although marked, are not considered of sufficient importance in the groups allied to *Gliricidia* to warrant the proposal of a new genus.

Inga macrantha, n. sp. Shrub branching copiously; young stems rufescent: leaves 6- to 10-foliolate; leaflets lanceolate to elliptical, somewhat pubescent on both sides, especially at the ribs, with the upper surface shining and the lower dull; base obtuse; apex acute or acuminate, commonly mucronate; larger leaflets 7 cm. long and 3.5 cm. wide; glands scutellate, located on the upper side of the petiole between the two

opposite leaflets: inflorescence pedunculate; peduncles 1.5 to 4 cm. long; pedicels none; calyx rufescent, striate, 8 to 9 mm. long: corolla about 2 cm. long, with long appressed pubescence: stamens exceeding corolla twice: style a little longer than stamens: pod flat, velvety, brown, 5 to 10 cm. long, about 2 cm. wide; the margins thickened and channeled. — Alt. 400 m., on Juan Griego trail from El Valle, *Johnston*, no. 25, July 11, 1903.

Machaerium striatum, n. sp. Shrub 2 m. high: leaves alternate; leaflets 5, subopposite, lanceolate, subcoriaceous, glabrous, with a rounded or cordate base, and acuminate apex, entire, 4 to 8 cm. long, and 1.5 to 4 cm. wide; petiole and petiolule puberulent; petiolule 2 to 3 mm. long; petiole 3 to 4 cm. long; stipule broad, striate, puberulent, 3 mm. long: inflorescence axillary, a compound raceme, rufescent; bracts leathery, small, ovate; bracteoles 2, concave, orbicular, wide, the two meeting around the calyx: calyx tubular, 2 to 3 mm. long, 5-dentate, the teeth short, rounded; standard oval, obtuse, with a shortly unguiculate base, externally pubescent; wings free, oblique, with a claw nearly one-third the length of entire petal; keel barely exceeded by wings, with its parts cohering, falcate, deeply auriculate, slightly pubescent on the outside: stamens monadelphous: ovary pubescent, stipitate, a deep cup surrounding the stipe; ovules lateral, 1 or 2: fruit unknown. — North hill, El Valle, *Johnston*, no. 124, Aug. 8, 1903.

Securidaca cordata, n. sp. Shrub 1 to 2 m. high: leaves alternate, ovate, 4 to 7 cm. long and 2.5 to 5 cm. wide, glabrous on both sides, slightly cordate at the base, retuse or obtuse at the apex, entire; petiole glabrous, 3 mm. long: racemes lateral, at or between the nodes, simple, bearing a dozen or less flowers; pedicels puberulent or glabrous, 8 mm. long: bud elongated, oval, acute: calyx glabrous, its margin ciliate; lobes oval, unequal, 2 inner ones being 11 mm. long, almost twice the length of the outer, shortly unguiculate: the two petals of the keel falcate, 8 mm. long; lip elliptical, the end folded, the posterior fold dentate: stamens 8; stamineal tube cleft dorsally, saccate and pubescent at the base toward the keel, otherwise glabrous: ovary glabrous, flattened; style a little longer than stamens; stigma arcuate, two globular bodies at centre: fruit ovoid; wing on the upper posterior portion about 2.5 cm. long, and 1 to 1.2 cm. wide; anterior dorsal portion short and oblique, surface of fruit lightly veined. — North hill, El Valle, alt. 250 m., *Johnston*, no. 60, Aug. 8, 1903.

Argithamnia cochensis, n. sp. Shrubby, deep red or purple throughout: leaves alternate, lanceolate, appressed-pubescent, 1.5 to 4 cm.

long, and 0.5 to 1.5 cm. wide; penninerved; margin serrulate to entire; base acute; apex acute, often mucronate; petiole 2 mm. long; stipules scarcely 1 mm. long, setaceous: inflorescence monoecious: flowers sessile or subsessile; bracts minute, ovate: *staminate flower*: — sepals 5, narrowly lanceolate, united slightly at base, with acute apex, white-dotted lobes, externally pubescent; petals externally sparingly long-pubescent, broadly lanceolate, acuminate, cuneate at the base, shortly unguiculate; glands alternate with petals, glabrous, slightly adherent to petals and staminal tube, fleshy, triangular, prolonged-acuminate; stamens 10, 3-whorled, the uppermost whorl bearing no anthers: corolla slightly exceeding the light-green calyx which is 3.5 mm. long: *pistillate flower*: — sepals 5, lanceolate, oblique from the middle up, with base narrowing but slightly, and apex attenuate, both sides sparingly long-pubescent, 4.5 mm. long, slightly coherent at the base; corolla 1.2 length of calyx, 5-lobed; lobes cohering but slightly at the shortly unguiculate base, lanceolate, with an acuminate apex; petals white-dotted; glands between the petals small, triangular; ovary pilose; the three styles united half way, each 2-lobed. — Coche, in the interior, *Johnston*, no. 12, Aug. 5, 1903.

Argithamnia erubescens, n. sp. Shrub 3 to 6 dm. high: leaves often becoming purple, fasciculate, lanceolate to obovate, 4 cm. long and 1 cm. wide, subsessile, minutely and remotely serrate; both sides covered by a long white pubescence; apex obtuse or acute, often mucronate; base attenuate: inflorescence dioecious, fasciculate, 1 to 4 flowers in a fascicle: *pistillate flower* appressed-pubescent; pedicel 4 mm. long; bracts 2, minute, oval, acute; calyx 5-parted; sepals lanceolate, 8 mm. long and 3 mm. wide; petals 5, subequal, slightly exceeding the sepals, minutely pubescent toward the base, elliptical, or narrowly obovate, shortly unguiculate, glands between petals conspicuous; ovary pubescent, style united above the middle, stigmas bilobed: *staminate flower* shortly pedicellate; sepals 5, narrowly lanceolate, acute; petals obovate, narrow at the base; stamens about 10, 2-whorled; the staminal column somewhat exserted. — El Valle, *Miller & Johnston*, no. 213, July 22, 1901, and *Johnston*, no. 58, Aug. 21, 1903.

Croton margaritensis, n. sp. Shrub 6 to 9 dm. high: leaves alternate, long-petioled, stipulate, narrowly to broadly lanceolate, 1 to 3 cm. wide, 4 to 6 cm. long, sinuately serrate, the teeth bearing glands; upper surface remotely stellate-pubescent; under side similar, but pale green; apex of blade acute or acuminate; base rounded or cordate; petiole slender, 2 to 3 cm. long; stipules very small, setaceous, bearing at apex a single gland: inflorescence monoecious, in a simple raceme:

pistillate flowers lowermost on the rachis; pedicels as much as 2 mm. long; bracts small, not equalling the pedicel; sepals 5, slightly pubescent, becoming at least 6 mm. long, possessing marginal stipitate glands; petals lacking; ovary slightly pubescent, with its styles twice dichotomously divided into unequal branches: *staminate flower* smaller than the pistillate; sepals elliptical, equalling the shortest petal; petals 5, unequal, from unguiculate to spatulate or obovate, largest nearly twice the length of the short obovate one; stamens 6, staminodia (?) 4; filaments at base long-pubescent; capsule glabrous or with few stellate hairs. — Among shrubs near summit of San Juan mt., alt. 700 m., *Johnston*, no. 50, Aug. 28, 1903. The upper stems possess a scattered loosely stellate pubescence, and some leaves are a dingy brown, while others are dark brown. This species differs from *C. populifolius*, Mill., in having bracts and stipules only one-third as long, in its lanceolate leaves, and in the absence of petals in the pistillate flower.

Croton Milleri, n. sp. Shrub 20 to 25 dm. high: leaves alternate, stipulate, narrowly to broadly lanceolate, 3 to 7 cm. long, 1 to 2.5 cm. wide, above brownish green, glabrous, minutely black-punctate, underneath shining silvery-lepidote, a few scales with brown centers; margin of leaf subentire; apex acute; base obtuse or narrowly cordate; petiole 3 to 7 mm. long; stipules setaceous, caducous, 2 mm. long: inflorescence terminal on short lateral leafy branches; simple spike sessile, 2 to 10 cm. long, often recurving; flowers pedicellate; pedicels 2 to 4 mm. long; bracts setaceous, scarcely equalling the 1-flowered pedicel; *pistillate flowers* lowermost, apetalous; calyx 5-fid; lobes ovate, 3 mm. wide, margin slightly reflexed; ovary lepidote; style bifurcate 3 times: *staminate flowers* with sepals narrower than those of pistillate, with 5 petals, obovate, white, densely pubescent within; stamens about 16 with filaments pubescent at base; no rudiment of gynoeceium present in staminate flower. — El Valle, *Miller & Johnston*, no. 229, July 18, 1901, and *Johnston*, no. 48, Aug. 10, 1903. Common on the low plains between El Valle and Punta Mosquito. This species resembles *C. elaeagnoides*, Wats.

Pavonia cochensis, n. sp. Shrubby, prostrate, branching; branches as long as 55 cm., stellate-pubescent: leaves long-petiolate, velvety stellate-pubescent on both sides, ovate, cordate, 3 cm. long and 2.5 cm. wide, some as broad as long, with an acute or obtuse apex; petiole 2.5 cm. long; stipules setaceous, 2 mm. long: inflorescence axillary, solitary; pedicel 1.5 cm. long: involucre about 17-leaved; leaves setaceous, 1 cm. in length, pubescent: calyx deeply 5-fid; lobes 4 mm. long, lanceolate, glabrous on the inside near the base, with an acute apex: corolla and

stamens unknown: carpels shortly 3-aristate, minutely puberulent, back convex, areolate; sides flat; base narrowed; seeds triangular-reniform, apex rounded, base acute, puberulent. — San Pedro, growing in the deep sand near the graveyard, Coche, *Johnston*, no. 18, Aug. 5, 1903. Allied to *P. humifusa*, A. St. Hil.

Casearia spiralis, n. sp. Tree 5 m. high: leaves alternate, elliptical, 4 to 10 cm. long and 3 to 5 cm. wide, membranous, punctate with pellucid dots and lines, crenate-serrate, indentations glanduliferous; apex shortly acute; base obtuse or truncate; petiole glabrous, 1 cm. long; stipule lanceolate-setaceous, 4 mm. long; inflorescence fasciculate, fascicles sessile or shortly pedunculate, compound, the branches bracteate at the base and at the nodes; bracts and bracteoles glabrous, as much as 1.5 cm. long; calyx corolline, 5- to 7-lobed; lobes unequal, imbricated, the smaller outside, pellucid-punctate, glabrous; corolla none; stamens about 22, slightly perigynous; connective of anthers produced into a short acumen; single, very short staminodia clothed with a whitish pubescence alternating with the stamens: ovary ovoid, pubescent; the three parietal placentas having many ovules; style short, thick; stigma 3-lobed; fruit unknown. — El Valle: river trail, *Johnston*, no. 283, Aug. 30, 1903.

The spiral arrangement of the sepals distinguishes this plant at once from all other *Caseariae* so far as can be determined from their descriptions. According to Warburg in Engler and Prantl's *Pflanzenfamilien*, III. 6a, 13 this spiral condition would place this plant in the *Erythospermeae*, a group consisting of four African genera and a monotypic Chilean genus. Though the plants of these genera have no staminodia, some of them have scale-like appendages at the base of the inside sepals. The plant under consideration, *Casearia spiralis*, has none of these appendages to the floral envelope, but has the staminodia characteristic of the genus *Casearia*. In such groups as these in which the calyx is imbricated and varying in the number of its parts, from 4 to 6, the spiral or cyclic character would seem to be a less distinctive characteristic than the presence or absence of calyx-appendages or of staminodia. Thus the plant seems to be more nearly affiliated to the *Caseareae* than to any of the *Erythospermeae*, though showing affinities to both. As to whether it is actually a *Casearia* may be a question.

None of the species of *Casearia*, so far as described, show any marked irregularity of sepals or any definite spiral arrangement. Nor have any of them as many as seven lobes and very few as many as 22 stamens, which is the case in *C. spiralis*. Nevertheless, the form of anthers, the

single staminodium alternating with each stamen, the amount of adnation between androecium and calyx, all suggest affinities of the plant under consideration with the genus *Casearia* rather than any other. As it does not seem advisable to base a new genus upon this one character, the spiral calyx, this new plant may stand as a *Casearia*, for the present at least.

Passiflora monticola, n. sp. Climbing, glabrous; tendrils at every node: leaves alternate, broadly ovate; blade 4 to 6 cm. long and 5 to 8 cm. wide, 3-lobed, glabrous, glaucescent on under side, subpeltate; base retuse; apex of lobes acute; margin of lobes entire; usually 2 separate glands between each two lobes; petiole glabrous, 2.5 to 3 cm. long; glands 1 to 3, unequal; stipules obliquely lanceolate, mucronate, about 2.5 cm. long and 12 mm. wide: inflorescence solitary, axillary; pedicels exceeding petiole, 2 to 4 cm. long; bud elongated, elliptical, 2 to 2.5 cm. long; bracts 3, lanceolate, acuminate, 4 mm. long, a little below the flower: sepals and petals 5 each; corona in at least two series, the outer series large and purple, the inner one-third as long and light-colored; 5 stamens adnate to gynoecium just below the ovary: ovary glabrous; styles 3, separate nearly to the ovary; stigmas peltate; fruit glabrous, ellipsoidal, 4 cm. long, 3 cm. wide; carpophore 2.5 cm. long; seeds many, flattened, elliptical in outline, areolate, with an abrupt point at the end opposite to the funiculus. — Climbing over low shrubs at the mountain top, alt. 700 to 795 m., San Juan mt., *Johnston*, no. 64, July 11, 1903. Probably belongs in section *Granadilla*, although its bracts are rather small. The corona is not membranous, a fact which tends to exclude the plant from the only other possible section, *Murucuia*.

Passiflora nitens, n. sp. (§ GRANADILLA.) Climbing, tendril-bearing; tendrils simple: leaf 3-lobed, 3-nerved, 9 to 12 cm. long and 7 to 10 cm. wide; lobes serrulate, usually with marginal glands between them; middle lobe with a much narrowed base; base truncate, shortly decurrent; upper surface shining; veins finely puberulent; under side covered with a white, glistening pubescence; petiole puberulent, 2.5 cm. long; 2 sessile glands above the base, often 1 or 2 near apex; stipules setaceous, unequally incised, about 4 mm. long: inflorescence solitary; pedicels puberulent, 3.5 cm. long; bracts 3, enclosing the flower, elliptical, acute, finely puberulent, 5.5 cm. long, 2.5 cm. wide; flower about 3.5 cm. long: calyx delicate, apparently similar to corolla, both (?) purple: corona 3-serial, lowest series short, membranous, middle with edges fimbriate, and upper with long, broad filaments: stamens 5; filaments flat, united part way to gynophore: styles 3 to 4, free to the ovary;

ovary glabrous, ellipsoidal, at least 1.8 cm. long. — El Valle, South hill, *Johnston*, no. 65, Aug. 31, 1903.

Cereus margaritensis, n. sp. Stem columnar, erect, 5 to 8 m. high, branching 1 to 2 m. from ground; branches ascending, usually 8-angled, clothed with a thin gray waxy coat; areolae oval or circular, about 6 mm. across, scarcely 1.5 cm. apart, with 11 short spines and a central longer one, the lower ones a little longer than the upper; often a few more small spines on the upper side which usually possesses a small brown woolly cushion; middle and lower part of areolae usually destitute of wool; central and lower spines recurved, longest almost 2 cm. long; all bulbous at base, and flattened horizontally: flower about 6 cm. long: calyx-tube slender, its lower part with few scales, and destitute of wool and spines; lobes broadened at top, acute or acutish: corolla lobes narrow, acute: fruit ellipsoidal, narrow at each end, glabrous or with few scales. — El Valle, on the hillside, *Johnston*, no. 344, July 27, 1903. Allied to *C. candelabrum*, Web., and to *C. eburneus*, Salm.

Blakea monticola, n. sp. (§ PYXIDANTHA.) Shrub 1 to 2 m. high, branching copiously: leaves alternate, obovate, 4 to 7 cm. long, 2 to 5 cm. wide, 5 main nerves, with inconspicuous cross nerves, which average 1 mm. apart, entire, with apex abruptly acute or with a blunt point and with base cuneate, on both sides minutely punctate; petiole 0.75 to 1.75 cm. long; inflorescence axillary, solitary; pedicels about 2 cm. long: bud globose, glabrate, minutely apiculate: bracts 4, decussate, outer ones 13 mm. long, inner 10 mm., orbicular, slightly apiculate: calyx 8 mm. long, slightly sinuate-lobed: corolla white; petals 6, orbicular, 12 mm. long: stamens 12; anthers biporous, produced into a subulate appendage: style 12 mm. long; stigma minute. — Abundant on the exposed top of San Juan mt., altitude 700 to 795 m., *Johnston*, no. 51, July 6, 1903. Differs from *B. Schlimii*, Triana, in its smaller leaves and shorter petioles.

Jacquinia petiolata, n. sp. Shrub 5 m. high: leaves fasciculate, 1 to 4 in a fascicle, obovate, puberulent when young, glabrate when older; apex rounded, obtuse, or emarginate; base cuneate, continuing into petiole; midrib conspicuous; lateral veins plain, nearly parallel, arched and connecting near margin, which is slightly or not at all revolute; new leaves 1.5 cm. wide and 2 cm. long, older ones often 2 cm. wide and 4 cm. long; petiole 5 to 7 mm. long, puberulent: inflorescence axillary or terminal, fasciculate, 1 to 3 flowers in a fascicle; pedicel about 4 mm. long, whitish pubescent as all the new parts: calyx 5-lobed; lobes orbicular; margin slightly crenate: corolla white; petals elliptical,

apex rounded; corona 5-parted, parts triangular, apex obtuse, margin slightly fimbriate, a little shorter than the corolla; base fleshy, united into a tube with the bases of filaments: filaments equalling petals; anthers small, sagittate, apex narrowly emarginate: ovary pubescent when young; style persistent, 1.5 mm. long, tapering; stigma minute; fruit one-celled with few seeds, fleshy, 2 mm. in diameter, capped by a small circular often pubescent disk subtending the style; fruit glabrous. — Punta Mosquito, east of Laguna Chica, *Johnston*, no. 273, Aug. 10, 1903, and Coche, Aug. 5, 1903.

Ditassa subulata, n. sp. Procumbent, pubescent: leaves oval to elliptical, varying from 2 by 0.8 cm. to 1 by 0.4 cm., subglabrous, often brown above, green below, revolute, with base obtuse, and with apex acute and mucronate by the prolongation of the one central nerve, about 7 to 10 pairs of lateral nerves parallel to each other and at an angle of 75° to 80° to the midrib; petiole pilose, 2 to 3 mm. long: inflorescence nodose, 3- to 5-flowered, subsessile, pilose; pedicels slender, equalling the petiole: calyx deeply lobed; lobes lance-ovate, narrowly obtuse or acute; 5 subulate glands at base of calyx alternating with the sepals: corolla white, deeply lobed; lobes narrowly lanceolate, subvalvate, externally glabrous, coarsely pilose within, 3 mm. long; corona 2-serial, adnate at base of column; outer series subulate, exceeding the stigma nearly twice, two-thirds as long as the corolla; inner series subulate, barely exceeding stigma, nearly two-thirds as long as outer series: appendages of anthers hyaline, orbicular, emarginate: ovary glabrous; stigma pentagonal with a smaller convex cap: fruit unknown. — San Juan mt., climbing over the low shrubs at the summit, alt. 740 m., *Johnston*, no. 262, July 6, 1903.

Evolvulus arenicola, n. sp. (§ ANAGALLOIDEI.) Annual; stem short; branches several, simple, 5 to 10 cm. long, silky-pubescent: leaves distichous, subsessile, elliptical, silky-pubescent all over, 0.6 to 1 cm. long and 0.2 to 0.4 cm. wide; base attenuate; apex acuminate: flowers axillary, solitary; pedicels 2 mm. long with two minute bracts at the base: calyx externally pubescent, 2 mm. long, 5-lobed; lobes narrow, acute: corolla pale blue, 3 times as long as calyx: ovary glabrous, containing 4 dull brown seeds. — Along the trail from Porlamar to San Antonio, *Miller & Johnston*, no. 218, Aug. 2, 1901. Allied to *E. incanus*, Pers. and *E. holosericeus*, HBK.

Bassovia ciliata, n. sp. Shrub 15 to 21 dm. high, branching: leaves alternate or fasciculate, 2 to 3 in a fascicle, unequal, lanceolate, as much as 7 cm. long and 3 cm. wide, attenuate at both ends; margin entire, cili-

ate; upper side green, remotely pubescent; under side paler, finely pubescent; petioles 1 cm. long: inflorescence fasciculate, as many as 8 flowers in a fascicle; flowers pedicellate; pedicels 1.5 cm. long, slender, puberulent: calyx truncate, slightly puberulent, not enlarging at fructification, possessing 5 to 6 setae arising laterally at the margin, about 1.5 mm. long, little more than one-half the depth of the calyx cup: corolla 6 mm. long, deeply 5-lobed; lobes ovate, acute, the margin finely glandular or papillate: stamens 5, affixed to base of corolla; anthers oblong, twice the length of filaments; filaments a little broadened at the base: ovary ovoid, 2-celled, with central placentation; placenta a little thickened, not divided, several-ovuled: fruit globular, several-seeded. — El Valle, river trail, *Miller & Johnston*, no. 255, July 15, 1901, and *Johnston*, no. 75, Aug. 30, 1903.

Solanum margaritense, n. sp. Slender shrub, 2 to 3 m. high; prickles stout, straight, as much as 7 mm. in length; stem rusty stellate-pubescent: leaves 2- to 4-clustered, unequal, above slightly stellate-pubescent, below paler, ovate, entire, or slightly repand, a few spines arising from the midrib on both sides; base often unequal, a little more attenuate than the apex which is often acute or shortly acuminate; blade of the larger leaves 5.5 cm. long and 3.5 cm. wide; petiole pubescent, as much as 1 cm. long: inflorescence fascicled, 2 to 4 flowers in a fascicle; pedicel slender, pubescent, 1.2 cm. long: calyx pubescent, 5-fid, segments narrowly lanceolate, two-thirds length of corolla: corolla 5-fid, lobes narrowly lanceolate, pubescent without, glabrous within, white, 0.7 cm. long: stamens just included within the corolla; filaments one-third as long as anthers: ovary 2-celled, puberulent; ovules numerous; style filiform, slightly exceeding corolla. — El Valle, a single ascending stem branching copiously near the top, at the side of the river trail, *Johnston*, no. 315, Aug. 20, 1903. Allied to *S. lanceaefolium*, Jacq., from which it differs in having straight spines, more deeply lobed calyx, and in general a less dense pubescence.

Solanum umbratile, n. sp. Shrub 10 to 15 dm. high, unarmed; stem and leaves clothed with brown stellate pubescence: leaves alternate, ovate-lanceolate; base attenuate, decurrent into the petiole; apex acuminate; lower surface paler and more densely pubescent than the upper surface, minutely punctate, and having 4 to 6 pairs of prominent lateral veins; larger leaves 3.5 cm. wide and 8 cm. long; petiole 0.5 cm. long: inflorescence axillary; peduncle 2 mm. or less long, bearing 1 to 6 clustered flowers; pedicels usually simple, slender, as much as 8 mm. in length: calyx 5-fid, stellate-pubescent, segments narrowly ovate, stellate without,

reflexed at maturity: stamens erect; filaments one-third length of anthers, broad at base; anthers a little shorter than corolla, broad; apical pores the width of cell, at maturity splitting laterally: ovary glabrous, ovoid, gradually passing into the filiform style; stigma minute, shortly 2-lobed; fruit ovoid, 7 mm. long; seeds numerous, flat, reniform, 2 to 3 mm. long. — Rio Asuncion, in the heavy woods along the Juan Griego trail, *Johnston*, no. 321, July 22, 1903. Allied to *S. gracillima*, Sendtn. of Brazil, it differs in having broader leaves, a very short peduncle, a stouter pedicel, and a larger calyx, the lobes of which are rounded at the apex.

Bignonia acuminata, n. sp. (§ CONJUGATAE.) Shrubby, scandent: leaves opposite, 3-foliolate; leaflets oval with rounded base, and with acuminate apex, entire or repand, on both surfaces covered with a glistening white pubescence, less dense above than below, in dry state nearly black above and gray below, 4 to 6 cm. long and 2 to 3 cm. wide; middle leaflet often giving place to a simple stout tendril; petiole 3 to 4 cm. long; lateral petiolules 0.5 cm. in length, middle one twice as long; stipules not apparent: inflorescence axillary, short-pedunculate, racemose-paniculate; pedicels slender, short, 3 to 5 mm. long; rachis and pedicels pubescent; bracts lanceolate, acute, 3 mm. long; bractlets similar, slightly smaller: calyx 2-lipped, pubescent or glabrous, 7 mm. deep, rarely unequally 3-lobed, each lobe rounded, very shortly apiculate: corolla purple, 3.5 cm. long, slightly 2-lipped, 5-lobed; lobes rounded: stamens pilose at the base, 4, didynamous; staminodium short: disk broad, pulvinate; ovary puberulent, 2-celled, axial placentation, with 2 rows of ovules in each cell; style slender, glabrous; stigma clavate, 2-cleft: fruit linear, compressed, 7 mm. wide, about 10 cm. long. — El Valle, *Johnston*, no. 345, 1903.

Tabebuia rufescens, n. sp. Arborescent: leaves opposite, palmately compound, 5-foliolate; young leaflets elliptical, acute or acuminate, stellate-pubescent, 1 cm. wide and 2.5 cm. long, probably larger at maturity; petiole 3.5 cm. long, and petiolule 2 to 6 mm. long, all tawny stellate-pubescent; inflorescence terminal, cymose, pubescent with the exception of the corolla, precocious; pedicel 1 cm. long; bracts minute, subulate: calyx tubular, 5-ribbed, 5-lobed; lobes acute: corolla yellow, 5 to 7 cm. long, glabrous without, villous within on under side; staminodium long, glabrous: style persistent; stigma clavate, 2-lobed: young pods brownish, velvety-pubescent; pod 2-celled, cylindrical, recurved. — San Juan mt., alt. 500 m., *Johnston*, no. 79, July 2, 1903.

Chiococca micrantha, n. sp. Shrubby; stems decumbent, 3 m.

long, slender, straight: leaves opposite, narrowly lanceolate, attenuate at both ends, acuminate, glabrous, shortly petiolate, including petiole 3 to 5 cm. long and 0.5 to 1.5 cm. wide; stipules produced into an awn the length of stipular sheath: inflorescence lateral, about 3-flowered; bracts subulate, entire, 2 mm. long; pedicels 5 mm. long; calyx 4- to 5-fid, lobes acute, minutely puberulent, accrescent in fruit; corolla greenish, 4- to 5-lobed, twice the length of calyx; anthers broad, filaments short: fruit flattened, circular in outline, 3 mm. in diameter. — San Juan mt., in woods above South hill, alt. 400 m., *Johnston*, no. 115, July 27, 1903. This species differs from *C. racemosa*, Jacq., in having smaller acuminate leaves, entire bracts, more slender calyx-lobes, smaller corolla, more slender habit, and a much reduced raceme; from *C. brachiata*, R. & P., in smaller, narrow leaves, in much reduced simple raceme, and slightly smaller flower.

ANGURIOPSIS, nov. gen. Flowers dioecious, fasciculate-spicate. Staminate flowers sessile or shortly pedicellate: calyx short, campanulate, 5-lobed. Corolla rotate, 5-parted, segments ovate. Stamens 2, free, affixed to the throat of the calyx-tube; filaments short; anthers oblong, bilocular; cells linear, straight or slightly curved. Rudimentary ovary none. Pistillate flowers sessile or subsessile on the short fascicled spikes. Staminodia 2. Ovary oblong; placentas 2; style bifid, stigmas 2, bifid; ovules few, horizontal. Fruit oblong, irregular in shape, glabrous, 1- to 4-seeded. Seeds ovoid with a broad neck at one end.

Stem woody, climbing. Leaves lobed, tomentose. Tendrils simple. Flowers very small.

Cucurbitaceous and allied to *Anguria* and *Gurania*. It is strikingly different, however, in having the pistillate and staminate flowers of unequal size as in *Melothria*, and in having a distinctly spicate inflorescence, a character rare or entirely lacking in other *Cucurbitaceae*.

A. margaritensis, n. sp. Stem climbing, somewhat woody; tendrils simple, as much as 15 cm. long; leaves clustered at the nodes; young leaves orbicular or slightly 5-angled; apex rounded; base widely cordate; margin crenate-dentate; upper surface green, lightly hispid; under surface densely velvety-pubescent, whitish; the largest leaves varying from 12 mm. wide and 18 mm. long to 15 mm. wide and 12 mm. long, undoubtedly becoming larger; petiole pubescent, 1 cm. long: inflorescence shortly spicate, the spikes single or fasciculate, from 2 or 3 mm. to 1 cm. long, rugose and whitish pubescent: *staminate flowers* sessile or shortly pedicellate, about 2 mm. long; calyx green, campanulate, 5-lobed, lobes ovate, glabrous, with a plain midrib; corolla 5-partite, lobes ovate,

spreading, acute, internally villous; stamens 2, free, inserted upon the throat of the calyx-tube; anthers oblong, 2-celled, straight or slightly curved, 1 mm. long; filament short, thick; rudiment of gynoecium none: *pistillate flower* 5 mm. long, sessile or shortly pedicellate, pedicel pubescent; calyx 5-parted, green, lobes ovate, glabrous; corolla rotate, 5-lobed, lobes acute, internally pubescent; staminodia 2, minute; ovary with two placentas and about 6 ovules horizontally arranged; style short, filiform, bifid at apex, stigmas 2, bifid, villose; fruit 1- to 4-seeded, glabrous, ovoid, about 7 mm. long. — Along the roadside from El Valle to San Antonio, climbing over such shrubs as *Lycium salsum*, R. & P., and *Cereus eburneus*, Salm., *Johnston*, no. 286, Aug. 8, 1903.

Vernonia Milleri, n. sp. Shrub 12 to 18 dm. high: leaves petiolate, alternate, 1.5 to 3 cm. long and 0.5 to 2 cm. wide, with acuminate apex and attenuate base, slightly mealy-pubescent above, the lower surface densely whitish-pubescent, minutely black-dotted, and reticulate veiny; petiole 0.5 cm. long; pedicels 0.2 cm. long: inflorescence irregular, densely cymose, the close aggregation of heads 4 cm. in diameter; heads 3- to 4-flowered, 0.6 cm. long, 0.3 cm. broad; bracts 3- to 4-serial, outer setaceous, the inner ones becoming broadly lanceolate, 0.3 cm. long, three times the length of the outer: corolla 5-lobed, lobes narrow, acute, five- to seven-twelfths the length of corolla: pappus 2.5 mm. long, 2-serial, outer series very short, fimbriate; inner series long, barbellate, 11 to 12 setae, white: anthers with a narrow triangular appendage at apex, at base deeply sagittate: style 2-cleft, pubescent above; achene truncate, slightly pubescent. — Summit of South hill, alt. 300 m., *Miller & Johnston*, no. 254, July 31, 1901, and *Johnston*, no. 329, Aug. 31, 1903.

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BY W. W. JONES.

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By W. W. JONES.

Presented April 12, 1905. Received May 3, 1905.

THE genus *Zexmenia*, belonging to the helianthoid *Compositae* and restricted to tropical and subtropical America, was originally described by La Llave and Lexarza¹ in 1824 and founded upon a single Mexican species, *Z. serrata*. The name *Zexmenia* was not taken up by De Candolle in his *Prodromus*, nor by his immediate successors in cosmopolitan classification, as, for instance, Endlicher (*Gen. Pl.* 1838) and Steudel (*Nomencl. Bot.* 1840). This neglect was doubtless due to the fact that La Llave's plant had not been rediscovered and the type, even if preserved, had not been seen by any of these authors. It is probable from a reference by D. Don² that La Llave sent him a specimen of his *Z. serrata*, but even if that were the case, it was probably deposited in the great Lambert Herbarium, which was sold in sections, and it would now be difficult if not impossible to trace the specimen in question.

In the *Prodromus*, v. 610, De Candolle described under the name *Lipochaeta* a genus of nine species, five of which came from the Sandwich Islands and the remaining four from Mexico, La Llave's *Zexmenia serrata* being added as doubtfully belonging to this genus.

In 1852 Gray³ restored the name *Zexmenia*, not only for its still unknown type, but for *Lipochaeta strigosa*, DC., and several of his own new species. Gray states that these are not congeneric with De Candolle's Hawaiian species, to which, in his opinion, the name *Lipochaeta* should be restricted. He also refers *Lasianthaea helianthoides*, DC. to *Zexmenia* and makes it the basis of the sectional group *Lasianthaea*, later taken up by Bentham and Hooker, f. Gray, however, did not transfer specifically the five American species of *Lipochaeta* to *Zexmenia*, but this was done

¹ Nov. Veg. Desc. fasc. i. 13.

² Trans. Linn. Soc. xvi. 170.

³ Pl. Wright. i. 113.

later by C. H. Schultz.¹ In 1858 Mueller² collated briefly nine species of *Zexmenia*, not including those previously referred to *Lipochaeta*.

At the time of Bentham and Hooker's *Genera Plantarum* *Zexmenia* had been extended to include about twenty-five species, and was divided into three sections: *Wedelioides*, *Lipochaeta*, and *Lasianthaea*. In the present treatment the achenial characters alone have been made the basis of the sectional division, and it has seemed undesirable to maintain *Lipochaeta* and *Lasianthaea* as sections of the genus, for their species are often so nearly alike habitally that it is difficult to distinguish them, and in respect to the achenial characters these two sections form a very homogeneous group, which may be very fitly regarded as *Zexmenia* proper as by Hoffmann³ (*Euzexmenia*). In this portion of the genus the achenes are all strongly angled, triangular in the ray-flowers, and much flattened (except in *Z. Salvini*) in the disk-flowers. True wings (developing after anthesis) are never present, but the angles are often produced into wing-like longitudinally striate margins. The awns are generally longer in the disk-achenes than in the ray-achenes. In the former they frequently exceed the length of the body of the achene, although they are sometimes quite short. On the ray-achenes they are sometimes reduced to short stoutish teeth. When the intermediate pappus scales (squammellae) are developed to the length of 1 mm. they are always united to form a small cup or short tube at the summit of the achene. The entire pappus is continuous with the margins of the achene, there being no constriction or pappus-disk at the summit, as will be found in *Auchenocarpa*, to be described later. The inflorescence is of a terminal cymose character, but often appears umbellate or fasciculate by a shortening of the internodes. In a few species peduncles arise from several of the upper nodes. This section includes about twenty-five species.

The § *Wedelioides*, proposed by Bentham and Hooker, f.⁴ was used by its authors to include an obvious mixture of plants not very nearly related. The name was probably suggested by the *Wedelia*-like habit of such species as *Z. reticulata*, *Z. caracasana*, and *Z. helianthoides*, Benth. & Hook. f., which can no longer be referred to *Zexmenia*. *Wedelioides* as a section of *Zexmenia* would, therefore, better be abandoned. The portion of the § *Wedelioides*, Benth. & Hook. f., which it seems best to retain in *Zexmenia*, together with several more recently described species,

¹ Sch. Bip. in Seem. Bot. Voy. Herald, 305-306.

² Mueller in Walp. Ann. v. 225-226.

³ Hoffm. in Engl. & Prantl. Nat. Pflanzenf. iv. Ab. 5, 238.

⁴ Gen. ii. 373 (1873).

may well be called § *Auchenocarpa*, a name which indicates the achenial character common to all these species, namely, a more or less marked constriction of the achene near its summit, forming a sort of neck, which separates the insertion of the pappus from the body of the achene. The awns in this section are generally fragile and pubescent. Squamellae are present in most of the species but are usually quite distinct. The body of the achene varies in the different species from the type found in § *Euzexmenia* on the one hand to 4-angled in the ray-flowers and 3-angled in the disk-flowers, or somewhat rounded in both. In none of the species of § *Auchenocarpa* do we find the rather dense inflorescence of many species of § *Euzexmenia*, the heads being commonly solitary on long leafy stems, or in few-headed cymes or more rarely somewhat corymbose.

So far as known *Zexmenia* is strictly a New World genus and is confined to the tropical and subtropical regions of the mainland. Three species are found in the southwestern part of the United States and four in South America. The greater number, however, are confined to Mexico and Central America.

This revision has been prepared at the Gray Herbarium, under the direction of Dr. B. L. Robinson, where it has been possible to study what is probably the largest collection of this particular group. The material examined, however, has also included that of the United States National Museum, the herbarium of Mr. John Donnell Smith, and of the Missouri Botanical Garden. Acknowledgment is due to Mr. F. V. Coville and Dr. J. N. Rose of the National Museum, Mr. Smith of Baltimore, and Professor Trelease of the Missouri Botanical Garden, for their obliging loan of these specimens. Through the kindness of Sir W. T. Thiselton Dyer and Mr. W. Botting Hemsley of the Royal Gardens at Kew, and Mr. Casimir de Candolle of Geneva in sending type-material and tracings, several species have been identified which would otherwise have remained indefinite. Special thanks are due to Dr. B. L. Robinson, Dr. J. M. Greenman, and Miss Mary A. Day for their assistance in the preparation of the paper, the revision of the manuscript, and the proof-reading.

§ 1. EUZEXMENIA. Perennial herbs or shrubs, with simple or branching stems, generally pubescent: leaves all opposite, more or less serrate, short-petioled or sessile: peduncles solitary or the heads corymbose or borne in umbelliform clusters; heads never more than 2 cm. long; involucre subglobose, campanulate, or short-cylindric, the scales 1-5-seriate: ligules usually conspicuous, yellow (except in *Z. zinnioides*);

disk-corollas mostly exceeding the involucre, numerous: achenes smooth (i. e. not warty), glabrous or glabrate, from fusiform to cuneate, those of the ray-flowers 3-angled and 3-awned, of the disk-flowers strongly flattened, 2-awned (in *Z. aurea* generally 3-awned and somewhat 3-angled); body of the achene 3 to 6 mm. long, 1 to 2.5 mm. wide, the angles never definitely winged but in several species produced into thin longitudinally striate margins; pappus of 2 to 3 short tooth-like or longer rigid awns continuous with the edges of the achene, a series of very short intermediate squamellae often present.

* Intermediate scales (squamellae) of the pappus on the disk-achenes at least 0.5 mm. long.

← Involucral bracts in 2 series.

↔ Involucral bracts recurved at tip.

1. *Z. SERRATA*, La Llave. Shrub, 4 m. or more high, pubescent, much-branched: leaves lanceolate, serrate, petiolate, stellate-pubescent on both sides: heads corymbose; involucre of 10 to 12 ovate recurved scales: ligules 10 to 12, ovate, emarginate. — Nov. Veg. Descript. 13 (1824); Hemsl. Biol. Cent.-Am. Bot. ii. 174. *Lipochaeta? serrata*, DC. Prodr. v. 611 (1836). — Southern Mexico. Type collected by La Llave at San José del Corral. No specimens examined, the above description compiled.

↔↔ Involucral bracts not recurved.

2. *Z. MONOCEPHALA*, Sch. Bip. Shrub: leaves ovate-lanceolate, 2 to 10 cm. long, 0.5 to 5 cm. wide, acuminate at the apex, rounded or somewhat acuminate at the base, serrate, scabrous above, very sparsely strigillose beneath; petioles 5 to 13 mm. long, very villous on the upper side: peduncles solitary, slender, monocephalous, shorter than the upper leaves; heads 15 mm. high; involucre campanulate, 10 to 15 mm. broad, the scales ovate, submembranaceous, about 2-seriate: ray-flowers 4 or 5: achenes margined; squamellae well developed. — Sch. Bip. in Seemann, Bot. Voy. Herald, 306 (1852-57); Hemsl. Biol. Cent.-Am. Bot. ii. 173. *Lipochaeta monocephala*, DC. Prodr. v. 610 (1836). — Southern Mexico. STATE OF VERA CRUZ: Mirador, *Sartorius*. Of this rare and imperfectly known species I have seen only a tracing with a leaf and some immature achenes from the De Candolleian Herbarium in Geneva.

3. *Z. SCABERRIMA*, Benth. & Hook. f. Shrub(?): leaves short-petioled, ovate-lanceolate, acute at the apex, cuneate at the base, remotely serrulate, very scabrous on both sides, 5-nerved: heads in a lax corymb;

outer involucre bracts obtuse; the inner acute: one awn of the ray-achenes about as long as the body of the achene; squamellae very small. — Gen. ii. 373 (1873). *Lipochaeta scaberrima*, Benth. in Hook. Journ. Bot. ii. 43 (1840). — South America. No specimens seen. Type collected by Schomburgk in the Roraima Mountains of Guiana, 1840. A doubtful species.

← ← Involucre bracts in 3 to 5 series.

↔ Awns of the disk-achenes as long as the body.

4. *Z. SEEMANNII*, Gray. Shrub, usually much-branched: leaves linear-oblong to oblong-lanceolate, 2 to 10 cm. long, 7 to 15 mm. wide, acute to rounded at the apex, acute or acuminate at the base, subentire, shining, hispid-scabrous above, glabrate beneath; petioles 3 to 10 mm. long: peduncles commonly fascicled or cymose in umbelliform clusters in the upper axils, 3 to 13 mm. long; heads about 15 mm. high; involucre cylindrical, 5 to 8 mm. broad; the involucre bracts about 5-seriate, lax at the apex and variously toothed, the outer series very short; the inner much longer: ligules 6 to 8, about 1 cm. long: margined angles of the achenes very prominent and confluent with the awns; body of the disk-achenes 4 mm. long, 1.5 mm. wide; squamellae about 1 mm. long, more or less united. — Pl. Wright. i. 114 (1852); Hemsl. Biol. Cent.-Am. Bot. ii. 174. — Northern Mexico. *Specimens examined*, — Cerro de Pinal, *Seemann*, no. 1476 (type, in herb. Gray). SINALOA: Sierra de Choix, *Goldman*, no. 249. TEPIC: *Palmer*, no. 1857, coll. of 1892.

5. *Z. HELIANTHOIDES*, Gray. Shrub or lignescent herb, 6 to 9 dm. high; branches stout: leaves 2 to 10 cm. long, ovate, subcordate, serrate or subentire, reticulate-veiny, above warty-strigillose, beneath velvety-villous; petioles less than 1 cm. in length: peduncles 1 to 3 cm. long, very stout, fascicled or occasionally solitary at the ends of the branches; heads about 2 cm. long; involucre 10 to 15 mm. broad, its bracts about 4-seriate, ovate, appressed, entire, rounded at the apex, the outer series considerably shorter than the inner: ligules 8 to 16, rather small; disk-corollas long and slender, much exceeding the involucre: achenes 4 to 6 mm. long, with margined angles much developed and confluent with the awns, these at least in the disk-achenes longer than the body of the achene. — Pl. Wright. i. 113 (1852); Hemsl. Biol. Cent.-Am. Bot. ii. 172; Sch. Bip. in *Seemann*, Bot. Voy. Herald, 305. *Z. ovata*, Benth. & Hook. f. Gen. ii. 373 (1873). *Lasianthus helianthoides*, Zucc. in Herb. Acad. Monac. according to Gray, l. c. *Lasianthaea helianthoides*, DC. Prodr. v. 608 (1836). *Tithonia ovata*, Hook. Bot. Mag. t. 3901

(1842).—Southern Mexico. *Specimens examined*, — MORELOS: near Cuernavaca, 1520 m. alt., *Pringle*, no. 6225; *Ghiesbreght*, no. 379 (type, in herb. Gray).

↔ ↔ Awns of the disk-achenes usually about half as long as the body.

↙ 6. *Z. GREGGII*, Gray. Shrub or lignescent herb, 2 to 3 m. high: leaves large on the lower part of the stem, 1.5 dm. long, 8 cm. wide, smaller above, sessile or nearly so, ovate to lanceolate, serrate, obtuse to acuminate, cordate or subcordate, reticulate-veiny, scabrous: peduncles 2 to 25 cm. long, stout, naked or bearing 1 or 2 scale-like bractlets; heads about 15 mm. high; involucre 1.5 to 2.5 cm. broad, its bracts 3-seriate, ovate or lanceolate, the outer attenuate, appressed, several-nerved, the inner rounded and chartaceous at the summit: ligules rather small, commonly not exceeding the disk; disk-corollas with long slender tubes, generally surpassing the involucre: achenes 5 to 6 mm. long, narrowly fusiform, the angles only slightly margined; squamellae about 1 mm. in length. — *Pl. Wright.* i. 113 (1852); *Hemsl. Biol. Cent.-Am. Bot.* ii. 172. — Southern Mexico. *Specimens examined*, — JALISCO: near Guadalajara, *Pringle*, no. 1769; Tequila, *Palmer*, no. 356, coll. of 1886; between the city of Mexico and Mazatlan, *Gregg*, no. 1003 (type, in herb. Gray).

* * Squamellae minute (less than 0.5 mm. long or entirely wanting).

+ Heads few, in terminal 3-headed cymes or solitary (in *Z. fruticosa*, the peduncles commonly in several of the upper axils).

↔ Herbs, 3 to 9 dm. high, from tuberiform roots or thickened lignescent base.

= Peduncles very long, usually not less than 1 dm. in length.

7. *Z. PODOCEPHALA*, Gray. Herbaceous, 6 to 9 dm. high, somewhat branched from a lignescent base; roots much thickened, fusiform; stems spreading-hirsute, bearing about 5 pairs of leaves and 1 to 3 long-peduncled heads: leaves subsessile, ovate-oblong to oblong-lanceolate, acute at the apex, subcordate, rounded or abruptly narrowed to a subcuneate base, serrate, 6 to 8 cm. long, 15 to 32 mm. wide, coarsely pubescent on both sides: heads about 1 cm. high; involucre cylindrical or campanulate, about 1 cm. broad, 2-seriate; outer bracts oblong-ovate, subacute, hirsute: ray-flowers about 12; ligules 13 mm. long; disk-corollas scarcely exceeding the involucre: achenes 3 mm. long, widest at or near the summit; awns shorter than the body, widened at the base, those of the ray-achenes usually reduced to strong teeth; minute squamellae sometimes present. — *Syn. Fl.* i. pt. 2, 286 (1884); *Rose, Contrib. U. S. Nat. Herb.* i. 103; *Britton & Kearney, Trans. N. Y. Acad. Sci.* xiv. 44. *Verbesina*

podocephala, Gray, Pl. Wright. ii. 92 (1853); Rothrock in Wheeler, Rep. 164; Torr. Bot. Mex. Bound. 92; Hemsl. Biol. Cent.-Am. Bot. ii. 190. — Rocky hills of southwestern United States to Guatemala. *Specimens examined*, — ARIZONA: Chiricahua Mountains, Rothrock, no. 517; near Fort Huachuca, Wilcox, no. 319; Huachuca Mountains, Lemmon, no. 374; Santa Rita, Pringle, no. 57. CHIHUAHUA: near the City, Pringle, no. 349; Colonia Garcia, Townsend & Barbour, no. 219; in the southwestern part, Palmer, no. II, coll. of 1885. SONORA: Santa Cruz, Wright, no. 1239 (type, in herb. Gray); Alamos, Palmer, no. 362, coll. of 1890.

8. *Z. Palmeri*, GREENMAN, n. sp. "Stem erect, 5 to 6 dm. high, apparently from a woody base, hirsute-pubescent: leaves showing a tendency to alternation, short-petioled, elliptical-lanceolate or oblong, 5 to 10 cm. in length, 2 to 4 cm. broad, acute or acuminate, serrate-dentate except toward the base, hirsute-hispid on both sides: heads 1 to 2 cm. high; peduncles solitary, terminal and axillary, 1 to 2 dm. long, naked or sparingly bracteolate, appressed-pubescent; involucre 3-seriate, the outer scales longer than the inner, lance-oblong, 12 to 18 mm. in length, acute or obtuse, externally hirsute-hispid: ray-flowers about 15; disk-flowers numerous: achenes narrowly margined on the inner side. — Southern Mexico. *Specimens examined*, — JALISCO: Rio Blanco, Palmer, no. 50, coll. of 1886 (type, in herb. Gray). The specimen here proposed as a new species was doubtfully referred by the late Dr. Sereno Watson to *Z. podocephala*, Gray, and its affinity certainly seems to be with that species; but it is readily distinguished by the distinctly although shortly petiolate leaves, and by their lanceolate rather than ovate form."

= = Peduncles less than 1 dm. long.

a. Pappus of the disk-achenes consisting of 2 short teeth connected by a shallow more or less continuous border (connate squamellae): ligules purple.

9. *Z. ROSEI*, Greenman. Herbs, 3 to 4 dm. high; roots several, fusiform-thickened; stem terete, leafy chiefly below the middle, covered by a dense spreading grayish villous pubescence, also finely and obscurely puberulent: leaves opposite, membranaceous, oblanceolate-oblong, acutish, short-petioled, subremotely serrate, scabrous-pubescent above with thick-based hairs, grayish tomentose and reticulate-veiny beneath, 6 to 16 cm. long, 2 to 5 cm. wide: inflorescence a rather contracted terminal cyme subtended by 1 or 2 pairs of large foliaceous bracts; heads 12 mm. high; involucre campanulate, 2-3-seriate; the outer scales subfoliaceous, oblanceolate, coarsely pubescent, obtusish:

ligules dark purple, 12 to 15 mm. long, a third as broad: achenes narrowly wing-margined; pappus reduced to short teeth more or less united into a shallow cup. — Proc. Am. Acad. xl. 42 (1904). — Western Mexico. TEPIC: in the foot-hills of the Sierra Madre between Pedro Paulo and San Blacisto, *Rose*, no. 1987 (type, in herb. U. S. Nat. Mus.; fragments and tracing in herb. Gray).

b. Pappus of the disk-achenes consisting of 2 to 3 awns nearly as long as the body of the achene: ligules yellow.

10. *Z. AUREA*, Benth. & Hook. f. Stem 1.5 to 3 dm. high, strict and simple or sparingly branched from the base, bearing 3 to 5 pairs of leaves, hirsute-pubescent, generally terminated by a 3-headed cyme: leaves ovate-oblong to elliptical or rhomboid-oval, dentate-serrate, rather densely pilose or hirsute along the veins beneath, densely strigose above: heads about 1 cm. high; involucre campanulate, commonly 1 cm. broad; outer bracts 5, ovate-oblong, densely hirsute: ray-flowers about 10; ligules bright yellow, considerably exceeding the disk; disk-flowers numerous, their corollas tubular-funnel-shaped, the teeth papillose on the inner surface: disk-achenes 3 mm. long, somewhat 3-angled but strongly compressed, usually bearing 3 rigid awns no longer than the body of the achene; awns of the ray-achenes none or reduced to 3 short teeth. — Gen. ii. 371 (1873); Hemsl. Biol. Cent.-Am. Bot. ii. 172. *Verbesina aurea*, DC. Prodr. v. 613 (1836). *V. tuberosa*, Klatt, Ann. Naturh. Hofmus. Wien, ix. 361 (1894). *Wedelia? aurea*, D. Don, Bot. Mag. t. 3384 (1835). — Prairies in Central Mexico. *Specimens examined*, — STATE OF MEXICO: *Pringle*, no. 3239. JALISCO: Henjuquilla, *Rose*, no. 2549. Mexico without precise locality, *Schmitz*, no. 248, and *Schaffner*, no. 56.

11. *Z. xylopoda*, n. sp. Herb, with a small cluster of rather slender stems 3 to 6 dm. high, from a lignescent base: leaves 1 to 7 cm. long, 7 to 25 mm. wide, ovate or spatulate to elliptic-linear, short-petioled or sessile, from cuneate to rounded at the base, generally acute at the apex, dentate-serrate to subentire, ciliate, sparingly pubescent or glabrous below, strigose above with bases of the hairs enlarged: peduncles from 1 to 9 (generally about 5) cm. long, terminal and solitary or in cymes of 3, strictly glabrous; heads 10 to 15 mm. high; involucre 5 to 10 mm. broad, 3-seriate; outer bracts ovate, attenuate, ciliate: ligules bright yellow, 1 to 1.5 cm. long, 5 mm. wide; disk-corollas scarcely exceeding the involucre, with short proper tube, long funnel-shaped throat, and short somewhat fimbriate limb: disk-achenes 2 mm. broad, 5 mm. long,

2-awned, the awns shorter than the body; ray-achenes somewhat margined and the margins produced upward into 3 coarse teeth. — Mexico. *Specimens examined*, — JALISCO: Rio Blanco, *Palmer*, no. 757, coll. of 1886 (type, in herb. Gray). This species has been confused with *Z. aurea*, but it is certainly quite distinct, being well marked by its thickened lignescent base, the shape and pubescence of its leaves, long and ciliated involucre scales, and large more or less margined ray-achenes.

↔ ↔ Suffruticose, fruticose, or arborescent.

= Rays purple.

12. *Z. ZINNIoides*, Hemsl. Much-branched; branches long, slender, scabrous-pubescent, ferruginous: leaves sessile or shortly petioled, rigid, ovate-oblong, 5 to 9 cm. long, acute or obtuse, remotely serrulate or subentire, sparsely strigillose-pubescent on both surfaces, shining above: peduncles 1.5 to 2.5 cm. long, commonly solitary, pubescent; heads about 1 cm. high; involucre campanulate, usually 1 cm. broad; bracts about 16, appearing somewhat decussate, scabrous, the outer rather broad, acute, the inner oblong or linear, glabrous, colored at the tip: ligules 10 to 12, purple, broadly oblong; disk-corollas purple, funnel-formed, papillose-hirsute on the limb: achenes margined; awns about as long as the body, rigid. — Biol. Cent.-Am. Bot. ii. 175 (1881). — Northern Mexico. *Specimens examined*, — A portion of the type, *Seemann's* no. 1464, collected on the Cerro de Pinal, and obligingly sent from herb. Kew.

= = Rays yellow.

α. Bracts unequal, in several series, the outer much the shortest.

1. Scales of the involucre recurved at the tip.

13. *Z. squarrosa*, GREENMAN, n. sp. "Shrub; stems and branches appressed sericeous-pubescent, often copiously dotted with lenticels: leaves broadly ovate, 3 to 7 cm. long, 2 to 6 cm. wide, somewhat acuminate, dentate, cuneate or rounded at the base, tuberculate-hispid above, paler and hirsute-pubescent on the prominently reticulated veins beneath, 3-nerved from the base; petioles 0.5 to 1.5 cm. long; peduncles terminal, 5 to 20 mm. long, cymosely arranged; heads 1 to 1.5 cm. high; involucre cylindrical or slightly turbinate, 5-6-seriate; bracts ovate to oblong, acute to rounded at the apex, conspicuously ciliate, the outermost shorter ones pubescent on the dorsal surface and with subfoliaceous squarrose tips: ray-flowers about 5, the ligules usually less than 1 cm. long, lemon-yellow; disk-flowers numerous, considerably exceeding the in-

volucre: achenes 6 to 7 mm. long, narrowly margined on the inner edge; squamellae minute or none. — Mexico. *Specimens examined*, — GUERRERO: mountains near Iguala, alt. 1230 m., *Pringle*, no. 8411 (type, in herb. Gray)."

2. Scales of the involucre not recurved at the apex.

14. *Z. GHIESBREGHTII*, Gray. Shrubby or arborescent: leaves ovate-lanceolate, acuminate, reticulate, submembranaceous, hirtellous-scabrous, subcordate: peduncles terminal, solitary or in cymes of 3, frequently thickened upward, several times longer than the upper leaves; heads about 15 mm. high; involucre hemispherical, 1 to 2 cm. in diameter, 3-seriate; outer bracts orbicular-ovate, appressed, considerably shorter than the others; the inner long, narrower, membranaceous at the tip: ligules orange-yellow, only slightly exceeding the disk; disk-flowers numerous, generally exceeding the involucre: achenes somewhat margined, about 5 mm. long, 1 to 2 mm. wide; awns, in the disk-achenes, more than half as long as the body, in the ray-achenes shorter; squamellae minute. — Pl. Wright. i. 113 (1852), as *Ghiesbreghtii*; Hemsl. Biol. Cent.-Am. Bot. ii. 172. — Mexico. *Specimens examined*, — Without precise locality, *Ghiesbreght*, no. 385 (type, in herb. Gray). COLIMA: *Palmer*, no. 1241, coll. of 1891. GUERRERO: Acapulco, *Palmer*, no. 491, coll. of 1895; between Juchitango and Omelepec, *Nelson*, no. 2312. TEPIC: *Palmer*, Jan. 5 to Feb. 6, 1892. Some of these specimens have been distributed as *Z. Greggii*, a species which should be readily distinguished by its prominent squamellae, very narrowly fusiform achenes, and sessile leaves.

15. *Z. MACROCEPHALA*, Hemsl. Suffruticose or fruticose, densely pubescent above; leaves firm, subsessile, lanceolate to elliptical, attenuate, serrate, short-pilose and more or less scabrous with tuberculate hairs above, strongly reticulate-veiny and densely hirsute beneath; peduncles longer than the upper leaves, terminal, usually in cymes of 3; heads 1 to 2 cm. high; involucre 10 to 15 mm. broad; bracts somewhat decussately arranged, ovate, from acute to rounded at the apex, outer pair quite small: achenes rather long and slender (as in *Z. Greggii*), those of the disk with slender awns less than half as long as the body, those of the ray with tooth-like awns; squamellae none. — Biol. Cent.-Am. Bot. ii. 173 (1881). *Lipochaeta macrocephala*, Hook. & Arn. Bot. Beech. Voy. 436. — Southern Mexico. *Specimens examined*, — GUERRERO: Acapulco, *Hinds*, no. 1841 (a portion of the type material sent from herb. Kew).

b. Bracts of the involucre subequal or the outer longest, in few series.

1. Outer bracts the longest, not foliaceous.

16. *Z. CROCEA*, Gray. Much-branched shrub: leaves oblong-ovate, subcordate, acuminate, short-petiolate, serrulate, reticulate-veiny, scabrous above, pilose beneath: peduncles often 12 cm. long, generally thickened upward, hirsute, terminal and solitary or in a cyme of 3; heads 1 to 2 cm. high; involucre 10 to 15 mm. broad, 2-seriate; outer bracts oblong-ovate to obovate or spatulate, acute or obtuse, strigose to densely hirsute, much longer than the inner: ligules orange-yellow, little or not at all exceeding the disk; disk-corollas with long slender tubes: achenes of the ray-flowers usually with 1 long awn and 2 short teeth; achenes of the disk-flowers about 5 mm. long, 1 to 2 mm. wide, their awns unequal and shorter than the body. — Pl. Wright. i. 114 (1852); Hemsl. Biol. Cent.-Am. Bot. ii. 172; Seemann, Bot. Voy. Herald, 305. *Z. Stenantha*, Hemsl. l. c. 174 (1881). — Mexico. *Specimens examined*, — MORELOS: near Cuernavaca, *Pringle*, no. 6187; near Yautepec, *Pringle*, no. 8701; *Bourgeau*, no. 1204. OAXACA: Huajuapam, *Nelson*, no. 1978.

17. *Z. SALVINII*, Hemsl. Shrub, diffusely branched, with large leaves and marked pubescence: leaves broadly-ovate, shortly petiolate, acute or acuminate, serrate, scabrous above, pilose beneath: peduncles about 1 to 2 cm. long, pilose, bearing a few small bracteal leaves and a solitary head; heads few, 10 to 15 mm. high; involucre about 1 cm. broad; bracts apparently decussate, the outer 4 strigose, ovate-oblong or spatulate, brownish: ligules conspicuous, yellow, exceeding the disk and involucre: achenes of the ray-flowers 3-angled, with 3 stout awl-shaped awns, those of the disk-flowers 2-angled, cuneate, 4 mm. long, with 2 awns. — Biol. Cent.-Am. Bot. ii. 173 (1881). — Central America. *Specimens examined*, — GUATEMALA: Santa Rosa, *Heyde & Lux*, nos. 3358 and 3797 of J. D. Smith's distrib.

2. Outer bracts of the involucre not longer than the inner.

18. *Z. FRUTICOSA*, Rose. Diffusely branched shrub: leaves lanceolate or ovate, obtuse to subcordate at the base, acute or acuminate at the apex, serrate, scabrous above, hispid-pubescent beneath, sessile or shortly petioled: peduncles slender, 2 to 4 cm. long, somewhat exceeding the upper leaves, chiefly terminal, solitary or in cymes of 3; heads about 1 cm. high; involucre campanulate, 2-3-seriate, 5 to 7 mm. broad; outer bracts lax, ovate or lanceolate, hispid, ciliate, acute, somewhat shorter than the inner: ray-flowers 5 to 10; ligules lemon-yellow, surpassing

the disk; disk-corollas considerably longer than the involucre: awns of the disk-achenes 2, longer than the body of the achene, much exceeding the involucre; ray-achenes slightly margined, with 2 tooth-like awns and one slender and bristle-like. — Contrib. U. S. Nat. Herb. i. 103 (1891). — Western Mexico. *Specimens examined*, — SONORA: Alamos, Palmer, no. 645, coll. of 1890 (co-type, in herb. Gray).

+ + Heads numerous; peduncles fasciculate, terminal and subterminal.

++ Involucral bracts 2 mm. or more broad, imbricated in several series, commonly appressed; heads small; involucre generally less than 5 mm. broad.

= Achenes 4 to 5 mm. long, those of the ray-flowers 3-awned, the awns on the outer angles short, tooth-like, on the inner long and bristle-formed; achenes of the disk-flowers with 2 awns as long as the body.

1. Some of the outer bracts of the involucre reflexed: petioles generally over 1 cm. long.

19. *Z. gracilis*, n. sp. Shrub with long very slender branches: leaves ovate to lanceolate, 5 to 10 cm. long, 2 to 4 cm. wide, acuminate to rounded at the base, very acute or acuminate at the apex, serrate except near the ends, strigose above, the hairs with swollen bases, the lower surface sparsely short-strigose; petioles 5 to 15 mm. long: peduncles 4 to 8 cm. long, slender, commonly in 3 or 4 of the upper axils, superposed; heads 1 to 1.5 cm. high; involucre 4 to 7 mm. broad, cylindrical, 2-3-seriate; outer bracts considerably the shortest, generally reflexed, ciliate: ligules orange-yellow: achenes as in the preceding species. — Western Mexico. *Specimens examined*, — COLIMA: Colima, Palmer, no. 163, coll. of 1897 (type, in herb. U. S. Nat. Mus.).

2. Outer bracts of the involucre not recurved or reflexed: petioles less than 1 cm. long.

>20. *Z. CEANOTHIFOLIA*, Sch. Bip. Shrub 2 to 3 m. high; branches striate, roughened by lenticels; branchlets pubescent: leaves from broadly ovate to narrowly oblong-lanceolate, usually ovate-lanceolate, acute or acuminate at the apex, acute to rounded at the base, serrulate, reticulate-veiny, sparsely scabrous-pubescent to densely strigose above, strigose to coarsely and densely pubescent beneath; petioles 5 to 10 mm. long: peduncles 1 to 3 cm. long, in terminal or subterminal fascicles; heads 5 to (occasionally) 10 mm. high; involucre 3-5-seriate, 4 to 5 mm. broad; outer bracts ovate, very obtuse to abruptly acuminate, much shorter than the inner: ligules 5 to 7, oblong, emarginate, orange-yellow; disk-flowers numerous: ray-achenes 4 mm. long, about 1 mm. wide, linear-ovate, with narrow margins, their pappus of 2 short teeth and one

awn shorter than the body; disk-achenes slightly narrower and longer, their 2 awns subequal, longer than the body and at maturity much exceeding the involucre; squamellae none or minute. — Sch. Bip. in Seemann, Bot. Voy. Herald, 305 (1852-57); Hemsl. Biol. Cent.-Am. Bot. ii. 172. *Verbesina ceanothifolia*, Willd. Sp. Pl. iii. 2225 (1804); DC. Prodr. v. 613 (1836). *Lipochaeta umbellata*, DC. l. c. 610 (1836). — Mexico. *Specimens examined*, — VERA CRUZ: Orizaba, *Botteri*, nos. 800 (in part), 477, and 487; *Thomas*, coll. in 1864. MORELOS: Cuernavaca, *Berlandier*, no. 1065 (co-type, in herb. Gray); *Pringle*, no. 9163; *Holway*, no. 3530; *Bourgeau*, no. 1219. OAXACA: Sierra de San Felipe, *Pringle*, no. 5783; *Conzatti & González*, no. 993; *Buites*, coll. in 1846. JALISCO: near Guadalajara, *Pringle*, nos. 2167 and 2301; near Colotlan, *Rose*, no. 2814. TEPIC: *Palmer*, presumably coll. of 1892.

Var. *conferta*, Gray in herb. Leaves lanceolate to elliptical, 1 to 2.5 cm. wide, attenuate to subtruncate at the apex, finely appressed-pubescent on both sides, subsessile: peduncles few to numerous, generally very short; involucre about 3-seriate; bracts acute: ligules apparently lemon-yellow. — *Lipochaeta umbellata*, var. *conferta*, DC. Prodr. v. 610 (1836). — Mexico: *Specimens examined*, — MORELOS: Cuernavaca, *Berlandier*, no. 1053 (type, fragment in herb. Gray). Without exact locality, *Gregg*, no. 1070. TEPIC: Acaponeta, *Lamb*, no. 519.

21. *Z. MICROCEPHALA*, Hemsl. Shrub with scabrous stems: leaves ovate-lanceolate, 4 to 10 cm. long, minutely serrulate, obtuse, short-petioled, rugose and strigillose above, strigillose, whitish, and with veins prominent beneath: peduncles slender, fasciculate-corymbose, about 15 mm. long; heads about 1 cm. high; involucre 4 to 6 mm. wide; bracts subcordate, oblong or ovate, rounded at the apex: ray-flowers about 4; ligules oblong-elliptical; disk-flowers about 20; teeth of the corollas hirsute: achenes glabrous, with 2 or 3 wing-like margins upwardly adnate to the awns; squamellae none. — Biol. Cent.-Am. Bot. ii. 173 (1881). — Western Mexico. *Specimens examined*, — TEPIC: San Blas, *Sinclair* (a leaf and head from herb. Kew).

= = Achenes about 3 mm. long, those of the ray-flowers obovoid, rounded above and with one long awn and two short teeth, those of the disk-flowers somewhat cuneate, scarcely 1 mm. wide at the summit and with two slender unequal awns shorter than the body.

22. *Z. IMBRICATA*, Sch. Bip. Suffruticose, canescent; stem glabrate: leaves 1 cm. long, subcordate, ovate, acute, irregularly dentate, scabrous; petioles about 2 cm. long: heads in the upper axils; involucre hemi-

spherical, turbinate, 5-seriate; bracts narrowly ovate, obtuse, scabrous: achenes ovoid, margined on the angles; squamellae minute. — Sch. Bip. in Seemann, Bot. Voy. Herald, 306 (1852-57). — Mexico. No specimen of this species has been seen by the writer and its place here in the genus is somewhat inferential.

23. *Z. FASCICULATA*, Sch. Bip. A tall much branched shrub; branches roughened by lenticels: leaves oblong-lanceolate to broadly ovate, acute or acuminate at the apex, acute to rounded at the base, serrate or subentire, appressed-strigose above (the hairs frequently with swollen bases), sparsely pubescent on the veins to densely pilose beneath: peduncles 1 to 5 cm. long in terminal and subterminal fascicles; heads 5 to 8 mm. high; involucre narrowly campanulate to cylindrical, 3 to 6 mm. broad; bracts about 3-seriate, ovate, obtuse to abruptly acuminate, the outer the shortest: rays conspicuous; disk-corollas elongated and rather narrowly tubular. — Sch. Bip. in Seemann, Bot. Voy. Herald, 306 (1852-57); Hemsl. Biol. Cent.-Am. Bot. ii. 173. *Lipochaeta fasciculata*, DC. Prodr. v. 610 (1836). — Mexico. *Specimens examined*, — CHIHUAHUA: southwestern part, *Palmer*, no. 155. TAMAULIPAS: Tula, *Berlandier*, nos. 2134, 717 (co-type, in herb. Gray). SAN LUIS POTOSI: Canoas, *Pringle*, no. 3753; between San Luis Potosi and Tampico, *Palmer*, no. 1578. A variable species, which with further knowledge may prove divisible. *Palmer's* no. 1578 and *Townsend & Barbour's* no. 384 are doubtfully placed here.

++ ++ Bracts about 1 mm. broad, in 3 series, lanceolate.

24. *Z. Pittieri*, Greenman, n. sp. "Stems striate, finely strigillose: leaves remote, elliptic-oblong, 10 to 15 cm. long, 6 to 8 cm. wide, short-acuminate, rounded or obtuse at the base, remotely denticulate, strongly 3-nerved from near the base to the apex, usually with 2 pairs of less conspicuous marginal veins, prominently reticulate-veiny beneath, hirtellous-pubescent on both surfaces; petioles 10 to 15 mm. long: heads 6 to 8 mm. high, borne in a terminal corymbose panicle; involucre 3-seriate, about 5 mm. broad; bracts ovate-lanceolate, 3 to 4 mm. long, appressed-hirtellous-pubescent, the outer somewhat the smallest: ray-flowers 6 to 9; ligules small and inconspicuous; disk-flowers about 35, exceeding the involucre: achenes narrowed below, glabrous, inconspicuously ciliate, those of the ray-flowers with 3 paleaceous awns longer than the body, those of the disk-flowers with 2 awns and several minute squamellae more or less united. — Central America. *Specimens examined*, — COSTA RICA: in woods, Tsâki, Talamanca, altitude 200 m., *Pittier*, no. 9565 (type, in herb. Gray)."

“In the Gray Herbarium there is another specimen from the same locality as the Pittier specimen here cited and with the same number, but said to have been collected by Tonduz. This was rightly referred by Dr. Klatt to *Salmea Eupatoria*, DC. (*S. scandens*, DC.). Notwithstanding a close habital similarity the plant of Pittier exhibits, by the presence of fertile ray-flowers with triangular achenes as well as by the pappus both in the ray- and disk-flowers, the technical characters of *Zexmenia*.”

↔ ↔ ↔ Bracts in few series, subequal.

= Heads on short peduncles (10 to 25 mm. long) in close clusters; bracts of the involucre ovate, rather long-acuminate.

25. *Z. elegans*, Sch. Bip. Leaves oblong-lanceolate to ovate, acute to somewhat rounded at the base, acute or acuminate at the apex, serrate, strigose or scabrous, beneath sparsely pubescent on the veins; petioles less than 1 cm. long, pilose: peduncles several in a cluster, terminating the branches, 10 to 25 mm. long, usually pilose; involucre subglobose or campanulate, 7 to 10 mm. wide, 2-3-seriate; outer bracts ovate, caudate-acuminate, pubescent: ligules about 7 mm. long, somewhat exceeding the disk; disk-corollas slightly surpassing the involucre: achenes 4 to 5 mm. long, those of the ray-flowers usually with 1 long awn and 2 short teeth, those of the disk-flowers rounded at the summit, cuneate toward the base, with 2 unequal awns shorter than the body. — Sch. Bip. acc. to Benth. & Hook. f. Gen. ii. 373 (1873), without description — Southern Mexico. *Specimens examined*, — VERA CRUZ: Mirador, Liebmann, no. 378 (type, in herb. Gray); Sartorius (without data); Orizaba, Pringle, no. 5911, Gray, May, 1885, Thomas, Coll. of 1864, Botteri, no. 800 (in part). This species, although long recognized, seems never to have been described.

26. *Z. COSTARICENSIS*, Benth. Branching shrub or lignescent herb: leaves 5 to 16 cm. long, 4 to 11 cm. wide, generally broadly ovate, with acuminate or rounded base, and very acuminate apex, subentire to serrate, above scabrous to densely strigose, beneath strigillose to densely pubescent; petioles 1 to 3 cm. long, puberulent to villous: peduncles fasciculate in terminal or subterminal clusters, 1 to 5 cm. long, puberulent to villous; heads 6 to 12 mm. high; involucre campanulate to subcylindrical, 5 to 10 mm. broad, about 2-seriate, outer bracts villous, from oblong to obovate or slightly panduriform, acute or occasionally rounded; ligules oblong, about 1 cm. in length: disk-corollas with short tubes: achenes about 4 mm. long, those of the disk-flowers somewhat margined

on the inner angle, the awns about as long as the body; ray-achenes narrowly margined and with the 2 outer awns usually tooth-like, the inner one commonly long and slender. — Benth. in Oersted, Vidensk. Meddel. 1852, p. 95. *Z. nicaraguensis*, C. Muell. in Walp. Ann. v. 226 (1858). — Central America. *Specimens examined*, — GUATEMALA: Santa Rosa, J. D. Smith's sets nos. 3786, 4196; Alta Verapaz, J. D. Smith's sets, nos. 1412, 7446; Heyde, no. 424; near Neuton, Nelson, no. 3545. HONDURAS: San Pedro Sula, Thieme, no. 5320. COSTA RICA: Llanuros de Santa Clara, J. D. Smith's sets, nos. 6617, 6618; also the following numbers of Pittier and assistants (*Tonduz* and *Biolley*) 1556, 3134, 4138, 4359, 4522, 4912, 4921, 5823, 7111, 7165, 7428, 8991, 12,911, 13,617. ? VERA CRUZ (Mexico): Cordoba, Kerber, no. 59 (not characteristic).

§ 2. AUCHENOCARPA. Leaves opposite or the uppermost alternate: mature achenes winged (except in *Z. aurantiaca*, *Z. lantanifolia*, and *Z. strigosa*), more or less constricted into a short neck bearing the pappus, or the summit of the body rounded and bearing the awns directly without any intervening neck; the awns 1 to 3, long and slender (or reduced to short teeth), not continuous with the margins of the wings.

* Leaves small, the cauline 2 to 3 or rarely 4 cm. long: outer involucre scales squarrose, loose and enlarged, or the heads subtended by 2 or 3 leaf-like bracts.

+ Achenes not winged.

27. *Z. LANTANIFOLIA*, Sch. Bip. Stem woody, branched, striate, scabrous-hirtellous or subcanescent-pubescent above: leaves ovate, acute at the apex, acuminate to subcordate at the base, 2 to 4 cm. long, irregularly serrate or serrate-dentate, above papillose-strigose, beneath strigose-hirsute, the veins prominent on the under surface; petioles 5 to 10 mm. long: peduncles solitary, 3 to 10 cm. long; heads 10 to 15 mm. high; involucre 10 to 12 mm. broad, 3-5-seriate, subtended by 4 leaves, 2 of these being scarcely larger than the ovate acute or abruptly acuminate proper involucre scales: ligules very showy, considerably exceeding the disk-flowers: achenes pubescent, those of the ray-flowers 2 to 3 mm. long, 1 mm. wide, abruptly rounded or subtruncate at the summit, with usually 1 very fragile awn and several minute squamellae; achenes of the disk-flowers ovate, 3 to 4 mm. long, 1 to 2 mm. wide, with 2 unequal awns (one of these about as long as the body) and usually a few minute squamellae. — Sch. Bip. in Seemann, Bot. Voy. Herald, 306 (1852-57); Hemsl. Biol. Cent.-Am. Bot. ii. 173. *Lipochaeta lantanifolia*, Sch. Bip. Linnaea, xix. 729 (1847). — Central Mexico. *Specimens examined*, —

SAN LUIS POTOSI: San José Pass, *Pringle*, no. 3062. This plant seems to have no very close affinities with the other known species, but in respect to the achenes it most nearly resembles *Z. Pringlei*.

+ + Achenes winged.

↔ Squamellae minute or wanting.

28. *Z. PRINGLEI*, Greenman. Tall, slender-branched, suffruticose or fruticose, arachnoid-pubescent except on the upper surface of the leaves: leaves opposite or the uppermost alternate, ovate, generally less than 3 cm. long, subcordate at the base, obtuse or acute at the apex, above rugose and appressed-tuberculate-hispid, beneath densely tomentose; petioles 4 to 7 mm. long, narrowly margined: peduncles solitary, long, slender; heads 10 to 15 mm. high; involucre 1 to 1.5 cm. broad, about 3-seriate and subtended by several leaf-like bracts; the inner scales oblong to oblong-lanceolate: ligules oblong, about 12 mm. in length, usually half as broad: achenes much as in the preceding species but slightly larger and those of the ray-flowers verrucose, those of the disk-flowers winged. — Proc. Am. Acad. xxxiii. 489 (1898). — Southern Mexico. *Specimens examined*, — PUEBLA: near Tehuacan, alt. 2166 m., *Pringle*, no. 6768 (type, in herb. Gray).

↔ ↔ Squamellae evident.

29. *Z. GNAPHALIOIDES*, Gray. Slender-branched floccose-lanate shrub: leaves deltoid-ovate to cordate-lanceolate, acute at the apex, entire, revolute-margined, above shortly sericeous-hispidulous, beneath tomentose; petioles very short: peduncles long, slender, solitary, tomentose or floccose-lanate; heads and involucre much as in the preceding but the subtending foliaceous bracts much smaller: achenes short-necked, sparsely pubescent, rugose; those of the ray-flowers 3 mm. long, narrow, with 1 to 3 fragile awns; those of the disk-flowers with 2 unequal awns and narrow wings; squamellae well developed. — Proc. Am. Acad. xv. 36 (1879). — Central Mexico. *Specimens examined*, — SAN LUIS POTOSI: between the city and Tampico, *Palmer*, no. 1106, coll. of 1878–79 (type, in herb. Gray).

30. *Z. BREVIFOLIA*, Gray. Fruticose or suffruticose, much-branched, about 1 m. high: leaves ovate or oval, less than 2 cm. long, 1 cm. or less in width, entire, obtuse at the apex, attenuate to subcordate at the base, above strigose, beneath papillose-scabrous, the uppermost alternate: peduncles long, slender, terminal, solitary, densely strigose; heads 10 to 15 mm. high; involucre lax, about 3-seriate, 1 cm. broad; the outer bracts ovate, foliaceous at the apex: ray-flowers 5 to 8; ligules small; disk-corollas

somewhat exceeding the involucre: achenes 4 to 6 mm. long, slightly rugose, those of the disk-flowers narrowly, of the ray-flowers broadly winged; squamellae well developed, usually united at the base to form a short cup on the summit of the achene, the neck evident at least in the achenes of the disk-flowers; awns shorter than the body, rather rigid. — Pl. Wright. i. 112 (1852); Hemsl. Biol. Cent.-Am. Bot. ii. 172. — Southwestern United States and northern Mexico. *Specimens examined*, — TEXAS: hills near Eagle Pass, alt. 250 m., *Pringle*, no. 9039; *Palmer* no. 625 (coll. of 1880); in the valley of the Rio Grande below Doñana, Mexican Boundary Survey, no. 591; limestone rocks 112 km. below El Paso, *Parry* (coll. of 1852); *Wright*, no. 353; Chisos Mountains, *Havard*, no. 10. CHIHUAHUA: near the city, *Pringle*, nos. 41, 349, 998. NUEVO LEON: Soledad, *Palmer*, no. 625 (coll. of 1880). COAHUILA: Saltillo, *Palmer*, no. 803; Mesillas, *Gregg*, no. 534 (type, in herb. Gray). SAN LUIS POTOSI: near the city, alt. 2000 to 2500 m., *Parry & Palmer*, no. 451.

* * Leaves larger, the cauline, 5 cm. or more in length (sometimes shorter in *Z. hispida*).

← Achenes angular, only slightly constricted at the summit (except in *Z. virgulta*); awns generally about as long as the body (but short and tooth-like in *Z. goyazensis*).

↔ Awns short and tooth-like; ray-achenes scarcely 3 mm. in length.

31. *Z. GOYAZENSIS*, Benth. & Hook. f. Stem woody, terete, scabrous: leaves 10 to 15 cm. long, 5 to 7 cm. broad, ovate or ovate-lanceolate, acute, subcordate or cuneate-attenuate at the base, serrate-dentate, above somewhat scabrous, beneath sparsely tomentose; petioles about 3 cm. long: peduncles terminal, usually 2.5 cm. long; heads 1.5 cm. high; involucre about 1 cm. broad, 2-seriate; outer bracts obtuse, foliaceous, scabrous, commonly equalling the disk-flowers: ray-flowers about 10; ligules oblong: achenes with short tooth-like awns and a short crown of paleaceous squamellae; achenes of the ray-flowers wingless, obpyramidal, 3-angled, about 3 mm. long; those of the disk-flowers more or less winged, 4 to 5 mm. long, flattened. — Gen. ii. 373 (1873). *Lipochaeta goyazensis*, Gardn. in Hook. Lond. Jour. Bot. vii. 406 (1848); Walp. Ann. ii. 867. — South America. *Specimens examined*, — BRAZIL: near San Domingos, Province of Goyaz, *Gardner*, no. 4235 (co-type, in herb. Gray). This is the most southern species of *Zexmenia* and its achenial characters are very unlike all others.

Parry # 451

++ Awns long, bristle-like; body of the achene usually exceeding 3 mm. in length.

= Achenes wingless.

a. Squamellae distinct.

32. *Z. AURANTIACA*, Klatt. Stem woody, branching, scabrous: leaves ovate, serrulate, acuminate at both ends, above scabrous or strigose, beneath somewhat pilose; petioles margined, clasping, about 2 cm. long: peduncles 4 to 12 cm. long, terminal, commonly solitary or in a cyme of 3; heads 10 to 15 mm. high; involucre cylindrical, about 1 cm. broad, 2-seriate; outer bracts herbaceous, generally reflexed at the apex, ovate-lanceolate, densely pubescent: ray-flowers about 15; ligules broadly ovate, tridentate: pales trifid, purple or violet at the apex: achenes 4 to 5 mm. long, slender, very slightly constricted, with very fragile plumose awns, generally only one as long as the body, and several unequal bristle-like squamellae; achenes of the ray-flowers 4-, of the disk-flowers, 3-angled. — Bull. Soc. Bot. Belg. xxxv. 296 (1896). — Central America. *Specimens examined*, — COSTA RICA: thickets on the banks of Virilla River, *Tonduz*, no. 2836 (type, in herb. Gray). This species may not belong to *Zexmenia*. The shape of the achene is exceptional and the pappus somewhat resembles that of a *Perymenium*.

b. Squamellae united; awns rather rigid, subequal.

33. *Z. STRIGOSA*, Sch. Bip. Suffruticose: leaves short-petioled, ovate-lanceolate, very acute, serrulate, above sparsely strigose, beneath appressed villous: peduncles terminal, monocephalous; involucre 2-seriate; bracts lanceolate, the outer foliaceous, strigose: achenes 5 to 7 mm. long, slender, very slightly constricted above, wingless, 2-3-awned; squamellae united between the awns but free from them, about 1 mm. long. — Sch. Bip. in Seemann, Bot. Voy. Herald, 306 (1852-57). *Lipochaeta strigosa*, DC. Prodr. v. 610 (1836). — Southern Mexico. *Specimens examined*, — OAXACA: *Andrieux*, no. 313, fragments lent from the De Candollean Herbarium.

= = Achenes of the ray-flowers winged; those of the disk-flowers wingless.

34. *Z. GUATEMALENSIS*, J. D. Smith. Fruticose, somewhat scabrous, covered with a whitish pilosity: leaves ovate-lanceolate, muriculate-scabrous above, pilose beneath, mucronulately serrulate, acute or acuminate at the apex, obtuse or rounded at the base; petioles margined, less than 1 cm. long: peduncles canescent-hirsute, slender, 0.5 to several cm. long, subumbellate; heads about 1 cm. high; involucre 2-seriate, campanulate; outer bracts slightly the longest, densely pubescent: ray-flowers

8; ligules 2-toothed, 10 to 15 mm. long; disk-flowers somewhat exceeding the involucre, about equalling the produced tips of the pales; limb of the corollas exceeding the tube, the lobes coarsely tomentose: ray-achenes obovoid, 3 mm. long, broadly winged; wings confluent with the awns and squamellae; disk-achenes oblong-turbinate, subtriquetrous, costate, with very caducous awns. — Bot. Gaz. xiii. 188 (1888). — Central America. *Specimens examined*, — GUATEMALA: Alta Verapaz, Coban, alt. 1400 m., von Tuecrkheim, no. 853 of J. D. Smith's distrib.

= = = Achenes of both the ray- and disk-flowers winged, or occasionally wings wanting in the ray-flowers.

a. Achenes long, narrow, not strongly constricted; wings very narrow. South American species.

1. Outer involucre bracts long, foliaceous: ligules wanting.

➤ 35. *Z. FOLIOSA*, Rusby in herb. Nearly herbaceous, leafy-stemmed: leaves commonly 1 to 2 dm. long, about half as broad, ovate, acuminate at the apex, subcordate or somewhat attenuate at the base, serrate, above strigose, beneath scabrous-puberulent; petioles margined, 1 to 4 cm. long: peduncles 1 to 3 cm. long, slender, pubescent, usually terminal and solitary or in cymes of 3; heads 1 to 2 cm. high, subtended by many long spreading foliaceous bracts; involucre bracts caudate-attenuate, ciliate or somewhat hirsute: rays none; disk-corollas exceeding the pales, the black anthers exerted: achenes narrowly winged, constricted, with short distinct squamellae; the marginal achenes 3-angled, 3-awned; those of the interior of the head compressed, 2-awned. — South America. *Specimens examined*, — BOLIVIA: Guanai-Tapuani, *Bang*, no. 1340 (type). Dr. Rusby (Mem. Torr. Bot. Club, vi. pt. 1, p. 63) mentions this plant (without specific name or characterization) and expresses a doubt whether it should be included in *Zexmenia* on account of the foliaceous bracts of the involucre and the absence of rays. However, it is closely related in achenial characters to *Z. wedelioides*, and in general habit to several other species of the genus.

2. Outer bracts not long and foliaceous: ligules present.

36. *Z. WEDELIOIDES*, Klatt. Stem woody, velvety-villous: leaves elliptical or ovate, 5 to 8 cm. long, about 4 cm. wide, remotely serrulate, above scabrous, beneath villous, acute or acuminate at the apex, obtuse or rounded at the base: peduncles subumbellately clustered, short, 1 to 2 cm. long; heads generally less than 1 cm. high; involucre subglobose; bracts oblong, acute, scabrous: achenes at maturity black, those of the ray-flowers 3-, of the disk-flowers, 2-awned; awns fragile, unequal, about

as long as the body; squamellae numerous, short, distinct or somewhat connate. — Abh. Naturf. Gesellsch. Halle, xv. 328 (1881). — South America. *Specimens examined*, — PERU: *Matthews*, no. 1383 (fragments of the type, in herb. Gray).

b. Achenes rather short and broadly winged, or strongly constricted at the summit.
Mexican species.

1. Involucral scales subequal.

37. *Z. SCANDENS*, Hemsl. Shrub, climbing or reclining; branches rusty-pubescent: leaves thick or leathery but varying to thinner and submembranaceous, from ovate to oblong-lanceolate, subcordate to somewhat attenuate at the base, acuminate to obtuse at the apex, serrate or subentire, above scabrous or strigose, beneath villous-hirsute, 7 to 13 cm. long: peduncles 1 to 4 cm. long, corymbosely arranged, slender; heads rarely over 1 cm. high; involucre 3-4-seriate, about 1 cm. broad, subcylindrical or campanulate; bracts from appressed and closely imbricated to rather loosely spreading: disk-flowers exceeding the involucre: achenes of the ray-flowers from strongly 3-winged to narrowly 2-winged (the third angle wingless); wings generally prolonged beyond the neck but not confluent with the awns; awns about as long as the body, enlarged below, subequal, pubescent; squamellae distinct or somewhat connate; achenes of the disk-flowers 2-winged, 2-awned. — Biol. Cent.-Am. Bot. ii. 174 (1881). *Z. trachylepis*, Hemsl. l. c. 175 (1881). *Z. dulcis*, Coulter, Bot. Gaz. xvi. 99 (1891). — Southern Mexico and Central America. *Specimens examined*, — VERA CRUZ: Valley of Cordova, *Bourgeau*, no. 1930 (type); Cordova, *Gray*, coll. of 1885; Fortin, near Orizaba, *Kerber*, no. 285; Coatzacoalcos, *C. L. Smith*, no. 976. CHIAPAS: Tuxtla, *C. & E. Sejer*, no. 1897. YUCATAN and TABASCO: *Johnson*, no. 24. GUATEMALA: Rio Dulce, *J. D. Smith*, no. 1607; eastern portion of Vera Paz and Chiquimula, *Watson*, no. 16. This species is highly variable and perhaps composite, but constant characters for its division have not been found.

2. Outer involucral scales longest, spreading and foliaceous.

38. *Z. VIRGULTA*, Klatt. Shrub with fuscous-hirsute branches: leaves ovate-lanceolate, 5 to 15 cm. long, acuminate at the apex, acute to rounded at the base, subentire to serrate, somewhat reticulate-veiny, above strigose, beneath villous; petioles 1 to 2 cm. long: peduncles 1 to 5 cm. long, corymbosely arranged, slender, pubescent; heads about 1 cm. high; involucre campanulate, 1 to 2 cm. wide (including the spreading bracts); outer bracts long, linear-lanceolate, foliaceous, spreading or re-

flexed: ray-flowers about 12; ligules small, narrow; disk-flowers much exceeding the involucre: achenes winged, pubescent, constricted at the summit; awns about as long as the body; squamellae small, numerous. — Bull. Soc. Bot. Belg. xxxi. 203 (1892). — *Z. dulcis*, Coulter in J. D. Smith, Enum. Pl. Guat. iv. 86 (1895), not Bot. Gaz. xvi. 99 (1891). — Central America. *Specimens examined*, — COSTA RICA: near San Mateo, *Pittier*, no. 7027; San José, *Tonduz*, no. 12,967; Aragon, Rio Turrialba, *Pittier*, no. 13,241 (no. 7504 of J. D. Smith's distrib.); San Miguel, *Biolley*, no. 7423; Rio Zhorquin, *Tonduz*, no. 8532; Talamanca, *Pittier*, no. 8676; Boca de Zhorquin, in thickets, *Tonduz*, no. 8699; Atirro, Carthago, *J. D. Smith*, no. 4872; Rio Turrialba, Carthago, *J. D. Smith*, no. 6610. GUATEMALA: Rio Samalá, Retalhulèu, *J. D. Smith*, no. 2854.

+ + Body of the achenes rounded (as in *Wedelia*) not strongly angled, but winged, strongly constricted near the summit; awns usually short.

+ + Shrubs or perennial herbs.

39. *Z. HISPIDA*, Gray. Branching shrub, about 1 m. high, strigose-hispid: leaves rhomboid-lanceolate or ovate-lanceolate, acute at the base, sessile or nearly so, sparingly dentate or subhastately lobed, generally strigose on both sides: peduncles terminal, solitary or occasionally in a cyme of 3, very long; heads about 1 cm. high; involucre 2-seriate, cylindraceous-campanulate, generally less than 1 cm. wide; outer bracts lanceolate, subfoliaceous: ligules broad, conspicuous: achenes variable as to wing and size; those of the ray-flowers commonly 3-angled, with 2 or occasionally 3 wings; achenes of the disk-flowers broadly 2-winged or with the wings reduced to 2 upwardly directed auricles; pappus separated from the body of the achene by a strong constriction or neck bearing a somewhat expanded row of very short squamellae and 2 or 3 short awns. — Proc. Am. Acad. xix. 10 (1883). *Z. texana*, Gray, Pl. Wright. ii. 112 (1852). *Stemmodontia scaberrima*, Cass. Dict. Sci. Nat. xlvi. 407. ? *Wedelia hispida*, HBK. Nov. Gen. et Spec. iv. 215 (1820). *Wirtgenia texana*, Sch. Bip. in Seemann, Bot. Voy. Herald, 304 (1852-57). *Viguiera longipes*, Coulter, Contrib. U. S. Nat. Herb. i. 41 (1890). — Southwestern United States to Central Mexico. *Specimens examined*, — TEXAS: Austin, *Hall*, no. 341; Crocket County, *Reverchon*, no. 1542; southwestern part of the state, *Wright*, no. 354, *Palmer*, no. 630; Rio de Medina, *Berlandier*, no. 2460; Arroyo de Colorado, *Berlandier*, no. 2553; Nueces County, *Heller*, no. 1479; New Braunfels, *Lindheimer*, no. 436, *Mex. Bound. Surv.* no. 590; Kerr County, *Bray*, no. 199;

Burnet County, *Hill*, no. 22; Tom Green County, *Tweedy*, no. 324; Corpus Christi County, *Nealley*, no. 95 (type of *Viguiera longipes*, Coulter); Gillespie County, *Jermy*, no. 646; Upper Guadalupe River, *Lindheimer*, no. 345. TAMAUlipAS: near Victoria, *Berlandier*, Nov. 1830; Matamoros, *Berlandier*, no. 3010. NUEVO LEON: Monterey, *Palmer*, no. 631, *Pringle*, nos. 2264, 11,907. COAHUILA: Saltillo, *Parry*, no. 24, *Palmer*, no. 328. SAN LUIS POTOSI: *Parry & Palmer*, no. 449. HIDALGO: Tula, *Pringle*, no. 6568. STATE OF MEXICO: Santa Fé, *Bourgeau*, no. 594; Tacubaya, *Schmitz*, no. 1029, *Schaffner*, no. 45. VERA CRUZ (?): near Tantoyuca, *Ervendberg*, no. 89.

Var. RAMOSISSIMA, Greenman. Stems 2 to 3 m. high, much-branched: peduncles rather slender, 1.5 to 6 cm. long. — Field Col. Mus. Bot. ser. iii. 127 (1904) — Southern Mexico. *Specimens examined*, — OAXACA: Tomellin Cañon, *Pringle*, no. 6283. YUCATAN: *Gaumer*, no. 826. "This variety in habit, more particularly on account of the much branched character of the stem and the numerous heads, seems, at first sight, specifically distinct from the typical *Z. hispida*, but a considerable series of specimens indicates that it is only an extreme variation. Forms connecting the species and the variety are shown by Pringle's no. 2264 and Palmer's no. 631 from Soledad." J. M. G.

40. *Z. LONGIPES*, Benth. Fruticose or suffruticose, much-branched, erect: leaves broadly ovate, 2 to 15 cm. long, 1 to 7 cm. wide, acuminate, serrate, at base somewhat attenuate, not lobed, above strigose, below hirsute-villous; petioles 0.2 to 2 cm. long: peduncles 1 to 6 cm. long, corymbosely arranged, densely hirsute; heads about 1 cm. high; involucre 2-3-seriate, cylindrical or somewhat campanulate, about 1 cm. broad; bracts lanceolate, hirsute: ligules conspicuous: achenes brownish, strongly 2-winged: wings projecting upwards in ear-like lobes, not confluent with the awns but attached to the neck of the achene; ray-achenes glabrous or nearly so and usually with 3 short awns and whitish wings not markedly streaked; disk-achenes hirsute, 2-awned and with wings streaked with brown. — Benth. in Oerst. Vidensk. Meddel. 1852, p. 95. *Aspilia costaricensis*, Klatt, Bull. Soc. Bot. Belg. xxxiv. 286 (1896), not xxxi. 201 (1892). — Central America. *Specimens examined*, — COSTA RICA: Guanacaste, *Pittier*, no. 2801 bis; near San Mateo, *Biolley*, no. 7016; near San José, *Pittier*, no. 3135; Rio Teliri, *Pittier*, no. 7194; between Mano and Tigre, *Pittier*, no. 4683; Nicoya, *Tonduz*, no. 13,616.

41. *Z. PHYLLOSTEGIA*, Klatt. Branches slender: leaves linear-lanceolate, 4 to 8 cm. long, 10 to 15 mm. wide, attenuate into a very short

petiole, acuminate, entire, above scabrous, beneath tomentose-canescens: peduncles solitary, terminal; involucre several-seriate; bracts ovate, obtuse; ray-flowers about 20; ligules exceeding the disk, dentate at the apex. — Leopoldina, xxv. 105 (1889). — Central America. *Specimens examined*, — GUATEMALA: *Bernouilli*, no. 1077 (tracing, in herb. Gray).

++ ++ Annuals.

42. *Z. RUDIS*, Baker. A much-branched herb, 6 to 12 dm. high; branches densely hispid: leaves broadly ovate to ovate-lanceolate, acuminate usually at both ends, irregularly serrate-dentate, short-petioled, strongly hispid-pubescent on both surfaces: peduncles 0.5 to several cm. long, borne in a lax corymb; involucre campanulate, 5 to 8 mm. broad, about 2-seriate; bracts lanceolate, with foliaceous tips, acute: ray-flowers about 10; ligules oblanceolate, 1 cm. long: achenes 2 to 3 mm. long, laterally compressed, pubescent; awns 2 to 3, short: squamellae united into a short cup, confluent with the awns.—Bak. in Mart. Fl. Bras. vi. pt. 3, 188 (1884). *Wedelia rudis*, Benth. in herb. ex Bak. l. c. — South America. *Specimens examined*, — BRAZIL: Falls of the Madeira, *Rusby*, 2142.

DOUBTFUL AND EXCLUDED SPECIES.

Zexmenia (?) in sched. pl. *Rusby*, no. 2138. *Calea*, Britton, Bull. Torr. Bot. Club, xix. 151 (1892). This plant, if one may judge by the specimen received under the number at the Gray Herbarium, is certainly neither a *Zexmenia* nor a *Calea*. It has sterile ray-flowers and the pappus of a *Viguiera*.

Zexmenia in sched. pl. Bang, no. 546, is *Oyedaea Pearcei*, *Rusby*, Mem. Torr. Bot. Club, iii. pt. 3, p. 59 (1893).

Z. caracasana, Benth. & Hook. f. Gen. ii. 371 (1873), is better treated as *Wedelia caracasana*, DC.

Z. caracasana, Klatt, Bull. Soc. Bot. Belg. xxxi. 202 (1892), is a mixture. Pittier's no. 3737 is apparently a *Wedelia*, while his no. 7019 is *Baltimora scolospermum*, Steetz.

Z. dulcis, Coulter, Bot. Gaz. xvi. 99 (1891), is not clearly distinguishable from *Z. scandens*, Hemsl., but Mr. J. D. Smith's nos. 2854 and 6610, referred to *Z. dulcis* by Coulter in J. D. Smith, Enum. Pl. Guat. iv. 86 (1895), seems better placed in *Z. virgulta*, Klatt.

Z. fasciculata, Coulter in J. D. Smith, Enum. Pl. Guat. iv. 86 (1895), as to no. 4244, is *Perymenium grande*, Hemsl., var. *strigillosum*, Robinson & Greenman.

Z. helianthoides, Benth. & Hook. f. Gen. ii. 371 (1873), is better restored to *Wedelia helianthoides*, HBK.

Z. Lindenii, Sch. Bip. in Seemann, Bot. Voy. Herald, 306 (1852-57). *Lasianthaea Lindenii*, Sch. Bip. l. c. "Foliis alternis ab omnibus differt, 3½ poll. longis, ¾-1 poll. latis, elliptico-lanceolatis, utrinque attenuatis, petiolatis, serratis, penninerviis, supra asperis, infra tomentosis, corymbo polycephalo (floribus flavis: Linden)." This inadequately characterized plant has not been identified among the specimens examined.

Z. longipes, Klatt, Bull. Soc. Bot. Belg. xxxi. 202 (1892) and xxxv. 287 (1896), as to Pittier's nos. 4365, 6961, and 6991, is referred with some doubt to *Wedelia filipes*, Hemsl.

Z. ovata, Benth. & Hook. f. Gen. ii. 373 (1873). *Tithonia ovata*, Hook. Bot. Mag. t. 3901 (1842). This plant is exactly *Z. helianthoides*, Gray.

Z. reticulata, Benth. & Hook. f. Gen. ii. 373 (1873), is better restored to *Wedelia*.

Z. scandens, Coulter in J. D. Smith's Enum. Pl. Guat. iv. 86 (1895), is probably *Perymenium Nelsonii*, Robinson & Greenman.

Z. stenantha, Hemsl. Biol. Cent.-Am. Bot. ii. 174 (1881), is *Z. crocea*, Gray.

Z. tagetiflora, D. Don ex Sweet, Hort. Brit. ed. 2, p. 309 (1830), is a name only.

Z. tequilana, Gray, Proc. Am. Acad. xxii. 425 (1887), is *Otopappus acuminatus*, Wats.

Z. trachylepis, Hemsl. Biol. Cent.-Am. Bot. ii. 175 (1881), is not satisfactorily distinguishable from *Z. scandens*, Hemsl. l. c. 174.

Z. villosa, Polak. Linnaea, xli. 579 (1877), was based on a Costa Rican plant, described as having the involucre 2 cm. broad. It is believed that a part of the type-material was deposited in the herbarium of the Royal Botanical Museum at Berlin, but Professor Urban, who has kindly made a search for it, writes that it is not to be found under *Zexmenia*. It is probable, therefore, that it has been found to belong elsewhere and has been removed to some other genus.

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I. DESCRIPTIONS OF SPERMATOPHYTES FROM THE
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BY J. M. GREENMAN.

TRADESCANTIA FLUMINENSIS, Vell. Fl. Flum. 140, t. 152 (1790); C. G. Clarke in DC. Monogr. iii.-294. Specimens of this white-flowered South American species were secured by Señor Professor A. Dugès in the vicinity of Guanajuato, Mexico, 1904, no. 3 (hb. Gr.). According to Professor Dugès the plant is not cultivated there, but is found growing wild in moist shady places about the city of Guanajuato, although it is rare. The species does not seem to have been recorded hitherto from Mexico.

Hymenocallis riparia, n. sp. Leaves lorate, 2 to 6 dm. long, 7 to 14 mm. broad, entire, bordered with a narrow whitish subcartilaginous margin, glabrous, their bases expanded, persistent and forming a membranous collar 10 to 12 cm. in length: peduncle 3 to 3.5 dm. long, flattened: spathe-valves 2, lance-attenuate, 3.5 to 6 cm. long, thin and scarious: flowers 3 to 7, sessile: perianth white; tube of the perianth 8 to 12 cm. in length; divisions of the perianth nearly or quite equalling the length of the tube, 3 to 5 mm. in breadth, 5-7-nerved: staminal cup broad-funnelform, 2 to 2.5 cm. high, subentire; free portion of the filaments 5 to 6 cm. long, slightly broadened at the base, gradually tapering to the 1.5 cm. long verticillate anther, greenish: style much elongated, greenish; stigma overtopping the anthers: ovary sessile, bearing 3 to 7 ovules in each cell, these ascending from the lower inner angle of the cell and sometimes subsuperposed. — MEXICO. State of Morelos: by streams near Cuernavaca, 11 November, 1895, *C. G. Pringle*, no. 5979 (hb. Gr.), and in the same locality, 27 July, 1896 *C. G. Pringle*, no. 7204 (hb. Gr.); rocky river banks, barranca of Cuernavaca, altitude

1735 m., 22 July, 1904, *C. G. Pringle*, no. 8952 (hb. Gr.). The species is well characterized by its long narrow leaves, white flowers with narrow perianth-divisions, greenish filaments and style. It is apparently most nearly related to *H. adnata*, Herb.

Myrica Pringlei, n. sp. Shrub, 3 to 10 dm. high: stem and branches covered with a reddish or gray bark and dotted with numerous lenticels; ultimate branchlets at first pubescent, later glabrate: leaves petiolate, oblanceolate to oblong, 1.5 to 5 cm. long, 0.5 to 2 cm. broad, obtuse to rounded at the apex and submucronate, sparingly dentate towards the apex, entire in the lower half and abruptly to gradually narrowed into the 1-4 mm. long petiole, dark green above, paler beneath, sparingly pubescent and densely resinous-dotted on both surfaces in the early stages, later glabrate, becoming thick and firm in texture and somewhat verrucose above; midrib and the subhorizontally spreading lateral nerves rather prominent on the under surface: pistillate catkins solitary in the leaf-axils, slender, 5 to 12 mm. in length: flowers scattered, 1 in the axil of each bract; bractlets or scales at the base of the ovary 4, ciliate; ovary densely covered, except at the very top, with wax globules; styles somewhat flattened: staminate catkins solitary in the leaf-axils, 1 to 2 cm. in length; rhachis sparingly pubescent, resinous-dotted: flowers scattered; stamens 4 to 12; anthers often roseate to purplish: mature fruit not seen.—MEXICO. State of Puebla: pine forests about Honey Station, altitude 1765 m., 25 April, 1904, *C. G. Pringle*, no. 10,002 (hb. Gr.).

The species here described is quite distinct from anything in the genus hitherto recorded from Mexico, and of the northern representatives it approaches most nearly *M. carolinensis*, Mill., from which, however, it differs in the longer and looser-flowered staminate and pistillate catkins, and in the somewhat smaller more glabrate leaves, which in age become distinctly verrucose on the upper surface.

Lozanella, n. gen. of *Urticaceae* (*Celtideae*). Flowers dioecious. Pistillate flowers in axillary cymes: perianth 5-6-parted; segments slightly imbricated. Ovary sessile; style divided to the base, branches stigmatose; ovules pendulent, solitary. Drupe small, ovoid, compressed; exocarp succulent; endocarp hard, bony. Embryo curved; cotyledons oblong-rotund. Staminate flowers unknown. Ligneous plants with opposite leaves, axillary cymose flowers, and small greenish drupaceous fruit.

L. trematoides, n. sp. Stem terete or slightly compressed at the nodes, and as well as the branches covered with a reddish-brown bark,

dotted with numerous whitish lenticels, at first pubescent later glabrate: leaves opposite, petiolate, ovate-acuminate, 5 to 9 cm. long, 3 to 4.5 cm. broad, evenly serrate-dentate, slightly rugulose and hirsute-hispid above, conspicuously reticulate-veined, hirsute and paler beneath; petioles 1 to 3 cm. long, pubescent; stipules lance-linear, about 4 mm. long, caducous: cymes of pistillate flowers rather slender, 1 to 2.5 cm. in length, 1.5 cm. or less in breadth, pubescent: flowers sessile: perianth 5-6-parted, 1.5 to 2 mm. long; divisions narrowly oblong, about 1 mm. in length, obtuse, ciliate-fringed: drupe sessile, ovoid, compressed or sublenticular, somewhat exceeding the perianth, greenish; styles more or less persistent. — MEXICO. State of Hidalgo: near Trinidad, 1904, *C. G. Pringle*, no. 8983 (hb. Gr.).

Although no staminate flowers of the plant here described are at hand, yet there can be no doubt that its affinity is with the *Celtideae*, and that it represents moreover a genus, hitherto unknown, related on the one hand to *Celtis*, and on the other to *Trema*. From both of these genera it differs in having opposite instead of alternate leaves. Habitally it is more like *Trema*, but from this genus it not only differs in leaf arrangement, but also in having pedunculate more or less open cymes, and broad cotyledons. The genus is named in honor of Señor Filemón L. Lozano, a keen and enthusiastic assistant of Mr. Cyrus G. Pringle.

Ficus subrotundifolia, n. sp. A small tree: stem and branches covered with a grayish or brownish bark; ultimate branches pubescent, especially at the nodes: leaves petiolate, subrotund to ovate-oblong, 4 to 7 cm. long, 3.5 to 6 cm. broad, rounded to obtuse at the apex, subtruncate to obtuse at the base, entire to subundulate-margined, somewhat villous-pubescent on both surfaces in the young stages, later glabrate, white-granulose on the upper surface, rather conspicuously netted-veined beneath; petioles 1 to 2.5 cm. long, more or less densely subsericeous-pubescent: receptacles sessile, axillary, usually in pairs, spherical, 8 to 12 mm. in diameter, greenish, covered with reddish-brown spots, densely short-pubescent to essentially glabrous. — MEXICO. State of Morelos: ravines near Cuernavaca, altitude 1525 m., 9 June, 1904, *C. G. Pringle*, no. 8931 (hb. Gr.). State of Jalisco: Guadalajara, *C. G. Pringle*, no. 11,850 (hb. Gr.).

Oxybaphus linearifolius, Watson. Proc. Am. Acad. xvii. 375 (1882). This species, described from specimens secured by Mr. J. G. Lemmon on the plains near Apache Pass, Arizona, in 1881, has again been found by Dr. A. Davidson along the Metcalf Road, near Metcalf, May 27, 1900, no. 327^a (hb. Gr.). Dr. Davidson's specimens conform in every

detail with the original and with Dr. Watson's description; they show, moreover, that the slender upright stems originate from a distinctly perennial base.

Cassia (§ *Chamaechristae*) *leptadenia*, n. sp. Annual: stem simple or branched, erect, 1 to 4 dm. high, pubescent with an upwardly subappressed puberulence commonly intermixed with long horizontally spreading hairs: leaves short-petiolate, 1 to 5 cm. long, 1 to nearly 2 cm. broad; leaflets sessile, usually 24 to 36 (sometimes fewer), linear-oblong, 5 to 10 mm. long, 1 to 2.5 mm. broad, mucronate, rather conspicuously ciliate, glabrous on both surfaces or with a few scattered hairs beneath, somewhat oblique at the base; rhachis pubescent with long spreading hairs, slightly canaliculate above, bearing just below the first pair of leaflets a stipitate tack-shaped gland; petioles 2 to 5 mm. long; stipules oblique-lanceolate, 3 to 6 mm. long, ciliate: flowers 1 to 3, on short axillary or supra-axillary branches, small, about 0.5 cm. long, and less than 1 cm. in diameter; pedicels 3 to 5 mm. long, 1-2-bracteate above the middle, somewhat elongated at maturity; sepals lanceolate, acute, slightly pubescent: petals unequal, pinkish or yellowish-pink; stamens 5 to 8, of different lengths: ovary appressed-pubescent: legume 2 to 4.5 cm. long, 3 to 4 mm. broad, on upwardly arched pedicels, subappressed-pubescent: seeds flat, oblique, about 2.5 mm. long. — *C. nictitans*, Gray, Pl. Wright. 1: 59 (1852), not L.; Torr. Bot. Mex. Bound. 59, not L.; Rothrock in Wheeler's Report, 106, not L. — UNITED STATES. Texas: gravelly plains near Comanche Springs, Dr. J. M. Bigelow (hb. Gr.); 48 km. east of El Paso, May to October, 1849, Chas. Wright, no. 154 (hb. Gr.). New Mexico: without locality and number, Chas. Wright, coll. of 1851 (hb. Gr.); Organ Mts., 1 September, 1897, E. O. Wootton, no. 435 (hb. Gr.), distributed as "*Cassia calycoides*, DC.;" Florida Mts., 27 August 1895, A. I. Mulford, no. 1038^a (hb. Gr.). Arizona: without locality, coll. of 1884, C. G. Pringle, no. 92 (hb. Gr.); Blue River, Clifton, 1 September, 1903, Dr. A. Davidson, no. 1340 (hb. Gr.); Sonoita Valley, 1874, Dr. J. T. Rothrock, no. 629 (hb. Gr.). MEXICO. State of Sonora: Ojo de Gavilan, August, 1851, Geo. Thurber, no. 1060 (hb. Gr.). State of Durango: vicinity of the city of Durango, April to November, 1896, Dr. Ed. Palmer, no. 654 (hb. Gr.). State of Oaxaca: Valley of Etna, September, 1895, C. Alvarez, no. 754 (hb. Gr.).

Var. *mensalis*, n. var. Stem 3 to 5 dm. high: leaves 2.5 to 9 cm. long; leaflets 12 to 50 (6 to 25 pairs), 1 to 1.5 cm. long, 2 to 3 mm. broad; pedicels 2 to 8 mm. long: other characters of the species. — MEXICO. State of Chihuahua: Hacienda San Miguel, near Batopilas,

September, 1885, *Dr. Ed. Palmer*, no. 175 (hb. Gr.), a strong vegetative specimen. State of Sonora: vicinity of Guaymas, on mesas among grass, October, 1887, *Dr. Ed. Palmer*, no. 242 (hb. Gr.).

Var. *jaliscense*, n. var. Stem rather freely branching from the base: legume pubescent with spreading hairs: in other characters like the species. — MEXICO. State of Jalisco: Guadalajara, September, 1886, *Dr. Ed. Palmer*, no. 460 (hb. Gr.). State of Guerrero: vicinity of Acapulco, October, 1894, to March, 1895, *Dr. Ed. Palmer*, no. 23 (hb. Gr.).

The species here described has been confused hitherto with *Cassia nictitans*, L.; it differs, however, in having a constantly narrower pod, smaller (except in var. *mensalis*) leaflets which are conspicuously ciliate, and also in having usually long spreading hairs as well as shorter subappressed ones on the stem. *C. nictitans* was originally ascribed to Virginia; and from a large suite of specimens now at hand its range in North America may be given as from Vermont and Massachusetts to Georgia, west to New York, Missouri, Kansas, and eastern Texas. *C. leptadenia* occurs in Texas, as far as yet known, west of the Pecos River only, and extends into New Mexico and Arizona southward through the dry parts of Mexico to Oaxaca. *C. leptadenia* is similar to *C. aspera*, Muhl., and to *C. Simpsoni*, Pollard, but from both of these species it is readily separated by the characters of the foliage and pod.

Argythamnia Pringlei, n. sp. Shrub: stem somewhat angulate, covered with a whitish cortex, glabrous; ultimate branches sericeous-tomentose: leaves petiolate, subrotund to oblong-lanceolate, 1.5 to 7 cm. long, 1.2 to 3 cm. broad, rounded to short-acuminate and acute at the apex, entire or denticulate, rounded to obtuse at the base, pale green and pubescent above, densely white sericeous-tomentose beneath; lateral nerves 4 to 6 on either side of the midrib, divergent: racemes axillary, pedunculate, few-flowered, subsericeous-pubescent; peduncles slender, 1.5 to 2.5 cm. long; bracts narrowly lanceolate, acuminate, persistent: flowers monoecious: staminate flowers 4 to 8; sepals linear-lanceolate, acute, 0.5 cm. long; petals unguiculate, oblong-ovate, about two-thirds as long as the calyx, obtusish, pubescent on the back along the midrib, greenish: pistillate flowers usually 1 at the base of each floral cluster; pedicels about as long as the subtending bract; calyx subangulate-winged in cross-section; sepals ovate, subacuminate, acute, 7 to 8 mm. long: petals minute, spatulate, about 1 mm. long; ovary densely pubescent; styles 3-parted, the divisions again 3-parted and crenately lobed: mature capsule not seen. — MEXICO. State of Morelos: sides of a bar-

ranca near Cuernavaca, altitude 1525 m., 17 June, 1904, *C. G. Pringle*, no. 8819 (hb. Gr.).

The species here proposed has its nearest affinity with *A. heterantha*, Muell. Arg., but differs in leaf-outline, the more divergent lateral nerves of the leaves, the ovate petals, and in the densely pubescent ovary.

EUPHORBIA CAMPESTRIS, Cham. & Schlecht., var. *subpuberula*, n. var. Stems 3 to 6 dm. high, glabrous below, puberulent above: leaves lanceolate to lance-ovate, 1 to 3.5 cm. long, 3 to 14 mm. broad; leaves and bracts of the inflorescence ovate and mucronate-acute. — MEXICO. State of Hidalgo: wet banks of river below Trinidad Iron Works, altitude 1740 m., 25 April, 1904, *C. G. Pringle*, no. 8906 (hb. Gr.). Distinguished from the species by the puberulence of the upper part of the stem and floral branches, by the less crowded and broader lanceolate to lance-ovate leaves, and by the more ovate or less rotund leaves and bracts of the inflorescence.

Clethra Alcoceri, n. sp. A small tree; ultimate branchlets terete or subangled, striate, densely covered with a close fine reddish brown stellate tomentum: leaves petiolate, elliptic-lanceolate to oblong-obovate, 7 to 14 cm. long, 3 to 6 cm. broad, obtuse to short-acuminate and submucronate-acute, shallowly sinuate-dentate to merely denticulate, slightly unsymmetrical at the base, dark green above, paler beneath, minutely stellate-puberulent on both surfaces; midrib and lateral nerves prominent beneath; petioles 1 to 1.5 cm. long, rather densely stellate-pubescent: inflorescence terminal, consisting of paniculately disposed racemes, the latter 1 to 2 dm. in length; rhachis striate, densely tawny stellate-tomentose; pedicels 2 to 3 mm. long, about equalling the caducous bracts: flowers 5 to 6 mm. high, equally broad: calyx about two-thirds as long as the corolla; divisions of the calyx ovate, obtuse, closely stellate-pubescent on both surfaces: petals white, obovate or obovate-oblong with thin subfimbriate margins: stamens included; filaments glabrous: ovary densely pubescent with silvery white stellate or branched hairs: mature fruit not seen. — MEXICO. State of Hidalgo: barranca near Trinidad Iron Works, altitude 1600 m., 22 August, 1904, *C. G. Pringle*, no. 8923 (hb. Gr.). The species is dedicated to Señor Dr. Gabriel Alcocer of the National Medical Institute, City of Mexico.

Halenia chlorantha, n. sp. Annual, glabrous throughout: stems erect, 4 dm. or more high, simple below, branched above, narrowly winged: leaves ovate to lanceolate, including the petiole 3 to 6 cm. long, 0.5 to 1.8 cm. broad, acute, entire, somewhat gradually narrowed below into the petiole, 3- (5-) nerved; petioles of the lower leaves about

equalling the blade, those of the other leaves gradually shorter upwardly on the stem: inflorescence terminating the stem and branches in several-flowered cymose clusters; pedicels 8 mm. or less in length, erect: calyx deeply 4-parted; divisions of the calyx lanceolate, acute, about 4 mm. long: corolla 8 to 10 mm. long, greenish; tube of the corolla about equalling the ovate-oblong short-acuminate lobes; spurs subperpendicular, slightly incurved at the base: capsule oblong, 12 mm. long, curved above, acuminate, glabrous: seeds subspherical, 1 mm. in diameter, smooth. — MEXICO. State of Hidalgo: wet woods near Trinidad Iron Works, altitude 1735 m., 11 July, 1904, *C. G. Pringle*, no. 8939 (hb. Gr.).

Phacelia Coulteri, n. sp. An erect rather stout herb: stem branched above, reddish brown, pubescent with long spreading villous hairs intermixed with stipitate glands: leaves bi-tripinnatisect, oblong to oblong-ovate in general outline, 2 to 9 cm. long, 1 to 6 cm. broad, hirsute on both surfaces with a few glandular hairs intermixed; segments narrow, obtuse to acute: inflorescence consisting of villous-hirsute and somewhat glandular scorpioid cymes subcorymbosely disposed; pedicels 1 mm. or less in length: calyx deeply 5-parted; divisions of the calyx unequal, linear to linear-oblong or subspatulate, 2.5 to 3 mm. long, obtusish, villous-pubescent intermixed with short-stipitate glandular hairs: corolla narrowly campanulate, 4 to 5 mm. long, light blue to white, glabrous; tube 2.5 to 3 mm. long, bearing within on either side of the filaments a small thin reflexed valve; lobes of the corolla subrotund, 2 mm. broad, subentire or minutely denticulate: stamens exserted: ovary hirsute-pubescent above, 4-ovuled: style short-stipitate, glandular at the base: capsule ovoid, 2.5 to 3 mm. long, pubescent above; seeds 4, from 1.5 to 2 mm. long, somewhat scrobiculate or subfoveolate. *P. glandulosa*, Hemsley, *Biol. Cent.-Am. Bot.* ii. 359 (1882), not Nutt., as to pl. *Coulter*. — MEXICO. State of Hidalgo: fields about Buena Vista Station, altitude 2590 m., 4 August, 1904, *C. G. Pringle*, no. 8988 (hb. Gr.). State of Vera Cruz: Real del Monte, *Dr. Thos. Coulter*, no. 921 (hb. Gr.).

The latter specimen in the Gray Herbarium bears the following note in the handwriting of Dr. Gray, "Between *P. glandulosa* & *P. tanacetifolia* = latter = *tanacetifolia*." Dr. Gray also placed a question mark opposite the printed word Mexico on the Coulter label, evidently inferring that the plant came from California instead of Mexico; but as Mr. Pringle's specimen above cited is identical in every regard with the Coulter plant there can be no doubt, as Hemsley indicates, that Coulter's

specimen no. 921 was collected in Mexico. With *P. tanacetifolia*, Benth., the species here described has little more than generic affinity. In certain forms of *P. tanacetifolia* the leaves are not unlike those of *P. Coulteri*, but the smaller flowers, shorter calyx, and smaller ovoid capsule of the latter readily separate the two species.

Hemsley, in the *Biologia Centrali-Americana*, Botany, ii. 359, refers the Coulter plant above cited to *P. glandulosa* Nutt. A careful comparison of *P. Coulteri* with the type and with authentic material of Nuttall's species shows very clearly that we have to deal with two quite distinct plants. Contrasted with *P. glandulosa* the Mexican *P. Coulteri* differs in having more divided leaves, smaller flowers, shorter capsules, and a more villous-hirsute stem. Habitally *P. Coulteri* most closely resembles *P. neo-mexicana*, Thurber (*P. alba*, Rydb.), but here again the somewhat more divided leaves, the subentire corolla-lobes, constantly shorter and more ovoid capsule, and smaller seeds of the former enable one to distinguish it at once from the Thurber species.

Mimophytum, n. gen. of *Boraginaceae*. Calyx 5-parted, persistent but not enlarged in fruit. Corolla tubular-campanulate, with a short tube and a spreading 5-lobed limb, bearing in the throat 5 blunt folds or scales; lobes 5, imbricated. Stamens 5, adnate to the corolla-tube, included; anthers small, obtuse. Ovary 4-lobed; style terete; stigma compressed-capitate; ovules subhorizontal. Nutlets 4, sometimes only 1 or 2 attaining maturity, depressed, obliquely affixed to the gynobase, and when removed revealing an ovate-triangular scar, convex above, flattened beneath, glochidiate over the entire upper surface. Seeds subhorizontal. Herbaceous perennials with trailing habit, alternate leaves, racemose inflorescence, and pale blue or whitish flowers.

M. omphalodoides, n. sp. Stems 6 dm. or more in length, somewhat bifurcately branched, glabrous or sparingly pubescent: leaves petiolate; blade ovate, acuminate, 2 to 7 cm. long, 1 to 4 cm. broad, acute, entire, deeply cordate, dark green and sparingly sub-appressed-hirsute above, becoming somewhat tuberculate in age, paler and strigillose beneath, thin and membranous, 5-7-nerved from the base; petioles slender, 1 to 6 cm. in length, pubescent with spreading hairs: inflorescence terminating the stem and branches in elongated slender subsecund strigillose racemes; pedicels filiform, 2 cm. or less in length, spreading or somewhat recurved: calyx about 4 mm. high, deeply 5-parted; divisions lance-oblong, acute: corolla 5 to 6 mm. long, 5-lobed to near the middle; tube upwardly expanded, bearing in the throat opposite the base of each lobe an oblong blunt fold or scale somewhat pruinose on the

inner face; lobes oblong-rotund, spreading: nutlets subcircular, plano-convex, 4 to 5 mm. in diameter, glochidiate-spinose over the entire upper surface, spinose beneath, minutely strigillose on both surfaces. — MEXICO. State of Puebla: under wet cliffs in the barranca below Honey Station, altitude 1525 m., 24 May, 1904, *C. G. Pringle*, no. 8822 (hb. Gr.).

The plant here described but for the character of the fruit might well be placed under the genus *Omphalodes*, being in habit and superficial characters almost the counterpart of *O. acuminata*, Rob. The fruit, however, bears a striking contrast to the saucer-like nutlet of *Omphalodes*. It is on the other hand more like that of *Cynoglossum*, but is more distinctly discoid, and bears the glochidiate spines on the upper side only. The trailing habit, moreover, is quite unlike anything known in *Cynoglossum*. On the whole it seems best to characterize the plant in question as a new genus based on the technical characters of its fruit and its habit, occupying a position in the order somewhat intermediate between *Omphalodes* and *Cynoglossum*.

MYOSOTIS PALUSTRIS, Lam. Fl. Fr. ii. 283 (1778). To this species the following specimens are to be referred: MEXICO. State of Hidalgo: near Trinidad, 25 November, 1903, *C. G. Pringle*, no. 11,882 (hb. Gr.); in shallow water along river ledges below Trinidad Iron Works, altitude 1700 m., 14 June, 1904, no. 8933 (hb. Gr.). The species seems not to have been recorded hitherto from Mexico.

Citharexylon Pringlei, n. sp. Shrub, 3 to 5 m. high, glabrous throughout: stem and branches covered with a grayish bark; branchlets somewhat flattened at the nodes: leaves short-petiolate, elliptic-lanceolate to lanceolate, 2.5 to 8 cm. long, 1 to 2.5 cm. broad, merely obtuse or short-acuminate and obtuse, entire or rarely subdentate towards the apex, narrowed at the base into a 3 to 5 mm. long petiole, dark green and shining above, paler and glandular-punctate beneath with larger circular glands scattered over the entire under surface: inflorescence terminating the stem and branches in elongated arcuate-recurved more or less secund racemes; bracts subulate, nearly or quite equalling the pedicels, 1 to 2 mm. in length: calyx cupulate, about 3 mm. high, 5-angled in cross section, sinuately 5-denticulate, slightly pubescent about the orifice on the inner surface, often purplish: corolla bicolorous, tubular-funnelform, about 4 mm. long, 5-lobed, externally glabrous, densely pubescent in the throat; tube white; lobes subrotund, scarcely more than 1 mm. long and broad, slightly pubescent on the inner or upper surface, deep purple or magenta colored: mature fruit not seen. — MEXICO. State of Hi-

dalgo: barranca below Trinidad Iron Works, altitude 1525 m., 13 July, 1904, *C. G. Pringle*, no. 8932 (hb. Gr.).

The glabrous character of the plant, with the smooth shining upper surface of the leaves, the gracefully recurved racemes and the bicolorous corollas, render this species of easy recognition, and readily separated from all known species of the genus. Its affinity, however, is apparently with the little known *C. lucidum*, Schlecht. & Cham.

Cedronella Wrightii, n. sp. An herbaceous perennial: stem erect, 5 dm. or more high, densely short-pubescent: leaves petiolate, ovate to ovate-lanceolate, 1 to 5 cm. long, 0.5 to 3 cm. broad, obtuse or acute, more or less irregularly crenate-dentate, closely puberulent on both surfaces and somewhat canescent beneath: inflorescence an elongated verticillate spike; the lower verticillasters becoming remote and subtended by foliar bracts, short-pedunculate: flowers small, 6 to 7 mm. long in anthesis: calyx short-tubular, subbilabiate, pubescent especially on the tube; calyx-teeth narrowly lanceolate or lance-linear, whitish or tinged with purple, the three upper teeth nearly or quite as long as the tube of the calyx, the two lower teeth about two-thirds as long as the upper: corolla about one-third longer than the calyx, purplish in fresh specimens, becoming more or less faded in the dried state: stamens slightly exserted: nutlets smooth, subtriangular in cross section with convex back, about 1 mm. long. — *C. pallida*, Torr. var. Bot. Mex. Bound. 133 (1859), in part, as to pl. *Wright*, no. 1534. *C. mexicana*, var. *cana*, Gray, forma, Syn. Fl. 1, pt. 2, 377 (1886). *Hyptis spicata*, Torr. l. c. 129. — MEXICO. State of Sonora: mountains near Sta. Cruz, *Wright*, no. 1534 (hb. Gr.); San Bernardino, *Thurber*, no. 780 (hb. Gr.). UNITED STATES. Arizona: Blue River, 8 September, 1902, *Dr. A. Davidson*, no. 840 (hb. Gr.).

The species here proposed has been much confused hitherto, as the literature cited would indicate. Dr. Gray, in his treatment of the genus *Cedronella* for the Synoptical Flora, finally passed *Wright's* specimen above cited as a small flowered form of *C. mexicana*, var. *cana*, with the comment "fl. not well developed." More material is now at hand, and careful dissections and comparisons of the *Wright*, *Thurber*, and *Davidson* plants show the flowers of each to be perfectly normal, and many, too, are fully developed. These collections evidently represent one and the same species, differing from all other known American species except *C. micrantha* in the size of the flowers and deeply toothed calyx. *C. Wrightii* is distinguished from *C. micrantha* in having a longer more interrupted verticillate spike, longer calyx-teeth, and in the character of the pubescence.

STACHYS BORAGINOIDES, Ch. & Schl. *Linnaea*, v. 100 (1830); DC. *Prodr.* xii. 467; Hemsl. *Biol. Cent.-Am. Bot.* ii. 551. MEXICO. State of Vera Cruz: Jalapa, *Schiede & Deppe*; in moist places near Jalapa, altitude 1200 m., 13 April, 1899, *C. G. Pringle*, no. 7788 (hb. Gr.).

Var. *glandulosa*, n. var. Branches and inflorescence pubescent as in the species, but with long-stipitate glandular hairs intermixed: lower verticillasters sometimes developed into pedunculate racemose-spikes: calyx copiously glandular-pubescent. — MEXICO. State of Hidalgo: barranca below Trinidad, altitude 1675 m., 5 May, 1904, *C. G. Pringle*, no. 8894 (hb. Gr.).

Stachys Pringlei, n. sp. An herbaceous perennial: stems erect or ascending, about 9 cm. in length, green or purplish, villous-hirsute: leaves petiolate, oblong to oblong-ovate, 2 to 5 cm. long, 0.5 to 2.5 cm. broad, rounded to obtuse at the apex, crenate-dentate, cordate, dark green above, paler beneath, hirsute-pubescent on both surfaces; petioles of the lower leaves 3 cm. long, villous-hirsute, gradually diminishing upwardly on the stem: inflorescence elongating in age, becoming 2 dm. or more long: verticillasters usually 6-flowered, subtended by lance-oblong to linear foliaceous acute bracts longer or shorter than the flowers, the lower verticillasters 4.5 cm. apart: flowers short-pedicellate, in anthesis 13 to 15 mm. long: calyx campanulate, short-hirsute, 5 to 6 mm. long; teeth acerose-acuminate, about equalling the tube: corolla conspicuously bilabiate, 13 to 15 mm. long, pale purple fading to nearly white; tube about 8 mm. long, bearing a ring of hairs just above the base, pubescent in the throat; galea erect, externally pubescent; lower lip spreading, about 6 mm. long, maculate, 3-lobed, the median lobe broader than long, emarginate: stamens nearly equalling the galea; filaments pubescent; anthers deep purple: nutlets black, minutely roughened, about 1.5 mm. in diameter. — MEXICO. State of Hidalgo: woodlands near Trinidad Iron Works, altitude 1735 m., 11 July, 1904, *C. G. Pringle*, no. 8941 (hb. Gr.). This species suggests the little known *S. mexicana*, Benth., which, however, is said to be hispid on both surfaces of the leaves and on the calyx, characters that do not apply at all to the plant here described.

Satureia procumbens, n. sp. Stems procumbent or somewhat ascending, slender, 1 to 2.5 dm. in length, rooting at the lower nodes, closely puberulent: leaves petiolate, ovate or broadly spatulate, including the petiole 7 to 22 mm. long, 3 to 12 mm. broad, rounded to subobtuse at the apex, crenate to entire, narrowed below to the slender puberulent petiole, nearly or quite glabrous on both surfaces, paler and glandular-punctate beneath: verticillasters 2-4-flowered; pedicels 3 to 4 mm. long,

puberulent: flowers in anthesis 12 to 13 mm. long: calyx bilabiate, 6 to 7 mm. long, 13-nerved, glabrous or with a few scattered hairs on the outer surface, glandular-punctate, pubescent in the throat; anterior lip of 2 rather slender long-ciliated teeth; posterior lip of 3 short obtuse or blunt teeth: corolla 12 mm. long, pale purple, somewhat pubescent in the throat; anterior lip spreading, 3-lobed; posterior lip suberect, emarginate: stamens 4, unequal; the anterior pair much longer than the posterior, and with somewhat larger anthers: nutlets ovoid, about 1 mm. long, minutely scrobiculate. — MEXICO. State of Hidalgo: shaded banks, barranca below Trinidad Iron Works, altitude 1685 m., 5 May, 1904, *C. G. Pringle*, no. 8895 (hb. Gr.). Mr. Pringle's plant here cited was distributed under the name "CALAMINTHA."

Salvia (*Heterosphace*) *Davidsonii*, n. sp. An herbaceous perennial: stems slender, ascending or erect, finely pubescent: leaves petiolate, the lower or basal ones lyrate-pinnatifid, the upper rhombic-ovate, 1 to 3 cm. long, 0.5 to 2.5 cm. broad, sinuately lobed to subentire, pale green in color at least in the dried state, sparingly pubescent on both surfaces, resiniferous-dotted, commonly 3-nerved from a symmetrical or not infrequently unequal base; petioles narrowly winged, 1 to 6 cm. long: flowers solitary in the axils of the upper leaves or disposed in terminal few-flowered verticillate racemes: pedicels erect or slightly recurved, 5 mm. or less in length: calyx externally short-hirsute-pubescent especially on the rather conspicuous veins, dotted with yellowish glands, sparingly ciliate-hirsute in the throat: corolla about 1 cm. long, red: nutlets smooth. — Arizona: Chiricabui Mts., September, 1881, *Lemmon*, no. 3077 (hb. Gr.); southern Arizona, *Lemmon*, no. 492 (hb. Gr.); *Metcalf*, October, 1900, *Dr. A. Davidson*, no. 615 (hb. Gr.).

S. Davidsonii is most nearly related to *S. Henryi*, Gray, to which species one of the Lemmon plants above cited was referred by the late Dr. Sereno Watson. The several specimens now at hand, however, representing *S. Davidsonii*, are so uniform in habit, foliar and floral characters, and so distinct in leaf-outline, size of the corolla, etc., from *S. Henryi* and other species of the group, that the writer has no hesitation in regarding them as representing a separate and well defined species.

Bassovia stellata, n. sp. Shrub, 2 m. or more in height; stem covered with a reddish brown cortex; branches, as well as the leaves, pedicels and calyx, tawny stellate-pubescent, somewhat glabrate: leaves usually in pairs and of unequal size, ovate to ovate-lanceolate, 2 to 8 cm. long, 1 to 3 cm. broad, often acuminate, obtuse or acute, dark green

above, a little paler beneath, stellate-pubescent on both surfaces, more densely so beneath, somewhat glabrate especially on the upper surface, entire, narrowed below to an obtuse or rounded base; petioles 3 to 10 mm. long, stellate-tomentose: inflorescence axillary, usually several-flowered; pedicels 6 to 12 mm. long, upwardly enlarged: calyx about 2 mm. high, crenately 5-lobed: corolla rotate or rotate-campanulate, about 7 mm. high and 8 mm. in diameter, 5-lobed to a little below the middle, pubescent in the throat; lobes ovate, obtusish, externally densely puberulent: stamens shorter than the corolla; filaments about equalling the anthers, densely pubescent with tawny matted hairs: fruit spherical, about 5 mm. in diameter, black, smooth, and glabrous. — MEXICO. State of Hidalgo: shaded bluffs of the barranca below Trinidad Iron Works, altitude 1525 m., 24 May, 1904, *C. G. Pringle*, no. 8824 (hb. Gr.).

Castilleja glandulosa, n. sp. Annual, or perennial by an indurated base, pubescent throughout with gland-tipped hairs intermixed with longer hirsutish hairs: stems usually simple, erect or nearly so, 1 to 3 dm. high, green or purplish: leaves sessile, a little dilated at the base and semi-amplexicaul, lance-attenuate, 1.5 to 5 cm. long, 1 to 6 mm. broad, acute, entire and often crenate-margined, 3-nerved from the base: inflorescence subspicate, 2 to 18 cm. in length, the lowermost flowers about 1 cm. apart; bracts of the inflorescence lance-attenuate to oblong, somewhat broader than the stem-leaves, the lower bracts entirely foliaceous, the middle and upper ones green below, and as well as the calyx-lobes tipped with color from yellow to scarlet: flowers sessile, in anthesis 2 to 2.8 cm. long: calyx about equally divided anteriorly and posteriorly, 2.5 cm. or less in length; lateral lobes oblong, about 8 mm. long, obtusish to slightly emarginate: corolla 2 to 2.7 cm. long, exceeding the calyx by 3 to 5 mm.; galea erect, 7 to 9 mm. long, with a greenish, glandular-puberulent keel and yellowish white thin margins: stamens 4, didynamous, the posterior pair a little shorter: ovary and style glabrous: capsule ovate-acuminate, 10 to 12 mm. long, smooth: seeds clavate, about 2 mm. long. — MEXICO. State of Mexico: hills near Lecheria Station, altitude 2225 m., 2 July, 1904, *C. G. Pringle*, no. 10,000 (hb. Gr.) *type*. State of San Luis Potosi: Valley of San Luis Potosi, *Schaffner*, no. 741 (hb. Gr.); 22° N. Lat., altitude 1800 to 2400 m., *Parry & Palmer*, no. 691 (hb. Gr.) Federal District: hills above Santa Fé, altitude 2400 m., 25 September, 1899, *C. G. Pringle*, no. 7979 (hb. Gr.). Valley of Mexico, *Schaffner*, no. 322 (hb. Gr.). N. W. Mexico, *Seemann*, in part (hb. Gr. under *C. lithospermoides*, HBK.).

This species is related evidently to *C. scorzonerifolia*, HBK., but differs in being glandular-pubescent throughout with longer hirsutish hairs intermixed, in having shorter narrower leaves, somewhat smaller flowers, and in having the upper floral bracts as well as the calyx-lobes orange- to scarlet-colored. From *C. lithospermoides*, HBK., with which it has been confused also, it differs in having the leaves more dilated at the base, the upper stem-leaves more attenuated, in being less hispid, and finally in having an ovate acuminate capsule.

CASTILLEJA HIRSUTA, Mart. & Gal. Bull. Acad. Brux. xii. pt. 2, 29 (1845); Walp. Rep. vi. 651; Hemsl. Biol. Cent.-Am. Bot. ii. 460. *C. obovata*, Benth. DC. Prodr. x. 528 (1846). To this species are referred specimens collected by Mr. C. G. Pringle in a barranca below Trinidad Iron Works, altitude 1525 m., 13 June, 1904, no. 8935 (hb. Gr.). Mr. Pringle's specimens agree well with the original characterization of the species except there is a tendency for the leaves to become incised-dentate or laciniate.

Lamourouxia brachyantha, n. sp. Stem about 1 m. high, branched above, yellowish green, somewhat hirsute below, densely stipitate-glandular above: leaves sessile, oblong-lanceolate to ovate, 1 to 3 cm. long, 0.5 to 1 cm. broad, acute, sharply and somewhat unequally dentate, half-clasping the stem, glandular-hirtellous on both surfaces: inflorescence racemose-paniculate; bracts of the inflorescence similar to the stem-leaves but smaller: flowers in anthesis 2 to 2.5 cm. long, short-pedicellate: pedicels 3 mm. long: calyx about 12 mm. long, 4-lobed to the middle; lobes ovate, acute, unequally dentate, and as well as the pedicels glandular-hirtellous: corolla 18 to 20 mm. long, bilabiate; posterior lip or galea conspicuously hooded, overarching the stamens, 2-lobed with the lobes soon becoming reflexed; lower or anterior lip recurved, 2-plicate-ventricose in the throat, 3-lobed with oblong rounded lobes: stamens 4, fertile; the posterior pair with smaller anthers: ovary glabrous below, above as well as the persistent style pubescent: capsule ovate, short-acuminate, about 1 cm. long. — MEXICO. State of Mexico: rocky hills, Lecheria, Valley of Mexico, altitude 2285 m., 1 July, 1904, C. G. Pringle, no 8815 (hb. Gr.). This species belongs to the § *Hemispadon*, Benth., and according to the revision of the genus by Robinson and Greenman in the American Journal of Science 1. 169, it should be placed next to *L. rhinanthifolia*, HBK. The short corolla with its strongly hooded galea combined with the ovate dentate calyx-lobes serve to distinguish *L. brachyantha* from all other known species of the genus.

Hygrophila Pringlei, n. sp. Stems simple or branched, 6 to 10 dm.

high, subterete, green to dark purple, pubescent with spreading or sub-reflexed short fine hairs: leaves lanceolate, 2.5 to 6.5 cm. long, 0.3 to 1.5 cm. broad, acuminate, acutish, entire, hirtellous-margined, glabrous or with a few scattered hairs on both surfaces, often reflexed: flowers in dense axillary clusters; bracts linear, attenuate: calyx about 1.5 cm. long, equally 5-parted to a little below the middle; tube 5-angled in cross-section, essentially glabrous, minutely lineolate; divisions lance-attenuate, keeled, sparingly pubescent on the keel, ciliate-margined: corolla tubular-funnelform, curved, bilabiate, 2.5 to 3 cm. long, crimson, externally pubescent; tube gradually amplified above, about 2 cm. long; posterior lip suberect, 2-lobed; anterior lip spreading, 3-lobed: stamens about equalling or sometimes slightly exceeding the upper lip; filaments below minutely pubescent, above glabrous: ovary glabrous; style puberulent: ovules two in each cell: mature fruit not seen. — MEXICO. State of Michoacan: hills near Uruapan, altitude 1675 m., 13 October, 1904, *C. G. Pringle*, no. 8847 (hb. Gr.).

Although mature fruit of this species has not been seen by the writer, yet on account of the convolute corolla-lobes and other technical characters of the flower, as well as the general habit and inflorescence, the plant is confidently placed in the genus *Hygrophila*.

***Deppea microphylla*, n. sp.** A much-branched shrub: stem and branches covered with a grayish bark; wood reddish; the ultimate branchlets puberulent: leaves somewhat elliptic to oblanceolate or subspatulate, including the petiole 6 to 15 mm. long, 2.5 to 5 mm. broad, obtuse, entire, dark green above, paler beneath, glabrous on both surfaces or with a few scattered crisp hairs on the upper surface in the very early stages, narrowed below into a puberulent petiole: inflorescence terminal and axillary; peduncles 1-2-flowered, usually unibracteate, 6 mm. or less in length; pedicels slender, 2 to 5 mm. long: calyx turbinate or obconical, 5-lobed, glabrous; lobes linear-oblong, 1 to 1.5 mm. long, obtusish, about as long as the adnate tube, persistent: corolla rotate, yellow; tube 1.5 mm. long; lobes oblong, 6 mm. long, 2.5 mm. broad, rounded or obtusish at the apex: stamens exserted: fruit an obconical capsule, 2 to 3 mm. long, longitudinally ribbed, loculicidally dehiscent and the two halves later separating along the septa: seeds small, angled. — MEXICO. State of Hidalgo: river bluffs below Trinidad Iron works, altitude 1735 m., 26 April, 1904, *C. G. Pringle*, no. 8907 (hb. Gr.). A very distinct species and readily separated from all the hitherto known members of the genus by the small leaves and few flowers.

***Galium pendulum*, n. sp.** Stems slender, 1 to 2.5 m. in length,

hirsute to nearly glabrous, inconspicuously hispidulous along the angles: leaves in fours, elliptic-oblong to subobovate, 0.5 to 1 cm. long, one-half to two-thirds as broad, abruptly short-acuminate, acutish, sparingly hirsute on both surfaces, entire, ciliate, often somewhat revolute-margined, narrowed below to a subpetiolate base, 3-nerved, punctate with oblong pellucid glands: inflorescence an elongated many-headed cymose panicle; lateral branches of the inflorescence dichotomously branched; bracts small; pedicels 1 to 14 mm. long, glabrous: flowers 2 to 3 mm. high: calyx-limb obsolete: corolla rotate-campanulate, about 2 mm long, 4-dentate to the middle; lobes ovate, acute: mature fruit didymous, 1.5 mm. long, 2 mm. broad, pubescent with upwardly incurved or subappressed uncinuate-hispid hairs; the two halves of the fruit often separating or diverging at maturity. — MEXICO. State of Hidalgo: hanging from wet cliffs and banks, barranca below Trinidad Iron Works, altitude 1585 m., 6 May, 1904, *C. G. Pringle*, no. 8985 (hb. Gr.). The pendulous habit, quaternate leaves, elongated paniculate cyme with its spreading dichotomous branches, and the upwardly subappressed-hispid fruit abundantly characterize this species, and enable one to readily recognize it among all the other species of the genus. Its affinity is with *G. Pringlei*, Greenm., on the one hand, and *G. uncinulatum*, DC., on the other.

Relbunium mazocarpum, n. sp. Stems prostrate or reclining, slender, 2 to 30 cm. long, glabrous; internodes longer or shorter than the leaves: leaves in fours, ovate-elliptic to elliptic-lanceolate, 1 to 5 mm. long, one-half as broad, terminated by a deciduous setiform mucro, entire, sparingly hirsute above, glabrous beneath: inflorescence axillary: peduncles slender, 4 mm. or less in length, 2-bracteate above; bracts opposite, similar to the leaves but smaller: flowers short-pedicellate: calyx-limb obsolete: corolla rotate, less than 2 mm. in diameter; lobes ovate, acute, externally bearing a few stiff hairs: ovary and mature fruit densely papillose-roughened, in the dried state appearing somewhat scaly. — MEXICO. State of Hidalgo: moist banks, barranca below Trinidad Iron Works, altitude 1675 m., 6 May, 1904, *C. G. Pringle*, no. 8834 (hb. Gr.). Related to *R. sphagnophilum*, Greenm., and *R. humile*, Schum., but differs from the former in being pubescent on the upper leaf-surface and in having a papillose-roughened instead of glabrous and smooth fruit; from the latter species it differs in having a papillose instead of pubescent fruit.

Viburnum caudatum, n. sp. Shrub or small tree, 4 to 6 m. high: stem and branches covered with a reddish brown cortex, subterete;

branchlets somewhat fuscous, glandular-puberulent: leaves ovate to rhombic-ovate, 9 to 13 cm. long, 5 to 9 cm. broad, caudate-acuminate, acute, subentire, 2-4-glandular-toothed at the rounded to cordate base, dark green above, paler beneath, slightly glandular-puberulent on the veins and bearing small patches of white stellate hairs at the junction of midrib and lateral nerves beneath, otherwise glabrous; petioles 8 to 12 mm. long, fuscous, canaliculate above, glandular-puberulent: inflorescence terminating the stem in a glandular-puberulent compound umbel, about 8 cm. in diameter; peduncle about 4 cm. long; rays of the umbel usually 7, from 1.5 to 2.2 cm. long: flowers many: tube of the calyx linear, 3 mm. long, compressed, densely glandular-puberulent; calyx-teeth obtusish, ciliolate: corolla rotate-campanulate, 6 to 7 mm. in diameter, white, 5-lobed to the middle; lobes ovate-rotund, reflexed: mature fruit not seen. — MEXICO. State of Hidalgo: barranca below Trinidad Iron Works, altitude 1525 m., 24 May, 1904, *C. G. Pringle*, no. 8826 (hb. Gr.).

This species is related evidently to *V. sulcatum*, Hemsl., but differs in having essentially terete instead of angulate-sulcate branches, caudate-acuminate larger leaves with a distinctly acute apex, and in not being in the least tomentose on the peduncle or under leaf-surface.

Viburnum ciliatum, n. sp. Shrub: stem and branches subterete, covered with a grayish or somewhat purplish cortex, glabrous; branchlets sulcate-angled, at first pubescent but soon glabrate: leaves broadly ovate, 4 to 7.5 cm. long, 3 to 5 cm. broad, somewhat acuminate, acute, sinuate-dentate, conspicuously ciliate, rounded to shallowly cordate at the base, dark green and except for a few scattered hairs near the margin glabrous above, sparingly hirsute intermixed with a few minute glandular hairs on the veins beneath, sometimes with small patches of stellate tomentum at the junction of midrib and lateral nerves, otherwise glabrous; petioles short, 5 mm. or less in length, pubescent with a few scattered hirsute hairs: inflorescence a terminal slightly glandular-puberulent compound umbel, 3 to 6 cm. in diameter; peduncles 1 to 2.3 cm. long; rays of the umbel usually 5, from 5 to 14 mm. long: flowers numerous: calyx-tube elongate-turbinate, about 2 mm. long, glabrous; calyx-teeth obtuse: corolla rotate-campanulate, 6 to 7 mm. in diameter, white, 5-lobed to the middle; lobes subrotund, spreading: fruit not seen. — MEXICO. State of Hidalgo: wet woodlands near Trinidad Iron Works, altitude 1675 m., 30 April, 1904, *C. G. Pringle*, no. 8881 (hb. Gr.).

The species to which *V. ciliatum* seems most nearly related is *V. mem-*

branaceum, Hemsl., but differs in having larger leaves which are entirely devoid of stellate hairs on the upper surface, in having very sparingly hirsute not tomentose petioles, and finally in having from 6 to 9 lateral veins on either side of the midrib instead of 4 or 5.

Valeriana calcicola, n. sp. An erect herbaceous annual: stem simple to the inflorescence, springing from a subterranean tuberous root, 8 to 9 dm. high, densely puberulent below, glabrous above: radical leaves not seen: stem leaves 1 to 3 pairs, bipinnatisect, oblong to oblong-ovate in general outline, 4 to 9 cm. long, one-half as broad, glabrous or under a lens slightly puberulent beneath; segments linear to linear-oblong, 4 to 15 mm. long, 1 to 3 mm. broad, obtuse; the uppermost pair of leaves much reduced: inflorescence a terminal paniculate cyme, when fully expanded 2 to 2.5 dm. long, 1 to 1.2 dm. broad; bracts short, narrowly ovate, 1 to 3 mm. long, acute, often subconnate at the base: flowers sessile, perfect, proterandrous: corolla subcampanulate, 2.5 to 3 mm. long, 5-lobed to the middle, purple; tube strongly gibbous at the base, densely villous in the throat; lobes at first erect, later reflexed: stamens 3, at the time of dehiscence of the anthers subincluded, later exerted: fruit somewhat flask-shaped, 3.5 mm. long, 2 mm. broad at the base, compressed, plano-convex and usually pubescent on the side of the fertile cell, 3-ribbed and glabrous on the other side with the lateral ribs prominent and rounded on the back; the persistent plumose calyx-teeth as long as or longer than the body of the fruit.—MEXICO. State of Puebla: on limestone hills near Tehuacan, 22 August, 1901, *C. G. Pringle*, no. 9622 (hb. Gr.).

Valeriana macropoda, n. sp. An herbaceous perennial: stem simple, about 3 dm. high, rising from a tuberous root, glabrous or very sparingly puberulent: leaves pinnatisect with numerous mostly crowded primary divisions and linear obtuse to acute ultimate segments, rather thick and firm in texture; radical leaves including the petiole 10 to 18 cm. long, 3 to 6 cm. broad, rhachis rather broad and continuous in breadth with the petiole, the latter 6 cm. or less in length; stem-leaves 1 to 2 pairs, the lower usually petiolate, the petioles ciliate and frequently connate, the upper pair of leaves sessile and much reduced often to mere bracts: inflorescence cymose, either simple or subcorymbosely disposed; bracts small, lance-linear, 2 mm. or less in length, acutish, green with scarious margins: flowers essentially dioecious, sessile: corolla of the staminate flowers tubular-funnelform, somewhat unequally 5-lobed, white or roseate; tube about 3 mm. long, slightly gibbous at the base, sparingly pubescent within; lobes ovate-oblong, about 1 mm. long, obtuse:

stamens 3, exserted: corolla of the pistillate flowers similar but smaller, 5-lobed to the middle: style exserted: fruit oblong-ovate, 6 to 6.5 mm. long, two-thirds as broad, crowned by the persistent plumose calyx-teeth, strongly compressed, unicostate on one side and 3-ribbed on the other, puberulent to essentially glabrous. — MEXICO. State of Mexico: hills near Lecheria Station, altitude 2225 m., 4 July, 1904, *C. G. Pringle*, no. 8998 (hb. Gr.). This species is closely related to, and possibly may prove eventually to be the same as, the inadequately characterized and obscure *V. Napus*, Lindl., but until more can be learned of the Lindley species and its identity established it seems best to regard Mr. Pringle's plant as representing a distinct species.

Valeriana Nelsonii, n. sp. An erect herbaceous perennial: stems 5 to 7 dm. high, simple or sparingly branched above, striate, glabrous, often purplish at the base: leaves bipinnatisect, oblong to oblong-ovate in general outline, including the petiole 6 to 24 cm. long, one-third as broad, glabrous; segments linear, 0.5 to 6 cm. long, 1 to 3 mm. broad, acute or obtusish; petioles 5 cm. or less in length; stem-leaves 1 to 2 pairs, the upper often reduced to mere attenuated bracts: inflorescence in terminal rather close cymes; bracts minute: flowers sessile, perfect: corolla subcampanulate, 3 mm. long, 5-lobed to or a little below the middle, roseate, proterandrous; tube but slightly gibbous at the base, densely villous in the throat; lobes oblong-ovate, obtuse, spreading: fruit oblong, upwardly a little narrowed, 5 mm. long, 3 mm. broad just above the base, glabrous, compressed, plano-convex, unicostate on the side of the ovuliferous cell, 3-ribbed on the other side with the lateral ribs somewhat more prominent and rounded on the back. — MEXICO. State of Durango: near El Salto, altitude 2400–2650 m., 12 July, 1898, *E. W. Nelson*, no. 4574 (hb. Gr.); El Oro to Guanacevi, 14 to 16 August, 1898, *E. W. Nelson*, no. 4744 (hb. Gr.). Mr. Nelson's specimens have been referred to *V. ceratophylla*, HBK., from which species they differ in having a less caespitose habit, taller stems, more crowded primary leaf-divisions and longer ultimate segments, and finally in the somewhat larger and glabrous fruit. In habit *V. Nelsonii* resembles *V. calcicola*, but it is readily distinguished by the glabrous stem, larger more oblong and glabrous fruit.

ELEPHANTOPUS MICROPAPPUS, Klatt, Jahrb. Hamburg. wissenschaft. Anstalt. ix. pt. 2, 124 (1892), not Less., is GOMPHENA PERENNIS, L., as is shown by an examination of Ule's no. 1184, collected in Campo near Laguna, Brazil, March, 1889, now in the Gray Herbarium from the herbarium of Dr. Klatt.

Achaetogeron ascendens, n. sp. An herbaceous perennial: stems several from a common ligneous base, subprostrate or ascending, 1 to 2 dm. in length, subappressed-hispidulous-pubescent: leaves sessile, linear and entire to subpinnatifid with short linear-acute or obtusish divisions, 1 to 2 cm. long, 1 to 5 mm. broad, hirsute-hispid: peduncles 1 to 5 cm. in length, sparingly pubescent with appressed or subappressed stiffish hairs: heads including the fully expanded rays 2 to 2.5 cm. in diameter: involucre campanulate, about 5 mm. high; bracts of the involucre in 2 to 3 series, linear or linear-lanceolate, scarious-tipped and acute, narrowly scarious-margined, hirsute-pubescent, more or less purplish: ray-flowers 2-3-seriate, numerous, fertile; rays including the tubular portion 7 to 9 mm. long, less than 1 mm. broad, white or roseate: disk-flowers many: pappus of both ray- and disk-flowers a laciniated crown of coalescent scales, mostly less than 1 mm. long, nearly or quite equalling the short tube of the corolla: mature achenes about 1 mm. long, laterally compressed, sparingly pubescent. — MEXICO. State of Hidalgo: meadows near Buena Vista Station, altitude 2530 m., 4 August, 1904, *C. G. Pringle*, no. 8851 (hb. Gr.).

Achaetogeron griseus, n. sp. An herbaceous perennial: stem erect, branched, about 3 dm. high, bearing several offsets at the base, green, striate, pubescent with appressed or subappressed grayish hairs: leaves of the offsets and the lower stem-leaves oblanceolate to spatulate, 3 to 8 cm. long, 0.5 to 1.5 cm. broad, obtuse or submucronate-acute, entire to more or less pinnatifid with oblong obtuse lobes, narrowed below to a subpetiolate base, subappressed-pubescent on both surfaces; upper stem- and rameal-leaves narrowly oblanceolate to lance-linear, entire: heads on rather long very pubescent peduncles, including the rays 2.5 to 3 cm. in diameter: involucre campanulate; bracts of the involucre lance-attenuate, narrowly scarious-margined and purplish, pubescent with subappressed hairs: ray-flowers numerous; rays including the tube about 1.5 cm. long, 1 mm. broad, white: disk-flowers many: pappus an inconspicuous fringed crown: achenes of both ray- and disk-flowers laterally compressed, slightly pubescent. — MEXICO. State of Durango: vicinity of the city of Durango, April to November, 1896, *Dr. Edward Palmer*, no. 821 (hb. Gr., and hb. U. S. Nat. Mus.). The affinity of this species is with *A. Wislizeni*, Gray, but the leaves are more or less pinnatifid, the pubescence in general is less spreading, the involucre bracts are purplish, and the pappus is much more reduced. Intermediate forms between *A. Wislizeni* and *A. griseus* may be found, but until such are known to occur it seems best to regard them as distinct species.

Achaetogeron purpurascens, Greenm. Proc. Am. Acad. xxxix. 94 (1903). By typographical error the generic name was here published as "*Archaetogeron*." It may be noted here, that specimens of this species were also secured from its original station, near Colonia Garcia in the Sierra Madre, State of Chihuahua, by *E. W. Nelson*, 1 to 20 August, 1899, no. 6213 (hb. Gr., and hb. U. S. Nat. Mus.).

Achaetogeron versicolor, n. sp. An herbaceous annual or sometimes indurated at the base and thus becoming perennial, 1.5 to 3 dm. high: stems much-branched from the base, erect or ascending, pubescent with spreading hirsute hairs: leaves alternate, sessile, linear-lanceolate to oblanceolate-spatulate, 8 to 18 mm. long, 1 to 6 mm. broad, acute, entire to 3-5-toothed, hirsute-pubescent: peduncles slender, 6 cm. or less in length, upwardly enlarged just beneath the head, pubescent with horizontally spreading hairs: heads including the fully expanded rays about 12 mm. in diameter: involucre campanulate, about 4 mm. high; bracts of the involucre biseriate, lanceolate to lance-ovate, acute, scarious-tipped and with thin margins, hirsute-pubescent, purplish: ray-flowers in about 3 rows, numerous, fertile; rays 4 to 5 mm. long, half a millimetre wide, white or whitish at the base, tipped with color varying from magenta to dark purple: disk-flowers many: pappus of both ray- and disk-flowers a minute inconspicuously fringed crown: mature achenes laterally compressed, about 1 mm. long, sparingly pubescent to essentially glabrous. — MEXICO. State of Hidalgo: meadows near Buena Vista Station, altitude 2530 m., 7 August, 1904, *C. G. Pringle*, no. 8849 (hb. Gr.).

Erigeron alcicornutus, n. sp. Annual: stem erect, simple and purplish below, branched and green above, striate, pubescent with long spreading or slightly reflexed jointed hairs: leaves sessile, semiamplexicaul, auriculate, oblong-lanceolate, 2 to 6.5 cm. long, 0.5 to 3 cm. broad, deeply laciniate-toothed in the terminal half with diverging teeth or divisions, hirsute on both surfaces: heads subcorymbosely disposed on naked or bracteate peduncles, including the rays 2.5 to 3 cm. in diameter: involucre campanulate; bracts of the involucre narrowly lance-attenuate, in 2 (3) series, hirsute-villous with some glandular hairs intermixed: rays white, many (180-200) nearly 1 cm. long, less than 1 mm. wide: disk-flowers many: pappus of both ray- and disk-flowers in a single series consisting of few slender setae, 1 to 2 mm. in length, very caducons: mature achenes about 1 mm. long, glabrous. — MEXICO. State of Chihuahua: on alluviums of Arroyo Auco, Sierra Madre, 15 October, 1887, *C. G. Pringle*, no. 1273 (hb. Gr.).

Mr. Pringle's plant was originally referred to *Achaetogeron Seemannii*,

Gray (*Erigeron Seemannii*, Greene), from which, however, it differs in the character of the foliage, the number of ray-flowers, and in other technical characters of the head. *E. alcicornutus* has the leaves relatively broad at the base, and this breadth is retained up to the point of lacination, not gradually narrowed to a subamplexicaul base. Moreover, the rays are more numerous, longer and narrower than in the Seemann plant, and the achenes again are smaller and quite glabrous. On account of the simple setose pappus with comparatively few setae Mr. Pringle's plant above cited seems to the writer best referred to *Erigeron*, related to *E. neo-mexicanus*, Gray, and *E. delphinifolius*, Willd.

➤ *Erigeron calcicola*, n. sp. Suffruticose: stems several from a stout ligneous base, erect or nearly so, 1.5 to 3 dm. high, usually branched, pubescent with short spreading or slightly reflexed somewhat crisp hairs: leaves spatulate to linear, 0.5 to 2.5 cm. long, 1 to 5 mm. broad, acute or obtusish, entire or the lower ones few-toothed, pubescent on both surfaces: peduncles 10 cm. or less in length, hirtellous-hirsute with short spreading or somewhat reflexed hairs: heads 6 to 9 mm. high, including the rays 1.5 to 2 cm. in diameter: involucre campanulate, a little shorter than the flowers of the disk: bracts of the involucre lanceolate, acute, more or less scarious-margined, hirtellous-hirsute: ray-flowers numerous, sub-biseriate; rays narrow, white or faintly tinged with purple: disk-flowers many: pappus double, consisting of long slender setae and of short lacinate squamellae, similar in both disk- and ray-flowers but somewhat shorter in the latter: mature achenes 1 to 1.5 mm. long, pubescent under a lens. — MEXICO. State of Hidalgo: calcareous bluffs near Tula, altitude 2070 m., 11 September, 1899, *C. G. Pringle*, no. 8223 (hb. Gr.); chalk bluffs, altitude 2070 m., 16 September, 1902, *C. G. Pringle*, no. 9899 (hb. Gr.). State of San Luis Potosi: 22° N. Lat., altitude 1800–2400 m., *Parry & Palmer*, no. 391 (hb. Gr.). State of Coahuila: Saltillo, 15–30 April, 1898, *Dr. Edward Palmer*, no. 20 (hb. Gr.).

E. calcicola resembles *E. pubescens*, HBK. (*E. Ervendbergii*, Gray), but differs in having a stouter more distinctly ligneous base, and a spreading or somewhat reflexed pubescence on the stem and peduncles not upwardly appressed or strigillose.

Erigeron morelensis, n. sp. Perennial: stem scapiform, slender, more or less flexuous, 1.5 to 2.5 dm. in length, bearing 3 to 5 linear acute bracts between the leafy base and the solitary terminal head, striate, green or slightly purplish, sparingly pubescent: leaves at the base of the stem crowning the oblique rootstock, petiolate, lanceolate to somewhat

obovate-lanceolate, including the petiole 3 to 10 cm. in length, 0.5 to 2 cm. broad, acuminate, acute, remotely and rather coarsely mucronate-dentate, gradually narrowed at the base into the slender petiole, dark green and pubescent above with scattered hirsute hairs, paler and glabrous beneath; petioles reddish-purple, usually as long as or sometimes exceeding the blade: heads 6 to 8 mm. high, including the rays 1.5 to 2 cm. in diameter: involucre campanulate, about as high as the flowers of the disk; bracts of the involucre 2-3-seriate, subequal, lanceolate, acute, pubescent with a few jointed hairs: ray-flowers 60 to 70, in 2 series; rays white or tinged with magenta, 2-3-dentate: pappus of both ray- and disk-flowers alike, consisting of a single series of numerous slender setae: mature achenes about 1 mm. long, nearly or quite glabrous. — MEXICO. State of Morelos: wet cliffs, mountain cañon near Cuernavaca, altitude 1980 m., 15 May, 1898, *C. G. Pringle*, no. 7668 (hb. Gr.).

Erigeron oaxacanus, n. sp. A low herbaceous perennial: stems several from a common base, ascending or suberect, simple or branched, about 1 dm. high, hirsute-pubescent: leaves oblanceolate to lance-linear, 0.5 to 1.5 cm. long, 1 to 4 mm. broad, incised-serrate with 3 to 7 teeth to entire, subappressed-hirsute-pubescent on both surfaces; the lowermost leaves narrowed to a subpetiolate base, the upper sessile: peduncles terminating the stems and branches, 4 cm. or less in length, slender, pubescent: heads excluding the rays 6 to 8 mm. in diameter: involucre campanulate; bracts of the involucre narrowly lance-attenuate, hirsute-pubescent: ray-flowers 2-3-seriate, 80 to 85; rays white, twice as long as the involucre: disk-flowers numerous: pappus of both ray- and disk-flowers biseriate; the outer series of fimbriated scales, the inner of numerous slender setae: achenes pubescent. — MEXICO. State of Oaxaca: near San Mateo del Mar, 16 May, 1895, *E. W. Nelson*, no. 2606 (hb. Gr., and hb. U. S. Nat. Mus.).

Erigeron oreophilus, n. sp. Perennial: stems erect from a ligneous base, 3 to 8 dm. high, branched above, green or purplish, striate, glandular-puberulent and sparingly hirsute with scattered horizontally spreading hairs: leaves mostly pinnatifid, 1.5 to 8 cm. long, 4 cm. or less broad, glandular-puberulent and sparingly hirsute; divisions linear or linear-oblong, acute or obtuse, entire; the broad petiole-like base of the leaves usually rather conspicuously ciliate; the uppermost leaves undivided, linear-lanceolate and entire: inflorescence a terminal corymbose cyme: heads including the rays 2.5 to 3 cm. in diameter: involucre campanulate, about 6 mm. high; bracts of the involucre linear, attenuate, somewhat scarious-tipped and more or less purplish, glandular-puberulent

or somewhat atomiferous-glandular with a few scattered spreading stiffish hairs intermixed: ray-flowers numerous, 2- (3-) seriate; rays white: disk-flowers many: pappus of both ray- and disk-flowers alike, double; the inner of slender deciduous setae, the outer of short laciniate squamellae: mature achenes about 1 mm. long, laterally compressed, pubescent.

— MEXICO. State of Chihuahua: southwestern part of the state, August to November, 1885, *Dr. Edward Palmer*, no. 419 (hb. Gr.); dry ledges of La Bufa Mt. above Cusihuiriachic, altitude 2375 m., 31 August, 1887, *C. G. Pringle*, no. 1271 (hb. Gr.); cool slopes, foothills of the Sierra Madre, 11 October, 1887, *C. G. Pringle*, no. 1272 (hb. Gr.); near Colonia Garcia in the Sierra Madre, 1-20 August, 1899, *E. W. Nelson*, no. 6218 (hb. Gr., and hb. U. S. Nat. Mus.); between Colonia Garcia and Pratt's Ranch below Pacheco, 20-24 August, 1899, *E. W. Nelson*, no. 6265 (hb. Gr., and hb. U. S. Nat. Mus.); near Colonia Garcia in the Sierra Madre, altitude 2255 m., 4 September, 1899, *Townsend & Barber*, nos. 305, 306, (hb. Gr.). — UNITED STATES. Arizona: Mt. Graham, altitude 2740 m., September, 1874, *Dr. J. T. Rothrock*, no. 731 (hb. Gr.); Ft. Whipple, 1865, *Coues & Palmer*, no. 421 (hb. Gr.).

Forma tenuilobus, n. form. Stems and leaves very sparingly pubescent; division of the leaf linear, elongated even 3 cm. in length, 2 mm. or less in breadth. — MEXICO. State of Sinaloa: Sierra de Choix, 15 October, 1898, *E. A. Goldman*, no. 255 (hb. Gr., and hb. U. S. Nat. Mus.).

Forma latilobus, n. form. Stem and leaves copiously glandular-puberulent; divisions of the leaf linear-oblong, obtusish, 3 cm. or less in length, 2 to 5 mm. in breadth. — MEXICO. State of Chihuahua: base of Mt. Mohinora, 12.8 km. from Guadalupe y Calvo, altitude 2130 to 2285 m., 23-31 August, 1898, *E. W. Nelson*, no. 4861 (hb. Gr., and hb. U. S. Nat. Mus.).

Var. dactyloides, n. var. Leaves lance-oblong, 2 to 7.5 cm. long, 0.3 to 2.5 cm. broad, laciniate-lobed in the upper portion with 3 to 7 slightly divaricating lance-linear acute lobes 12 mm. or less in length, the lower two-thirds of the leaf-blade of nearly uniform breadth, 5 to 12 mm. broad, entire: rays white or roseate-tinged in the young stage. — MEXICO. State of Chihuahua: near Colonia Garcia in the Sierra Madre, 1-20 August, 1899, *E. W. Nelson*, no. 6220 (hb. Gr., and hb. U. S. Nat. Mus.). The variety connects directly with typical forms of the species through *Townsend & Barber's* no. 305, and *Pringle's* no. 1272.

E. oreophilus is closely related to *E. delphinifolius*, Willd., and to *E. neo-mexicanus*, Gray, and has been confused with both of these species.

From the former it differs in having horizontally spreading hirsute hairs on the stems, and in being glandular-puberulent; from the latter it differs in being glandular-puberulent or at least atomiferous-glandular, and in having heads averaging fully one-third larger not only in the length of the ray-flowers but in the longer involucre bracts, etc.

ERIGERON REPENS, Gray, var. **psammophilus**, n. var. Stem slender, somewhat flexuous, sparingly pubescent: leaves glabrous or inconspicuously pubescent: other characters of the species. — MEXICO. State of Vera Cruz: Lizardo, *Dr. Wawra*, no. 276 (hb. Berlin, and hb. Gr.). Mr. C. G. Pringle's no. 9673 collected on sand dunes near the City of Vera Cruz, and noted in the Proceedings of the American Academy xxxix, 95, 1903, forms a good intermediate between the type of the above species and the variety here described.

➤ **Baccharis Palmeri**, n. sp. Suffruticose: stems one to several from a ligneous base, erect, 2 to 3 dm. high, striate-angled or furrowed, glabrous, glandular-viscid: leaves sessile, lanceolate to oblanceolate, 7 to 28 mm. long, 1 to 8 mm. broad, acute, entire, glabrous, punctate and glandular-viscid, uninerviate or with 2 lateral inconspicuous nerves: inflorescence corymbose or corymbose-paniculate: heads 3 to 5 at the ends of the branches on rather short peduncles: heads of the staminate flowers 8 to 10 mm. high, 11–13-flowered; involucre bracts in 3 to 4 series, lanceolate, 3 to 7 mm. long, acute, the outer greenish glandular and shorter than the inner almost colorless ones: heads of the pistillate flowers 1 to 1.5 cm. high, 15–18-flowered; bracts of the narrowly campanulate involucre 3–4-seriate, elliptic-lanceolate to lanceolate, 2 to 6 mm. long, the outer greenish, glandular-viscid, obtuse and shorter than the pale almost colorless or subhyaline inner acute ones: mature achenes 2 mm. long, striate, glabrous, bearing the rather persistent pappus, the latter 10 to 12 mm. in length. — MEXICO. State of Durango: vicinity of the city of Durango, April to November, 1896, *Dr. Edward Palmer*, no. 801 (hb. Gr., and hb. Berlin) staminate plant, and no. 802 (hb. Gr.) pistillate plant. The species is related to *B. Seemanni*, Gray, which it superficially resembles, but differs in having shorter peduncles, more numerous heads, and a fewer-seriated involucre.

Baccharis Pringlei, n. sp. Stem striate, purplish, pubescent with crisp hairs; internodes 5 to 6 cm. in length: leaves alternate, sessile, ovate, acuminate, 4 to 12 cm. long, 2 to 5.5 cm. broad, abruptly narrowed below the middle to about 1.5 cm. in breadth, amplexicaul, mucronate-acute, subsinuate-dentate and the teeth terminated by a mucro, ciliate, hirsute-pubescent above, paler and pubescent on the midrib and

lateral veins beneath: inflorescence a terminal leafy hirsute-pubescent many-headed panicle; peduncles 6 mm. or less in length, slender; bracts of the ultimate inflorescences lanceolate to subsetaceous: heads of the staminate flowers about 5 mm. high and broad, about 25-flowered: involucre campanulate, 3-seriate; bracts of the involucre lanceolate, purplish, the outer acute, the inner longer, obtuse, and more or less scarious on the margins and at the tip: pistillate flowers unknown. — MEXICO. State of Oaxaca: in wet ravines, Sierra de San Felipe, altitude 2285 m., 11 December, 1895, *C. G. Pringle*, no. 7014 (hb. Gr.).

In foliar characters *B. Pringlei* suggests *B. oaxacana*, Greenm., from which, however, it is easily distinguished by its larger acuminate leaves, many-headed paniculate inflorescence, smaller heads, and finally by the absence of glandular hairs on the stem and in the inflorescence.

Melampodium Nelsonii, n. sp. Perennial: stems ascending or erect, much-branched, hirsute-pubescent: leaves sessile, linear-lanceolate, 1.5 to 5 cm. long, 1 to 4 mm. broad, entire and undivided or pinnately 3-cleft into linear divaricately spreading divisions, pubescent above, densely sericeous-villous beneath, revolute-margined: peduncles rather slender, 1 to 8 cm. in length, pubescent with spreading hairs: heads including the conspicuous orange-yellow rays 1 to 1.5 cm. in diameter: outer involucre bracts herbaceous, ovate-deltoid, gradually narrowed to an acute apex, densely hirsute-pubescent: ray-flowers about 12; rays oblong, 5 to 6 mm. long, 3 mm. broad: fruit somewhat quadrangular in cross-section, ribbed on the sides, and more or less tuberculate; the hood conspicuously developed and usually prolonged into a spirally coiled puberulent appendage. — MEXICO. State of Michoacan: Volcano of Jorullo, 28 March, 1903, *E. W. Nelson*, no. 6939 (hb. Gr., and hb. U. S. Nat. Mus.).

The fruit characters place *M. Nelsonii* in the § *Eumelampodium* near *M. longipes*, Rob., from which species, however, Mr. Nelson's plant is readily separated by the distinctly ligneous stem, more numerous ray-flowers, longer rays, and a ribbed fruit. In habit *M. Nelsonii* assimilates *M. heterophyllum*, Lag., but differs in having a well-developed hood with an attenuated coiled appendage, narrower leaves, and a more densely pubescent upper leaf-surface.

SANVITALIOPSIS, Schz. Bip. Among Liebmann's plants of Mexico is one which was determined by Schultz Bipontinus as "*Sanvitaliopsis Liebmanii*." The earliest reference to *Sanvitaliopsis* appears in Bentham and Hooker's *Genera Plantarum*, where it is mentioned under *Zinnia* with the following brief characterization: "*Sanvitaliopsis*, Schz. Bip. in Pl. Liebm. est species habitu *Heliopsidis*, acheniis tamen 2-arista-

tis *Zinniae*." The first adequate description and publication of the name was in 1887, when Klatt published a careful diagnosis of the Liebmann plant under *Zinnia Liebmannii*, Benth. & Hook. f., citing *Sanvitaliopsis Liebmannii*, Schz. Bip., as a synonym. On this description of Klatt the genus *Sanvitaliopsis* must rest.

The essential characters of the plant in question are such that it does not seem to the writer to have been correctly referred to *Zinnia* where Bentham and Hooker, f., placed it. The narrow attenuated bracts of the involucre, the uncinately-tipped pales, as well as the habit are all greatly at variance with *Zinnia*; indeed these differences are so well marked that our only course is to accept *Sanvitaliopsis* to generic rank, as a member of the subtribe *Zinnieae*. The recently described *Grypocarpa*, Greenm., is unquestionably congeneric with *Sanvitaliopsis*, but represents a second species of the Schultz Bipontinus genus. The complete synonymy with citation of specimens may be given as follows:—

SANVITALIOPSIS, Schz. Bip. in Benth. & Hook. f. Gen. Pl. ii. 357 (1873), and in Leopoldina xxiii. 89 (1887), reprint p. 2 in synonymy. *Grypocarpa*, Greenm. Trees & Shrubs, i. 145, t. 73 (1903).

S. LIEBMANNII, Schz. Bip. in Leopoldina, l. c. *Zinnia Liebmannii*, Benth. & Hook. f. Leopoldina, l. c.; Rob. & Greenm. Proc. Am. Acad. xxxii. 19 (1896). — MEXICO. Rio Taba, *Liebmann*, no. 552 (hb. Copenhagen, and hb. Gr.).

S. Nelsonii, n. comb. *Grypocarpa Nelsonii*, Greenm. Trees & Shrubs, l. c. — MEXICO. State of Chiapas: top of ridge back of Tonalá, *Nelson*, no. 2892 (hb. Gr., and hb. U. S. Nat. Mus.).

Rumfordia floribunda, DC. Prodr. v. 550 (1836); Deless. Ic. Sel. 4. t. 30 (involucre poorly represented); Hemsley, Biol. Cent.-Am. Bot. ii. 157. Typical forms of this species are now represented in the Gray Herbarium by the following collections: MEXICO. State of Oaxaca: without further locality, *Ghiesbreght*. State of Morelos: on mountain-side about Parque Station, 2130 m., 26 November, 1902, *Pringle*, no. 9955. State of Michoacan: mountains near Patzcuaro, 26 November, 1891, *Pringle*, no. 3940; north slope of Mt. Patambau, altitude 3150 m., 28–31 January, 1903, *Nelson*, no. 6570; north slope of Mt. Taucilaro, altitude 2590 to 3200 m., 24 February, 1903, *Nelson*, no. 6889. State of Jalisco: mountains near Talpa, altitude 1340 to 1525 m., 7 March, 1897, *Nelson*, no. 4024; near Compostela, altitude 915 to 1830 m., 7–8 April, 1897, *Nelson*, no. 4172.

Forma pubescens, n. form. Similar to the species in every way except that the leaves are tawny pubescent on the under surface. —

MEXICO. State of Oaxaca: Cerro de San Felipe, altitude 2440 m., 29 November, 1895, *C. Conzatti*, no. 30 (hb. Gr.).

Sabazia (?) *anomala*, n. sp. Annual, 3 to 4.5 dm. high: stem dichotomously branched from near the base, pale green or purplish, hirsute-pubescent with glandular hairs intermixed: leaves opposite, sessile, ovate-lanceolate, 2 to 5 cm. long, 7 to 22 mm. broad, acute, remotely and coarsely sinuate-dentate, cuneate to slightly rounded at the base, pale green and hirsute-pubescent on both surfaces, 3-nerved from near the base: peduncles terminating the stem and branches, 7 cm. or less in length, hirsute-pubescent with glandular hairs intermixed: heads including the fully expanded rays about 1.5 cm. in diameter: involucre campanulate, 1-2-seriate; bracts of the involucre ovate to lance-ovate, 4 to 5 mm. long, acute or obtuse, herbaceous or somewhat tinged with purple: receptacle conical, paleaceous; pales narrow, trifid: ray-flowers 8, fertile; rays white or roseate, obtusely 3-dentate: disk-flowers numerous; corollas yellow: pappus of both ray- and disk-flowers of 10 obovate or narrowly oblong ciliate-fringed persistent scales, half as long as the achenes: mature achenes subterete, 1.5 mm. long, striate, rather sparingly pubescent. — MEXICO. State of Hidalgo: rocky mesas near Buena Vista Station, altitude 2530 m., 7 August, 1904, *C. G. Pringle*, no. 8853 (hb. Gr.).

This species is placed doubtfully in the genus *Sabazia*, because of the presence of a scaly pappus. In every other regard the plant is truly congeneric, having a habit closely assimilating *S. humilis*, Cass., from which it differs not only in the presence of a pappus but in the pubescent shorter achenes. There is a superficial resemblance between *Sabazia anomala* and *Tridax trilobata*, Hemsl.; it is, however, a similarity in habit and foliage rather than in technical or essential characters.

PERYMENIUM BUPHTHALMOIDES,* DC. Prodr. v. 609 (1836); Hemsl. Biol. Cent.-Am. Bot. ii. 181; Rob. & Greenm. Proc. Am. Acad. xxxiv. 523, in part. *P. Cervantesii*, Hemsl. l. c., at least as to *Bourgeau*, no. 378 (hb. Gr.); Rob. & Greenm. l. c.; not DC. — MEXICO. *Alaman* (hb. DC., tracing of type in hb. Gr.). Federal District: hills above

* Since the revision of this genus by Robinson and Greenman (Proc. Am. Acad. xxxiv. 521-529, 1899) types of several of the earlier species have been examined in the De Candolle herbarium by Dr. Robinson, and additional information was obtained concerning their identity, especially that of *P. buphthalmoides*, DC., which has been much confused with *P. Cervantesii*, DC. The above synonymy and the specimens cited it is hoped may help to clear up the confusion of these two species.

Santa Fé, altitude 3000 m., *Pringle*, no. 9322 (hb. Gr.); *Bourgeau*, no. 378 (hb. Gr.). State of Mexico: Flor de Maria, *Pringle*, no. 3169 (hb. Gr.). State of Jalisco: granitic hills near Guadalajara, *Pringle*, no. 8624 (hb. Gr.).

P. CERVANTESII, DC. l. c. — MEXICO. *Alaman* (hb. DC., photograph of type in hb. Gr.). State of Mexico: rocky hills, Lecheria, Valley of Mexico, 21 km. north of the City of Mexico, altitude 2285 m., 4 July, 1904, *C. G. Pringle*, no. 8816 (hb. Gr.). Mr. Pringle states that this species grows from 9 to 12 dm. in height.

P. flexuosum, n. sp. An herbaceous perennial: stems decumbent or ascending from a ligneous base, slender, flexuous, 1.5 to 6 dm. in length, green or purplish, striate, pubescent with appressed or somewhat spreading stiffish hairs: leaves opposite, sessile or nearly so, ovate to lanceolate, 1.5 to 4.5 cm. long, 0.5 to 2.2 cm. broad, acute, dentate, usually abruptly contracted at the base sometimes to a very short petiole, hirsute-hispid on both sides especially on the midrib and nerves beneath, intermixed on the surface with shorter finer strigillose hairs, 3-7-nerved from or just above the base: heads solitary, including the rays 2 to 3 cm. in diameter, borne on long naked peduncles terminating the stem: peduncles 4 to 8 cm. in length, densely subappressed-canous-pubescent towards the head: involucre subuniseriate; bracts of the involucre lanceolate to lance-oblong, obtuse or obtusish, hirsute with spreading hairs: ray-flowers about 8; rays oblong, including the short tubular portion about 1 cm. long, 4 to 5 mm. broad, yellow: pales of the receptacle often purplish-tipped: disk-flowers about equalling or slightly exceeding the involucre: pappus of both ray- and disk-flowers much reduced, consisting of a few very minute setae and a single long awn or seta borne on the inner or posterior angle of the achene: achenes slightly pubescent above. — *P. buphthalmoides*, Rob. & Greenm. Proc. Am. Acad. xxxiv. 523 (1899), not DC. — MEXICO. Federal District: Serrania de Ajusco, altitude 3000 m., 9 July, 1898, *C. G. Pringle*, no. 7636 (hb. Gr.).

This species differs from *P. buphthalmoides*, DC., in having lanceolate to ovate rather than elliptic-lanceolate leaves, and the same are as a rule more numerously dentate and less conspicuously nerved; the pubescence on the involucre is of spreading not appressed hairs; and the pappus is much more reduced.

Bidens Pringlei, n. sp. Perennial: stems ascending from a ligneous base, 3 to 4.5 dm. in length, green or slightly purplish, nearly or quite glabrous below, pubescent above with short canous subappressed or somewhat spreading hairs: leaves, except the uppermost, petiolate, bi-tripin-

natisect, 2 to 6 cm. long, 1 to 4 cm. broad, glabrous; divisions linear, acute: peduncles long, slender, 1.5 dm. or less in length, naked, sub-appressed-canescens-pubescent: heads few, including the fully expanded rays 2.5 to 3 cm. in diameter: involucre campanulate, 5 to 6 mm. high; outer bracts of the involucre about 15, linear, acute, equalling or slightly exceeding the inner ones, canous-pubescent, the inner bracts oblong-lanceolate, obtuse, pubescent along the median line, scarious-margined: ray-flowers 8 to 10, neutral; rays whitish or roseate: disk-flowers yellow, numerous, 45 to 50; mature achenes linear, about 1 cm. long, hirsute-hispid above, bearing 2 or 3 rather short retrorsely barbed awns 2 mm. or less in length. — MEXICO. State of Michoacan: fields near Uruapan, altitude 1525 m., 8 October, 1904, *C. G. Pringle*, no. 8814 (hb. Gr.).

BIDENS ROSEA, Schz. Bip. in Seem. Bot. Herald, 308 (1852-57). *Cosmos pilosus*, HBK. Nov. Gen. & Sp. iv. 241 (1824); Hemsl. Biol. Cent.-Am. Bot. ii. 200 (1884). Although the Humboldt and Bonpland specimen on which this species was based has not been examined by the writer, yet there are in the Gray Herbarium several specimens which correspond fairly well with the original description. The mature achenes in the material at hand are elongated, as in many species of *Bidens*, but not attenuated above into a beak as in *Cosmos*, hence the disposition of the plant as made by Schultz Bipontinus is here maintained. The following collections are taken to represent the above species: MEXICO. State of San Luis Potosi: Alvarez, 28 September to 3 October, 1902, *Palmer*, no. 192 (hb. Gr.). State of Michoacan: Los Reyes, 8 to 12 February, 1903, *E. W. Nelson*, no. 6868 (hb. Gr., and hb. U. S. Nat. Mus.). GUATEMALA, Department of Santa Rosa: Cuijiniquilapa, altitude 800 m., *Heyde & Lux*, no. 6172 (hb. Gr.).

Var. *calcicola*, n. var. Leaves more divided; divisions lanceolate: involucre rather densely canous-pubescent. — MEXICO. State of Morelos: on limestone hills, Yautepec, near Cuernavaca, altitude 1220 m., 21 October, 1902, *C. G. Pringle*, no. 11,340 (hb. Gr.).

Bidens sarmentosa, n. sp. A low almost prostrate herbaceous perennial: stems freely branched, 1.5 dm. or less in length, glabrous or bearing a few scattered hairs: leaves petiolate, bipinnate, 1 to 1.5 cm. long, two-thirds as broad, glabrous on both surfaces; segments obtuse or obtusish: heads small, 5 to 7 mm. high, about 1 cm. in diameter including the rays, borne on glabrous or essentially glabrous peduncles 4.5 cm. or less in length: involucre double, the outer bracts usually 5, linear or linear-spatulate, obtusish, glabrous, sometimes ciliate-margined,

spreading or subreflexed, inner involucre bracts lanceolate to lance-oblong, obtuse: ray-flowers 5 to 6, sterile; rays short-oblong, 4 to 5 mm. long, nearly as broad, orange-yellow: disk-flowers about 20: mature achenes linear, 2 to 6 mm. long, glabrous or sparingly hispidulous, awnless or with reduced awns. — MEXICO. Federal District: Serrania de Ajusco, Ajusco Station, altitude 2895 m., 9 November, 1903, C. G. Pringle, no. 11,486 (hb. Gr.) This plant was distributed as "*Bidens ferulaefolia*, DC.," but the prostrate habit, the small leaves and heads, and the short rays amply distinguish it from that species.

BIDENS SEEMANNII, Schz. Bip. in Seem. Bot. Herald, 307 (1852-57); Hemsl. Biol. Cent.-Am. Bot. ii. 203, as to plant of Seemann, not of Parry and Palmer. *B. Seemanni*, Gray, Proc. Am. Acad. xix. 16. *Cosmos Seemanni*, Gray, l. c. This species has been referred both to *Bidens* and to *Cosmos*. The mature achenes are linear, elongated, 13 mm. or less in length and nearly of the same diameter throughout, but not attenuated above into a beak as in true *Cosmos*. Certainly if the two genera are to be kept separate the above species must be retained in the genus *Bidens*, where it was originally placed by Schultz Bipontinus. Besides the original specimen collected by Seemann, fragments of which are in the Gray Herbarium, and the Ghiesbreght plant cited by Dr. Gray in the paper referred to above, there are now at hand excellent specimens collected by Mr. C. G. Pringle in fields, near Uruapan, State of Michoacan, altitude 1525 m., 8 October, 1904, no. 8845 (hb. Gr.). The finely divided pinnatisect leaves, the deep purple rays, and the long linear smooth-bodied usually 6-awned achenes render this species one of the most striking and easily recognized of the entire genus.

Cosmos ocellatus, n. sp. Annual: stem erect or ascending, simple or branched, 3 to 5 dm. high, more or less pubescent with crisp jointed hairs: leaves opposite, petiolate, 2 to 8 cm. long including the petiole, 1.5 to 4 cm. broad, bi-tripinnately parted, dark green above, pale beneath, subappressed-pubescent on both surfaces; segments lanceolate or lance-linear, acute; petioles 0.5 to 4 cm. long, pubescent: heads 1.2 to 2 cm. high, including the rays 3 to 4 cm. in diameter, borne on long naked striate somewhat pubescent peduncles 1 to 2 dm. in length: involucre double, the outer bracts subfoliaceous, linear or lance-linear, callous-tipped, 8 to 10 mm. long, densely pubescent with long jointed somewhat interwoven hairs; inner involucre bracts narrowly elliptic-ovate, acutish, yellowish-brown in color, scarious-margined: ray-flowers about 8, sterile; rays obovate-oblong, 1.5 cm. long, two-thirds as broad, notched with a broad truncated notch, orange-yellow, usually with a

reddish-brown or chocolate-colored eye near the base: pales of the receptacle tipped with black: disk-flowers numerous; mature achenes about 1.5 cm. in length, attenuated above into a long slender beak, glabrous towards the base, pubescent above. — MEXICO. State of Guerrero: thin soil of the knobs of the Sierra de Tepoxtlan, altitude 2285 m., 4 October, 1900, *C. G. Pringle*, no. 8386 (hb. Gr.), distributed under the name "*Bidens daucifolia*, DC."

A portion of the type-number of De Candolle's species is in the Gray Herbarium, and a careful comparison of Mr. Pringle's plant with it shows the two to be rather remotely related. The larger heads, the broader deeply notched bicolorous rays readily separate the Pringle plant from *Bidens daucifolia*, DC.; and moreover its distinctly long-attenuated or beaked achenes place it in the genus *Cosmos*.

Eutetras Pringlei, n. sp. An herbaceous perennial, more or less glandular pubescent throughout: stems erect or ascending, 1.5 to 3 dm. or more in length, often with tufts of white hairs in the leaf-axils: leaves opposite, petiolate, deltoid-ovate, 1 to 4.5 cm. long, 1 to 4 cm. broad, acute, irregularly and rather coarsely sinuate-dentate, dark green, 3-nerved from the cordate base, the lateral nerves again branching; petioles 0.5 to 3 cm. in length, canaliculate above: inflorescence a few-headed corymbose cyme; peduncles 2 to 5 cm. long, upwardly enlarged just below the involucre: heads about 12 mm. high, including the fully expanded rays 2.5 to 3 cm. in diameter: involucre broadly campanulate, a little shorter than the flowers of the disk; bracts of the involucre uniseriate, linear-lanceolate, acuminate, about 1 cm. long, acute: ray-flowers 12 to 15, fertile; corolla-tube 3.5 mm. long, stipitate-glandular; rays oblong, 10 to 12 mm. long, 4 to 5 mm. broad, 3-dentate, white: disk-flowers numerous; corollas tubular, 7 mm. long, 4-dentate: anthers conspicuously appendaged with oblong appendages: pappus of both ray- and disk-flowers of 4 short lacerated scales alternating with an equal number of slender setae, persistent: mature achenes 3.5 mm. long, pubescent along the angles, nearly or quite glabrous on the four faces. — MEXICO. State of Guanajuato: about basaltic cliffs, near Acambaro, 6 October 1904, *C. G. Pringle*, no. 8813 (hb. Gr.).

This genus has been known hitherto only through *E. Palmeri*, published by Dr. Gray in 1880. The discovery of a second species is noteworthy, especially as the plant was found in a region quite remote from Dr. Palmer's locality. *E. Pringlei* exhibits perfectly the general characters ascribed to the genus by Dr. Gray, and it is readily distinguished from *E. Palmeri* by being larger throughout, and of a less caespitose habit.

SENECIO ALBONERVIUS, Greenm. Shrub, 2 to 3 m. high: stem in the younger parts white-tomentose, later becoming glabrous and covered with a grayish bark: leaves petiolate, broadly ovate, cordate, 3 to 12 cm. long, nearly or quite as broad, palmately nerved, 5-9-angulately lobed, at first tomentulose on both surfaces, later more or less glabrate and discolorous, persistently white-tomentulose on the nerves especially of the upper surface, short mucronate-denticulate on the margins; lobes short-mucronate-acute: inflorescence a terminal many-headed corymbose panicle: heads 10 to 12 mm. high, radiate; involucre calyculate with short triangular-lanceolate acute bracteoles; bracts of the involucre usually 8, lance-linear to oblong, obtuse, about 6 mm. long, thickened along the median line, glabrous or slightly tomentulose-puberulent, the inner with broad scarious margins: ray-flowers commonly 5; pappus surpassing the tube; rays 4-nerved: disk-flowers 8 to 10: achenes glabrous. — Monogr. Senecio, 26 (1901) & Engl. Bot. Jahrb. xxxii. 22 (1902). — MEXICO. State of Mexico: Tamascaltepec, *Schiede*, coll. of 1831 (hb. Gr., and hb. Mus. Bot. Berol.); Mt. Ixtaccihuatl, altitude 2440-3350 m., 1903, *C. A. Purpus*, no. 201 (hb. Gr., hb. T. S. Brandege). State of Michoacan: north slope of Mt. Tancilaro, altitude 2285-3200 m., 24 February, 1903, *E. W. Nelson*, no. 6904 (hb. U. S. Nat. Mus., and hb. Gr.). State of Morelos: Sierra de Tres Marias, altitude 3050 m., 15 April, 1904, *C. G. Pringle*, no. 8903 (hb. Gr.). State of Vera Cruz: Mineral del Monte, *Ehrenberg*, no. 324 (hb. Gr., and hb. Mus. Bot. Berol.).

SENECIO BRACTEATUS, Klatt. Leopoldina, xxiv. 125 (1888), reprint p. 7. *S. leucanthus*, Greenm. Monogr. Senecio, 25 (1901) & Engl. Bot. Jahrb. xxxii (1902). *Cacalia amplexicaulis*, Schz. Bip., acc. to Klatt, l. c., reprint p. 8. I am indebted to Professor Eug. Warming of Copenhagen for a critical comparison of Mr. Pringle's no. 5713 with Liebmann's no. 192, the original of *S. bracteatus*, Klatt (*Cacalia amplexicaulis*, Schz. Bip.). There can be no doubt of the identity of the two plants, although the Liebmann specimen is said to be rather incomplete. — MEXICO. Between St. Andres and St. Miguel, *Liebmann*, no. 192 (hb. Copenhagen, fragment and drawing ex herb. Klatt in hb. Gr.). State of Oaxaca: Sierra de San Felipe, altitude 3050 m., 19 September 1894, *Pringle*, no. 5713 (hb. Gr.).

Cirsium pinetorum, n. sp. Stem 1 to 2 m. high with a few widely spreading branches above, striate, tawny arachnoid-tomentose: leaves pinnatifid, lanceolate-oblong in general outline, acuminate, the lower 3 to 4 dm. long, 1 to 1.5 dm. broad, the upper gradually smaller and sessile but not decurrent on the stem, spinose-margined, hirsute-hispid

above, densely white-tomentose beneath; the terminal and lateral segments prolonged into a stoutish straw-colored spine: heads solitary, terminating the stem and branches, large: involucre 5 to 6 cm. high; bracts of the involucre disposed in many series, essentially uniform, narrowly lance-attenuate, 2.5 to 5 cm. in length, spiny tipped, entire or sparingly spinose-margined, somewhat glabrate on the back, deep purple in color, the outer successively shorter: flowers apparently white or slightly purplish: mature achenes oblong, 5 to 6 mm. long, glabrous. — MEXICO. State of Puebla: in pine forests, Honey Station, altitude 1765 m., 15 September, 1904, *C. G. Pringle*, no. 8884 (hb. Gr.).

This species is one of the most showy of the genus and is easily recognized among all known American species on account of the very large heads, the narrow lance-attenuated deep purple essentially uniform bracts of the involucre.

Onoseris conspicua, n. comb. *Rhodoseris conspicua*, Turcz. Bull. Soc. Nat. Mosc. xxiv. pt. 2, 95, t. 2 (1851); Hemsl. Biol. Cent.-Am. Bot. ii. 254 in synonymy.— MEXICO. Sierra San Pedro, Nolasco, *Jurgensen*. State of Oaxaca: near Plumia, altitude 1000–1500 m., 17 March, 1895, *E. W. Nelson*, no. 2480 (hb. Gr.). The few-flowered heads and the long involucre are important diagnostic characters of this species.

Onoseris rupestris, n. comb. *Caloseris rupestris*, Benth. Pl. Hartw. 88 (1841). *Pereziopsis Donnell-Smithii*, Coulter. Bot. Gaz. xx. 53, t. 6 (1895). Mr. W. Botting Hemsley of the Royal Gardens at Kew has kindly compared for me *Heyde & Lux* no. 4527, exsiccatae John Donnell Smith, with the original of *Caloseris rupestris*, Benth., and states that the two plants are conspecific. The species is characterized especially by the long involucre, the purplish involucreal bracts, and by the mingling of hirtellous hairs with the arachnoid tomentum of the peduncles. *O. rupestris* is easily separated from *O. Isotypus*, Benth. & Hook. f., with which it has been confused by having a much longer involucre.

Perezia Lozani, n. sp. Stem striate, purplish, hirtellous-puberulent: leaves sessile, amplexicaul, ovate-oblong, in specimens at hand 2.5 to 7 cm. long, 1 to 4 cm. broad, acute, unequally and subspinously dentate, slightly hirtellous above, glandular-hirtellous and rather prominently reticulate-veined beneath: inflorescence a terminal corymb or corymbose panicle, leafy: heads mostly short-pedunculate, 12 to 16 mm. high, about 25-flowered: involucre narrowly campanulate; bracts of the involucre imbricated in 5 to 6 series, linear-oblong to lanceolate, 4 to 8 mm. long, the outer bracts successively shorter, squarrose, mostly herbaceous, slightly expanded at the tips and mucronate, hirtellous-puberulent, the inner

lanceolate and obtuse or acute, greenish or purplish: mature achenes 5 mm. long, glandular-hirtellous. — MEXICO. State of Hidalgo: under dry cliffs between Metepec and Zontecomate Stations, altitude 2590 m., 19 September, 1904, *C. G. Pringle*, no. 8871 (hb. Gr.).

The rather unusual involucre with its squarrose broad-tipped more or less herbaceous bracts readily characterizes this species and renders it easily distinguishable among all other species of the genus. It is named in honor of Sr. Filemón Lozano, worthy assistant of Mr. C. G. Pringle.

Perezia megacephala, n. sp. An herbaceous perennial, glabrous throughout: stem simple, erect, about 6 dm. high, springing from an enlarged ferruginous-tomentose base, striate: leaves obovate-oblong to oblanceolate, 2.5 to 11 cm. long, 1 to 5 cm. broad, obtuse or acutish, serrate-dentate to entire, thick and firm in texture, conspicuously reticulate-veined on both surfaces, strongly ascending and subimbricated on the stem; the lower leaves largest, semiamplexicaul and serrate-dentate, the upper smaller, narrowed to a petiole-like base and entire: heads large, 3.5 to 4 cm. high and about as broad, solitary, terminating the stem: involucre broadly campanulate; bracts of the involucre 6-7-seriate, those of the outer series oblong and mucronate-acute, the innermost lanceolate, acute and purplish-tipped: flowers numerous, 2 to 2.5 cm. long: corollas purplish: achenes about 7 mm. long, glabrous. — *P. Wislizeni*, var. *megacephala*, Gray, Proc. Am. Acad. xxii. 433 (1887). — MEXICO. State of Jalisco: Rio Blanco, October, 1886, *Dr. Edward Palmer*, no. 655 (hb. Gr.). Dr. Palmer's plant was regarded by Dr. Gray as a variety of *P. Wislizeni*. The latter is now well represented in the Gray Herbarium through the collections of Wislizenus, Pringle, Palmer, and Nelson; it is a species showing little tendency to extreme variation, and is characterized especially by the glaucous nature of stem and foliage, the upper portion of the stem being essentially naked, and by the comparatively few broad outer involucre bracts. In *P. megacephala*, on the other hand, the bloom is absent, the stem is leafy to the single terminal head, and the outer involucre bracts are more numerous, longer, and broader. In view of these apparently constant differences the writer has no hesitation in raising Dr. Gray's variety to specific rank.

PEREZIA MONTANA, Rose. Contr. U. S. Nat. Herb. i. 105, t. 8 (1891). Specimens of this very distinct species have been secured by Dr. Edward Palmer at Santiago Papasquiario, State of Durango, April and August, 1896, no. 59 (hb. Gr., and hb. U. S. Nat. Mus.). The achenes, although originally described as glabrous, are not infre-

quently somewhat pubescent. The Durango collection adds another station towards determining the geographical range of the species.

Trixis megalophylla, n. sp. Shrub: stem covered with a grayish brown bark, at first pubescent, later glabrate, somewhat winged from the decurrent foliage: leaves short-petiolate or the uppermost sessile, oblong-lanceolate, 5 to 17 cm. long, 1.5 to 6 cm. broad, acute, entire or denticulate, revolute-margined, mostly contracted at the base into a short narrowly winged petiole, hirtellous-puberulent above, tomentulose beneath; midrib and lateral veins prominent on the under surface: inflorescence a terminal leafy glandular-hirtellous paniculate cyme; bracts of the inflorescence ovate to ovate-lanceolate, foliaceous: heads 15 to 18 mm. high, about 12-flowered: outer or accessory bracts of the involucre lanceolate or slightly oblanceolate, nearly equalling or a little exceeding the linear-oblong about 12 mm. long short-acuminate inner true involucral-bracts; mature achenes about 7 mm. long, hirtellous-pubescent with a few glandular hairs intermixed. — MEXICO. State of Guerrero: between Sochi and Tlalkinsala, altitude 1100 to 1465 m., 29 November, 1894, *E. W. Nelson*, no. 2038 (hb. Gr., and hb. U. S. Nat. Mus.). On account of the large leaves and the glandular inflorescence the species is very characteristic, and readily recognized among all the other species of the genus.

Trixis Nelsonii, n. sp. Shrub: stem covered with a brownish bark, wingless; ultimate branches tawny-pubescent: leaves petiolate, elliptic-ovate to oblong-lanceolate, 3 to 7 cm. long, 1 to 3 cm. broad, abruptly acuminate-apiculate, entire or denticulate, narrowed at the base into a short petiole, rugulose and somewhat hirtellous on the upper surface, densely and permanently tomentose beneath, revolute-margined; petioles 5 to 8 mm. long: heads about 1.5 cm. high, rather crowded at the ends of the branches: bracts of the outer involucre mostly oblanceolate, 5 to 8 mm. long, acute; inner bracts of the true involucre 8, linear-oblong, about 12 mm. long, short-acuminate, acutish, and as well as the outer bracts and peduncles tawny-pubescent intermixed with glandular hairs or glandular papillae: flowers about 16. — MEXICO. State of Chiapas: between San Cristobal and Teopisca, altitude 2040 to 2590 m., 4 December, 1895, *E. W. Nelson*, no. 3459 (hb. Gr., and hb. U. S. Nat. Mus.). Of the known species of this genus *T. Nelsonii* is nearest *T. rugulosa*, Rob. & Greenm., but differs in having broader leaves, which are abruptly contracted at the apex not gradually attenuated, and in being densely and permanently tomentose beneath; moreover, the outer involucral bracts in *T. Nelsonii* are usually broader than in *T. rugulosa*.

II. DIAGNOSES AND NOTES RELATING TO AMERICAN EUPATORIEAE.

BY B. L. ROBINSON.

Ophryosporus venosissimus, n. comb. *Eupatorium venosissimum* Rusby, Mem. Torr. Bot. Club, vi. 57 (1896). The anthers of this species, even when examined with a compound microscope, show no vestige of an apical appendage. In other respects, such as the few subequal scales of the involucre, the species is in agreement with *Ophryosporus*. In habit and foliage it somewhat resembles *O. Cumingii*, Benth.

THE GENUS *AGERATELLA* seems never to have received a formal or detailed characterization. It was originally founded (without generic description) upon two plants which Dr. Gray regarded as varieties of a single species. Hoffmann, in Engl. & Prantl, Nat. Pflanzenf. iv. Abt. 5, p. 137 (1890), also regarded the genus as monotypic and gave only a comparative, 2-line description of it. With the more abundant material now at hand it is clear that there are two distinct species. The generic characters and specific distinctions may be recorded as follows:—

AGERATELLA, Gray. Capitula homogama, cylindrica vel anguste campanulata, ca. 15-flora. Involucri squamae valde inaequales, in seriebus 5 verticalibus imbricatae, exterioribus brevibus ovatis, interioribus longioribus lanceolato-oblongis, intimis linearibus angustissimis deciduis paleiformibus. Receptaculum hemisphaericum, nudum, parvum. Corollae anguste tubulosae sine ullis faucibus distinctis summa parte plus minusve contractae, externe sparse glandulosae, dentibus limbi 5 anguste oblongis brevissimis erectis. Antherae oblongae, basi obtusae, connectivo apice incrassato truncato vel in appendicem brevem obtusam producto. Achaeinia 5-gona, prismatica, deorsum leviter angustata, in costis sursum hispidula. Pappi paleae ovatae vel lanceolatae, translucidae, erosae, costa unica hispidula in aristam longam purpurascentem producta. Styli rami elongati, leviter clavellati. — Gray ex Wats. Proc. Am. Acad. xxii. 419, 420 (1887); Hoffm. in Engl. & Prantl, Nat. Pflanzenf. iv. Abt. 5, p. 137 (1890). — Frutices vel suffrutices graciles, humiles, ramosi. Folia parva, opposita vel alterna, ovata vel oblonga vel linearia. Capitula numerosa, mediocra, racemosa vel paniculata.

A. *MICROPHYLLA*, Gray, l. c. Fruticosa copiose paniculatim ramosa; ramis gracillimis subteretibus decumbentibus puberulis apice nudiusculis

in pedunculos gracillimos ca. 6 cm. longos laxe spicato-pluricapitados productis; foliis subsessilibus oppositis late ovatis vel ovato-rhomboideis crenato-serratis obtusiusculis 6-10 mm. longis 4-7 mm. latis utrinque puberulis et glanduloso-atomiferis; pedicellis ad 3 mm. longis; involucri anguste campanulati squamis viridibus vel brunnescentibus dorso puberulis, exterioribus acutis, interioribus obtusiusculis vel apice rotundatis; capitulis ca. 17-floris. — *Ageratum microphyllum*, Sch. Bip. in Seemann, Bot. Herald, 298 (1856). *Decachaeta Seemanni*, Benth. & Hook. f. Gen. ii. 239 (1873). *D. Seemannii*, Hemsl. Biol. Cent.-Am. Bot. ii. 78, t. 42 (1880). *Ageratella microphylla*, var. *Seemanni*, Gray, l. c. — Northwestern Mexico, *Seemann*, no. 2043 (co-type, in hb. Gr.).

A. Palmeri, n. sp. Suffruticosa erecta; caulibus saepius plurimis 5-6 dm. altis teretibus pilis brevissimis crispis griseo-puberulis foliosis; foliis alternis lanceolatis vel lineari-oblongis obtusiusculis vel apice rotundatis inciso-serratis vel integris 1-3-nerviis 12-20 mm. longis griseo-puberulis et obscure atomiferis; inflorescentia elongata angusta folioso-bracteata, ramulis gracilibus ad 4 (rarius 10) cm. longis adscendentibus 1-6 (rarius 15)-capitatis; squamis involucri subcylindrici vel anguste campanulati viridibus striatis, exterioribus brevibus plus minusve griseo-puberulis capitulis ca. 13-floris. — *A. microphylla*, var. *Palmeri*, Gray, l. c. — Rio Blanco, Jalisco, Mexico, *Palmer*, no. 537 (type, in hb. Gr.); on dry porphyritic hills near Guadalajara, *Pringle*, no. 1815; Sierra de San Esteban, *Pringle*, nos. 9840, 11,480. This species is readily distinguished from the other by its narrow alternate leaves and different inflorescence.

Oxylobus adscendens, ROBINSON & GREENMAN, n. comb. *Ageratum adscendens*, Sch. Bip. ex Benth. & Hook. f. Gen. ii. 242 (1873), nomen subnudum; Hemsl. Biol. Cent.-Am. Bot. ii. 80 (1881), where first described; Klatt, Leopoldina, xx. 75 (1884). This species, both from habit and technical characters, should be placed in *Oxylobus*, Moc., a marked group of three or four ageratoid *Eupatorieae* regarded as a genus by Mociño, as a subgenus of *Phania* by De Candolle, Prod. v. 115 (1836), as aberrant species of *Ageratum* by Bentham and Hooker f., l. c., but restored to generic rank by Dr. Gray, Proc. Am. Acad. xv. 25-26 (1879), who, however, failed to include the species here mentioned. Dr. Gray's two binomials, *O. arbutifolius* and *O. glanduliferus*, appear to have been entirely overlooked by the compilers of the Index Kewensis. In this connection it may be worth while to call attention to a probable error by which Mr. Hemsley (Biol. Cent.-Am. Bot. ii. 82) extends the range of the latter of these two species to "Venezuela, &c., Fendler,

1155." It seems more than likely that the specimen referred to was Linden's 1155 from Southern Mexico, which is, in fact, *O. glanduliferus*, while Fendler's 1155 is, at least in the Gray Herbarium, a piperaceous plant.

Fleischmannia Langlassei, n. sp. Suffruticosa decumbens plus minusve ramosa 2 dm. vel ultra alta; caulibus teretibus griseo-brunneis, ramulis leviter angulatis infra glabratis supra glanduloso-pilosis foliosis; foliis alternis graciliter petiolatis ovato-lanceolatis inciso-serratis vel etiam profunde trilobatis tenuibus 1-2.5 cm. longis 5-12 mm. latis utrinque viridibus subconcoloribus glabratis, petiolo 5-14 mm. longo juventate glanduloso-pilosiusculo maturitate omnino glabrato; capitibus multifloris longissime pedunculatis, pedunculis 1-4 in apicibus ramorum dispositis gracilibus plus minusve flexuosis obscure glanduloso-pilosiusculis vel in maturitate glabris; involucro turbinato-campanulato 8-14 mm. diametro squamis lanceolato-linearibus acutissimis striatis valde inaequalibus multiseriatim imbricatis glaberrimis purpurascens; receptaculo leviter convexo nudo; corollis albidis anguste tubulosis glabris 4.5 mm. longis sub limbo brevissimo erecto 5-dentato saepe leviter constricto; styli ramis longe exsertis conspicuis purpureo-roseis; achaeniis linearibus in angulis 5 sursum hispidis 1.7 mm. longis basi callosis, setis pappi 5-6 purpureis capillaribus sed firmissimis 4 mm. longis. — Moist rocks, Arroyo de Barabas, Michoacan or Guerrero, Mexico, alt. 1000 m., 11 March, 1898, *E. Langlassé*, no. 27 (type, in hb. Gr.). Vernacular name, *clavellilo*. In inflorescence, flowers, and achenes this species is much like *F. Schaffneri*, Gray, but it differs conspicuously in its chiefly undivided very thin and completely glabrate leaves, as well as in its glabrate petioles and peduncles. In *F. Schaffneri* the leaves, which are of firm texture and somewhat grayish green with a fine permanent glandular puberulence, are regularly cleft nearly to the base into three linear lobes.

Piptothrix aegiroides, n. sp. Erecta; caule 6-12 dm. alto subtereti purpureofolioso simplici glaberrimo; foliis oppositis graciliter petiolatis ovato-deltaideis acuminatis serrato-dentatis vel crenatis firmissimis utrinque subreticulatis supra viridibus glabris subtus pallidioribus in nervis 3 pubescentibus 6 cm. longis 5 cm. latis, petiolo purpureo supra subsulcato 1.5-3 cm. longo; capitulis ca. 20-floris numerosissimis in corymbo planiusculo dispositis, pedicellis 5 mm. longis bracteolatis glabris; involucri campanulati squamis ca. 12 subaequalibus sub-biseriatim imbricatis oblongis viridibus vel apice obtuso eroso purpurascens 3 mm. longis; receptaculo paleaceo, paleis linearibus obtusis; corollis albis tubulosis glabris tubo proprio gracili saepe curvato ca. 1.3 mm.

longo in fauces longos subcylindricos leviter gradatimque ampliato, dentibus limbi ovato-oblongis obtusis erectis vel plus minusve patentibus; antheris apice longe appendiculatis basi rotundatis; filamentis glabris; achaeniis atrofusis prismaticis valde 5-costatis glabris saepius leviter curvatis basi albocallosis 1.7 mm. longis; pappi setis paucis inaequalibus sursum scabridis purpurascensibus ca. 2 mm. longis caducissimis. — Under oaks, cool slopes of mountains above Etzatlan, Jalisco, Mexico, 24 October, 1904, *C. G. Pringle*, no. 8859 (type, in hb. Gr.)

Eupatorium chrysostylum, n. sp. Herbaceum e radice lignosa suberectum 2–3 dm. altum, caulibus compluribus flexuosis subsimplicibus mollissime albo-lanatis, pilis perlongis tenuibus patentissimis plus minusve viscosis; foliis oppositis petiolatis deltoideo-ovatis acutis grosse et argute dentatis ca. 3 cm. longis 2.5 cm. latis tenuibus concoloribus utrinque viridibus sed a grisea pubescentia tectis; petiolo 1–1.5 cm. longo patente tomentoso; paniculis rotundatis compactis multicapitulatis terminalibus vel subterminalibus, pedicellis 3–7 mm. longis viscoso-tomentosis; capitulis ca. 30-floris 12 mm. longis, involucrio turbinato-cylindrico, squamis lanceolato-linearibus viridibus striato-nerviis valde inaequalibus multiseriatim imbricatis adpressis acutissimis dorso margineque griseo-pubescentibus; corollis glabris flavescentibus vel virescentibus longe tubulosis sursum sub limbo brevi 5-dentato erecto vel modice patente leviter angustatis ca. 5 mm. longis; antheris linearibus apice appendice ovato-lanceolata munitis; stylis clavatis valde exsertis aureis conspicuis; achaeniis gracilibus 4 mm. longis nigris pubescentibus deorsum leviter angustatis basi callosis; pappi setis ca. 25 vix barbellatis valde inaequalibus albis. — Dry ledges, rocky hills near Chihuahua, Mexico, 17 April, 1885, *C. G. Pringle*, no. 135 (type, in hb. Gr.) This plant, although distributed as *E. Parryi*, Gray, differs from that species conspicuously in its far more copious and less glandular pubescence, its more sharply toothed leaves, which are truncate rather than cordate at the base, and in its dense inflorescence, the pedicels in *E. Parryi* being two to four times as long and the heads relatively few.

Eupatorium leucoderme, n. sp. Fruticosum; ramis teretibus flexuosis albidis laevibus, ramulis fulvo-tomentellis; foliis oppositis oblongo-lanceolatis tenuibus utrinque viridibus 3-nerviis serratis vel subintegris 5–7 cm. longis 2–2.5 cm. latis utrinque praecipue in nerviis fulvo-puberulis subtus crebre nigro-punctatis apice attenuato-acuminatis basi obtusis vel rotundatis; nerviis a venulis transversariis quam eae *Miconiae* connexis; petiolo ca. 6 mm. longo gracili flexuoso fulvo-tomentello; paniculis lateralibus oppositirameis dense corymboso-thyrsoideis 6–9 cm. dia-

metro; capitulis ca. 6-floris sessilibus in glomerulis rotundatis congestis; squamis involucri lanceolato-linearibus acuminatis valde inaequalibus subuniseriatis dorso fulvo-puberulis; corollis albis anguste tubulosis 4 mm. longis, limbo resinoso-punctato leviter ampliato brevissime 5-dentato; achaeniis prismaticis vix 3 mm. longis; setis pappi ca. 40 barbellatis 3.5 mm. longis sordido-albis; antheris breviter sed distincte in apice appendiculatis. — Sandy soil, Chuta, Michoacan or Guerrero, Mexico. alt. 25 m., 20 June, 1898, *E. Langlassé*, no. 183 (type, in hb. Gr.). In habit this species much resembles *E. albicaule*, Sch. Bip., but differs in its thin punctate leaves, acuminate involucreal scales, etc.

Eupatorium Lozanoanum, n. sp. Fruticosum oppositirameum glaberrimum; ramis striatulis teretibus fuscescentibus, ramulis teretibus viridibus foliatis, internodiis 2–9 cm. longis; foliis oppositis petiolatis ovato-lanceolatis falcatis caudato-acuminatis cuspidato-serratis basi inaequali obtusis vel rotundatis supra basin trinerviis sed etiam prope basin nerviis duabus parvis brevibus marginalibus plus minusve obscuris munitis utrinque laete viridibus sublucidis pulcherrime pellucide punctatis reticulatisque 8–10 cm. longis 2–3 cm. latis; paniculis terminalibus laxis trichotomis 5–10 cm. diametro pyramidalibus 60–80-capitatis, ramulis gracilibus saepe divaricatis plus minusve puberulis capitula subsessilia ad apicem gerentibus; capitulis cylindricis 1 cm. longis 3 mm. diametro 4-floris; involucri squamis paucis (ca. 8) valde inaequalibus viridibus striatulis convexis apice obtusiusculis, exterioribus minimis ovatis, interioribus oblongis; corollis viridi-albis tubulosis 5 mm. longis glabris, tubo proprio faucibus vix ampliatis subaequantibus, dentibus limbi 5 brevibus triangularibus patentibus; antheris apice longe appendiculatis; achaeniis prismaticis deorsum angustatis 3.7 mm. longis in costis 5 hispidulis inter costis obscure puberulis; pappi setis ca. 40 albis sursum-barbellatis, plurimis sublongioribus corollae superantibus prope apicem subdilatis; styli ramis rectiusculis longissimis vix clavatis flavido-brunneis. — In the deep barranca below Trinidad Iron Works, Hidalgo, Mexico, 12 July, 1904, *C. G. Pringle*, no. 8942 (type, in hb. Gr.). Dedicated to Mr. Filemón L. Lozano, the faithful and efficient assistant of Mr. Pringle in his field work.

Eupatorium petraeum, n. sp. Frutex 1.5 m. altus, caule solitario tereti purpureomaculato minute puberulo; foliis alternis late ovatis vel suborbicularibus acutiusculis angulatis vel sublobatis undulato-dentatis petiolatis supra basin 3–(5)-nerviis utrinque reticulatis in nerviis puberulis 10 cm. longis 9 cm. latis, petiolo puberulo subtereti 2–2.6 cm. longo; panicula ramosissima ampla pyramidata obscure pubescenti, bracteis minimis angustis, ramulis prope apicem solum capituliferis, pedicellis

filiformibus divergentibus 3 mm. longis; capitulis numerosissimis parvis 4 mm. longis ca. 14-floris; involucri campanulati squamis valde inaequalibus sub-3-seriatim imbricatis, extimis brevissimis parvis paucis lanceolatis subacutis puberulis, interioribus elliptico-oblongis obtusis vel rotundatis supra mediam partem pubescentibus 2.2 mm. longis, receptaculo leviter convexo paleaceo, paleis caducis linearibus obtusiusculis apice puberulis; corollis albis minute sparseque glandulosis 2 mm. longis, faucibus gradatim ampliatis tubo proprio vix longioribus, dentibus limbi ovato-deltaeideis acutiusculis brevissimis recurvatis; antheris subtruncatis sed inter apicibus thecarum connectivo valde expanso evasculoso; achaeniis brevibus deorsum angustatis in costis 5 sursum hispidulis, setis pappi ca. 15 albis sursum barbellatis 1.7 mm. longis. — In granitic soil, Sierra Madre in the State of Guerrero, Mexico, altitude 1200 m., 4 November, 1898, *E. Langlassé*, no. 565 (type, in hb. Gr.). This species shows in its anthers a transition to *Ophryosporus*. However, the modification of the upper part of the connective into an expanded transparent spongy cushion devoid of vascular tissue is clearly a rudimentary form of the terminal appendage. In the true species of *Ophryosporus*, on the other hand, no such rudiment is visible even under the compound microscope. Furthermore, the true *Ophryospori* have an involucre of nearly equal subuniseriate scales and a naked disk.

Eupatorium Michelianum, n. sp. Fruticosum 1.25 m. altum; ramulis teretibus gracilibus rectis foliosis fulvo-glanduloso-hirsutulis; foliis oppositis subsessilibus basi rotundatis vel cordatis subamplexicaulibus elongato-oblongis attenuatis argute serrulatis firmissimis ad 13 cm. longis 3 cm. latis glabriusculis penninerviis utrinque reticulato-venulosis subtus pallidioribus aureo-atomiferis; paniculis terminalibus oppositiramis bracteatis rotundatis ca. 1 dm. diametro ca. 90-capitatis, pedicellis teretibus ca. 5 mm. longis; capitulis ca. 22 floris ovoideo-cylindricis 1 cm. longis; squamis involucri arcte adpressis multiseriatim imbricatis apice rotundatis erosis discoloribus, extimis brevissimis suborbicularibus, intimis anguste linearibus; corollis albis anguste tubulosis sursum vix ampliatis, limbo patente breviter 5-dentato; antheris apice longe appendiculatis; achaeniis prismatis 5-costatis deorsum leviter angustatis 3.3 mm. longis in costis hispidulis. — In granitic soil of the Sierra Madre, Guerrero, Mexico, altitude 1200 m., 7 December, 1890, *E. Langlassé*, no. 589 (type, in hb. Gr.). This species is allied to *E. glaberrimum*, DC., but is glandular-hirsute. It is also near *E. Oerstedianum*, Benth., from which it differs in its hispidulous achenes and narrower involucre, the lowest scales being suborbicular and not at all herbaceous. It is dedicated to

the memory of the late Marc Micheli, at one time editor of the interesting *exsiccatae* of which it forms a part.

EUPATORIATRUM NELSONII, Greenman, var. *cardiophyllum*, ROBINSON & GREENMAN, n. var. Habitu et floribus formae typicae; foliis suborbicularibus duplicato-dentatis basi valde cordatis. — Los Piños, Chiapas, Mexico, 2 June, 1904, *E. A. Goldman*, no. 1052 (type, in hb. U. S. Nat. Mus., tracing and fragments in hb. Gr.).

KANIMIA NITIDA, Bak. in Mart. Fl. Bras. vi. pt. 2, 370 (1876). In the *Index Kewensis*, ii. 3 (1895), Hooker, f. and Jackson reduce this species to *K. erythralina*, crediting the latter name to Bentham and Hooker, f. Gen. ii. 247 (1873). If the combination had been correctly made in the *Genera Plantarum* it would obviously antedate Baker's binomial and stand according to the rule of priority under the genus, but this is not technically the case. At the place indicated, Bentham and Hooker, f. merely refer to *Kanimia*, the plant which they call "*Mikania erythralina*, DC." The combination *Kanimia erythralina* is not made, and indeed there is no assurance that the authors of the *Genera Plantarum* regarded the transferred plant as a distinct species or that in naming it under *Kanimia* they would have adopted the combination *K. erythralina*. All that their statement conveys is the fact that the generic affinities of De Candolle's plant are with *Kanimia* rather than with *Mikania*. There is, however, an added reason why the transfer in the *Genera Plantarum* should not in this instance be regarded as equivalent to the creation of the new binomial *K. erythralina*, for De Candolle's specific name was *erithalina*, given from a fancied resemblance of the plant to *Erithalis*. *Kanimia nitida*, Baker, is not only the first correct combination accompanied by accurate synonymy, but happily it is also in accordance with the most rigid priority of the specific name, for it is founded on *Eupatorium nitidum*, DC. Prod. v. 180 (1836), which has priority of position over *Mikania erithalina*, DC.

CARPHEPHORUS REVOLUTIFOLIUS, DC. Prod. v. 133 (1836). This species, described by the eldest De Candolle, was based upon a specimen sent to him by Sternberg from the herbarium of Haenke and supposed to have been collected in Mexico. Concerning the plant Bentham and Hooker, f. (Gen. ii. 249) say "*C. revolutifolius*, DC. l. c. 133, e Mexico, et *C. cordifolius*, DC. Prod. vii. 267, e Brasilia, nobis ignoti, certe e descr. e genere expellendi sunt." By Hemsley (*Biol. Cent.-Am. Bot.* ii. 108), *C. revolutifolius*, DC., is still included in the Mexican flora, but with the comment that both this and *C. ? triangularis*, Gray, are doubtful species. At the request of the writer, Mr. Casimir De Candolle has

been so kind as to lend for examination a bit of the original plant of Haenke from the Prodrum Herbarium at Geneva, calling attention to the fact that Schultz Bipontinus had once seen the specimen, and recorded on the sheet his opinion that it was not Mexican, but was the Chilean *Pleocarphus revolutus*, Don. It appears that this supposition has never been put on record in print. It is, however, fully confirmed by an examination of the fragment sent by Mr. De Candolle. The plant is certainly not a *Carphephorus*, nor does it belong to the *Eupatorieae*. The corollas are distinctly bilabiate, and the achenes are not at all angled. It agrees very closely with Don's description of *Pleocarphus revolutus* and with Gay's admirable colored plate of the Chilean plant (Fl. Chil. t. 43). In the Gray Herbarium there is furthermore a specimen of *Pleocarphus revolutus* collected by Gay, and with this also the plant of Haenke is in close agreement, the only differences noted being a slightly greater pubescence on the pedicels and a tendency for the bracts of the involucre to be a little narrower, differences of degree only, and so slight that they may be confidently attributed to individual variation. The genus *Pleocarphus* has no floral distinctions from *Jungia*, with which it has been united by nearly all writers, who have had occasion to mention it in recent years. In accordance with this view, the plant in question should be called:

Jungia revoluta, n. comb. *Pleocarphus revolutus*, D. Don. Trans. Linn. Soc. xvi. 228 (1830); Remy in Gay, Fl. Chil. iii. 427, t. 43. *Carphephorus revolutifolius*, DC. Prod. v. 133 (1836). Of the same habitually divergent section of *Jungia* is also

J. dentata, n. comb., *Pleocarphus dentatus*, Phil. Linnaea, xxxiii. 51 (1864).

It is well known that confusion has existed in the collections of Haenke and Née, whose plants came partly from western South America and partly from Mexico. It is, therefore, a matter of no surprise that the problematic *Carphephorus revolutifolius*, which many acute and diligent collectors in Mexico have never succeeded in rediscovering, should be found identical with a plant from Chili, whence without doubt the plant of Haenke originally came. The species should, therefore, be eliminated both from the Mexican flora and from the genus *Carphephorus*.

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STUDIES IN THE EUPATORIEAE.

BY B. L. ROBINSON.

Presented March 14, 1906. Received February 21, 1906.

INTRODUCTORY.

DURING the summer of 1905 the writer spent some weeks in visiting several of the larger herbaria of Europe in order to examine and photograph plants not hitherto authoritatively represented in the Gray Herbarium. In the course of this work considerable attention was given to the tropical American species of the great genus *Eupatorium* and several allied genera. As must be expected in all such large and difficult groups, which have not been subjected to recent revision, the study of the type-specimens of several hundred species has yielded much new information on the synonymy and proper classification of the group. The collections examined were: (1) the herbarium of the Museum of Natural History in Paris, where the herbaria of Jussieu, Lamarck, and Michaux were consulted, and special attention given to an admirably preserved and well-nigh complete set of the tropical American plants collected by Humboldt and Bonpland and critically described by Kunth in the *Nova Genera et Species*; (2) the rich private herbarium of the DeCandolle family in Geneva, including the invaluable *Prodromus* types; (3) the herbarium of the Imperial Museum of Natural History at Vienna, noteworthy among other ways by containing the fullest series available of the species of Jacquin and an excellent series of the plants of Pohl and species of Poeppig and Endlicher; (4) the herbarium of the Royal Botanical Museum at Berlin, remarkably rich in South American as well as in Old World types and in the study of *Eupatorieae* specially noteworthy by exhibiting to its fullest extent the recent critical work of Dr. Hieronymus; (5) Professor Urban's large and carefully selected West Indian herbarium; (6) the herbarium of the Botanical Museum of the University of Copenhagen, containing, together with much other material of interest, the extant types of Vahl; (7) the herbarium of the Linnean

Society of London, where special attention was given to the types of Linnaeus filius and of Sir James Edward Smith; (8) the herbarium of the Royal Botanical Gardens at Kew, noteworthy to the student of the *Eupatorieae* by exhibiting the very numerous Brazilian types of Gardner, Hooker & Arnott, Bentham, and Baker, as well as the Mexican work of Hemsley; (9) the herbarium of the British Museum of Natural History, including, among many other specimens of high interest, the plants of Clayton, Walter, and Philip Miller.

The writer would here express his sincere thanks to all those in charge of these herbaria for their cordial hospitality, uniform courtesy, and valuable aid during his researches. He is also indebted to Messrs. Oakes Ames and A. A. Eaton for several excellent photographs of type-specimens at Paris, to Mr. H. Hua for a critical comparison of a Peruvian *Piqueria* in the herbarium of Jussieu, to Miss Mary A. Day, Librarian of the Gray Herbarium, for bibliographical assistance, and to Mr. F. V. Coville and Dr. J. N. Rose for the loan of the material of *Piqueria* belonging to the United States National Museum.

About four hundred photographs of types were taken in the European herbaria, some important exchanges effected, and many notes and sketches prepared, which it is hoped may form an accurate basis for considerable work on the group concerned. In the present paper only a small part of the results of the summer's investigation can be presented, but as any complete or monographic treatment of so large a group must be delayed for a considerable time, it seems best to record such identities and synonymy as can be at once stated with definiteness, in order that certain traditional errors may not become more fixed by longer usage. The nomenclature adopted is that recommended by the international congress at Vienna.

I. REVISION OF THE GENUS PIQUERIA.

Piqueria is the typical genus of the *Piquerinae*, a small subtribe of the *Eupatorieae*. The *Piquerinae* are chiefly marked by their blunt anthers, which entirely lack the more or less expanded, oblong, or lanceolate prolongation of the connective, which is present almost without exception in other *Compositae*. In this subtribe the genus *Piqueria* is characterized by a complete absence or very rudimentary development of its pappus. Its natural affinities are obviously on one hand with *Ophryosporus*, which scarcely differs save in the presence of a well-developed setose pappus, and on the other hand with *Alomia* and *Ageratum*, which are habitually approached by the species of *Piqueria* belonging to the subgenus *Phalacraea*. Geographically *Piqueria* extends from the Sierras of northern Mexico through central

and southern Mexico, Central America, and Andean South America to northern Chili. The only known exception to this range of the genus is the occurrence of *P. trinervis* Cav. in the mountains of Haiti, a station called to my attention by Professor Urban. The genus is capable of pretty clear division into four subgenera, of which *Erythradenia* is Mexican, *Eupiqueria* is of Mexico, Central America, and Haiti, *Phalacraea* of the moister Andean region from Colombia to Ecuador, and *Artemisioides* characteristic chiefly of the drier parts of the Andes of Peru and Chili.

Since the treatment of some eight species in DeCandolle's Prodrômus in 1836 no effort has been made to revise the genus, although the number of its species has been considerably increased since that time. The following revision has been drawn up after personal examination of nearly all the specific types and of all the specimens of the genus found in several of the leading herbaria of Europe.

PIQUERIA Cav. (in memoriam Andreae Piquerii — hispanice, *Andrés Piquer* — medici hispanici et auctoris philosophici). — Capitula parva homogama 3-∞-flora, involucri ovoideo vel cylindrico vel campanulato, squamis saepius paucis subaequalibus laxè imbricatis vel subuniseriatis, receptaculo nudo plano vel leviter convexo. Corollae tubulosae albae vel caerulescentes, tubo proprio saepissime brevi piloso vel glanduloso-puberulo, faucibus saepe ampliatis, dentibus limbi ovato-deltaideis suberectis vel saepius ovati-oblongis et patentibus acutiusculis. Achaenia 5-angulata prismatica deorsum plus minusve angustata basi saepe oblique callosa apice rotundata calva vel disco annulari deciduo vel rarissime setis paucis brevibus coronata. Styli rami filiformi-clavellati longe exserti saepe valde recurvati. Antherae breviter oblongae, connectivo apice nec incrassato nec appendiculato. — Ic. iii. 18, t. 235 (1795); Usteri, N. Ann. xviii. 62 (1800); Pers. Syn. ii. 397 (1807); Rees, Cycl. xxvii. (1814); Cass. Bull. Soc. Philom. 1819, p. 127 (1819), et Dict. Sci. Nat. xli. 115 (1826); Less. Syn. 154 (1832); DC. Prod. v. 104 (1836); Endl. Gen. 366 (1838); Reichenb. Nom. 97 (1841); Jameson, Syn. Pl. Aequat. ii. 75 (1865); Benth. et Hook. f. Gen. ii. 238 (1873); Hemsl. Biol. Cent.-Am. Bot. ii. 77 (1881); Hoffm. in Engl. et Prantl, Nat. Pflanzenf. iv. Ab. 5, 133 (1890); Hook. f. et Jacks. Ind. Kew., ii. 544 (1894); Bailey et Scott in Bailey, Cycl. Hort. iii. 1357 (1901). *Phalacraea* DC. Prod. v. 105 (1836); Endl. Gen. 366 (1838). *Stevia* Hort. — Herbae annuae vel perennes vel frutices. Caulis erectus vel decumbens foliosus ramosus. Folia opposita vel alterna petiolata vel subsessilia integra vel saepius serrata vel dentata vel rarius angulata.

Species 19 generaliter bene distinctae quarum 5 Mexicanæ sunt, una Mexicana et Centrali-Americana etiam Haitensis, reliquiae Andium montium Australi-Americæ incolæ.

Clavis subgenerum.

- a. Corollæ fauces tubulosi a tubo proprio non distincti. Folia alterna, glanduloso-punctata. Subg. I. ERYTHRADENIA.
- a. Corollæ fauces ampliati a tubo proprio bene distincti. Folia opposita vel alterna. b.
- b. Corollæ fauces turbinati, brevissimi, dentibus limbi breviores; tubus proprius villosus vel rarissime glanduloso-puberulus. Subg. II. EUPIQUERIA.
- b. Corollæ fauces campanulati vel cylindrici dentibus limbi longiores. Corolla externe præsertim tubo glanduloso-puberula. c.
- c. Capitula 4-5-flora. Subg. III. ARTEMISIOIDES.
- c. Capitula 15-∞-flora. Subg. IV. PHALACRAEA.

Subg. I. ERYTHRADENIA, subg. nov. Capitula circa 6-flora sessilia in panicula ampla pyramidata disposita. Corolla subcylindrica glanduloso-puberula sine faucibus distinctis; dentibus brevissimis. Folia alterna. — Species unica habitu distinctissima.

- ✓ 1. P. PYRAMIDALIS Robinson, caule tereti maculato 2-2.6 m. alto omnifariam puberulo-velutino; foliis alternis magnis longe petiolatis late ovatis vel suborbicularibus angulatis vel leviter lobatis crenatodentatis 3-nerviis, basi rotundatis vel cordatis supra viridibus subtus griseis et glandulis parvis globosis numerosissimis brevissime stipitatis rubris munitis in nerviis et venis reticulatis velutino-tomentellis; panicula ampla folioso-bracteata, ramis ascendentibus; capitulis in glomerulis sessilibus ca. 6-floris; involucri squamis anguste oblongis dorso pubescentibus; corollis anguste tubulosis externe glanduloso-punctatis, dentibus brevissimis; achaeniis 5-angulatis, basin versus leviter angustatis parum obliquis, costis sursum hispidulis. — Proc. Am. Acad. xxxvi. 475 (1901). — MEXICO: in rupibus umbrosis montium supra Igualam, alt. 1250 m., Pringle, n. 8389 (hb. Gray, hb. U. S. Nat. Mus.).

Subg. II. EUPIQUERIA DC. Capitula parva 3-4-flora cymoso-corymbosa vel laxè paniculata, involucri anguste obovoideo vel subcylindrico, squamis 3-4 subaequalibus obovatis vel oblongis concavis tenuibus, apice obtusis vel rotundatis mucronatis eroso-subciliatis rarius dorso pubescentibus. Corollæ tubus proprius extus pubescens, dentibus limbi oblongo-lanceolatis acutiusculis patentibus. — Prod. v. 104 (1836); Endl. Gen. 366 (1838); Hoffm. in Engl. & Prantl, Nat. Pflanzenf. iv, Ab. 5, 133 (1890) pro parte; nec Gardn.; nec Walp. — Vel herbae annuae vel perennes vel frutices. Folia opposita lanceolata vel ovata breviter petiolata.

Clavis specierum.

- a. Involucri squamae dorso pubescentes. 2. *P. triflora*.
 a. Involucri squamae dorso glabrae. b.
 b. Herba annua. Inflorescentia perlaxa, racemiformis. . . 3. *P. laxiflora*.
 b. Herbae perennes. Inflorescentia plus minusve corymbosa. Achaenia basi
 valde obliqua. c.
 c. Caulis omnifariam pilosus vel puberulus. 4. *P. pilosa*.
 c. Caulis bifariam solum puberulus. 5. *P. trinervia*.
 b. Frutices. Achaenia basi subrecta. 6. *P. serrata*.

2. *P. TRIFLORA* Hemsl., caule tereti vel supra subhexagono ubique pilosiusculo folioso 4 dm. alto plus minusve ramoso; foliis oppositis anguste lanceolatis basi perangustatis subsessilia caudato-attenuatis sed in apice vero obtusiusculis 3-6 cm. longis 5-9 mm. latis utrinque crispe puberulis remote serratis vel subintegris; inflorescentia laxe ramosa racemiformi; bracteolis linearibus; pedicellis filiformibus unilateraliter pilosis 3-7 mm. longis; capitulis numerosis obovoideis; involucri squamis 3 obovatis carinatis 3-nerviis scarioso-marginatis eroso-ciliatis apice rotundatis mucronatis, dorso hirsuto-pubescentibus; flosculis 3; corolla alba; tubo proprio extus lanato; faucibus quam dentes 5 oblongo-lanceolati brevioribus; achaeniis atro-fuscescentibus glabris 1.7 mm. longis. — Biol. Cent.-Am. Bot. ii. 77 (1881). — MEXICO: Cerro de Pinal, *Seemann*, n. 1478 (hb. Kew., hb. Gray).

3. *P. LAXIFLORA* Robinson & Seaton, herbacea tenuis laxe et copiose ramosa; radice annua; caule tereti viridi 4-5 dm. alto piloso; foliis oppositis, ovatis vel ovato-lanceolatis serratis 3-5-nerviis sparse pilosis basi cuneatis petiolatis apice obtusiusculis; inflorescentia trichotomofurcata racemiformi; bracteolis subfiliformibus 2-4 mm. longis; pedicellis fere capillaribus 1 cm. longis flexuosis; capitulis obovoideis parvis 4-floris; involucri squamis viridibus obovatis mucronatis erosis tenuibus persistentibus; corollis albis; tubo perbrevis externe pubescenti; achaeniis atro-fuscescentibus 5-angulatis glabris lucidis. — Proc. Am. Acad. xxviii. 107 (1893). — MEXICO: in rupibus frigidulis convallium montanarum prope lacum Chapalam, *Pringle*, n. 4333 (hb. Gray, etc.); montibus prope Durango, *Pringle*, n. 10,067 (hb. Gray).

4. *P. PILOSA* HBK., herbacea perennis ramosa 5-13 dm. alta; caule subtereti omnifariam glanduloso-puberulo saepe purpurascenti folioso; foliis oppositis petiolatis ovatis serratis acuminatis 4-6 cm. longis 2-3 cm. latis utrinque puberulis; petiolo 4-10 mm. longo glanduloso-puberulo; inflorescentia trichotoma cymoso-corymbosa; capitulis parvis numerosis saepe congestis 4-floris; involucri squamis 4 ellipticis margine scariosis erosis apice rotundatis mucronatis dorso glabris; corollis albis, tubo brevi piloso-lanato, faucibus brevibus, dentibus

limbi 5 lanceolati-oblongis acutiusculis patentibus; achaeniis 5-angulatis glabris 2 mm. longis. — Nov. Gen. et Spec. iv. 153 (1820); Cass. Dict. Sci. Nat. xli. 116 (1826); DC. Prod. v. 104 (1836); Hemsl. Biol. Cent.-Am. Bot. ii. 77 (1881). *P. trinervia*, var. *pilosa* O. Kuntze, Rev. Gen. i. 355 (1891). *P. Pringlei* in sched. Pringlei pro parte, non Robinson & Seaton. — MEXICO (praecipue in montibus partis centralis rei publicae): *Humboldt et Bonpland*, n. 4342 (hb. Par.); *Alaman* (hb. DC.); Real del Monte, *Ehrenberg*, n. 481 (hb. Berol., hb. Gray); *Bates* (hb. Kew.); silvis deserti Vieja, *Bourgeau*, n. 828 (hb. Berol.); *Bourgeau*, n. 825 partim (hb. Par.); *Uhde*, nn. 414, 416 (hb. Berol.); Tacubaya, *Schaffner*, n. 300 (hb. Berol.); *Pringle*, nn. 3624, 4119, 4285 partim, 7930 (hb. Gray, etc.); Sierra de Pachucha, Hidalgo, *Rose*, n. 8867 (hb. U. S. Nat. Mus.).

Var. *Pringlei* (Robinson & Seaton), n. comb., caule et inflorescentia omnino eglandulosis pubescentibus; pilis brevibus albidis crispis. — *P. Pringlei* Robinson & Seaton, Proc. Am. Acad. xxviii 107 (1893). — MEXICO: saepe cum forma typica: pinetis convallis mexicanae, *Bourgeau*, n. 825 partim (hb. Gray, hb. Kew.); *Schmitz*, n. 398 (hb. Imp. Mus. Vindob.); *Pringle*, n. 4285 partim (hb. Gray); Sierra de las Cruces, alt. 3000 m., *Pringle*, n. 11,563 (hb. Gray).

5. *P. TRINERVIA* Cav., herbacea perennis erecta ramosa; radice fibrosa; caule tereti bifariam puberulo folioso 4–7 dm. alto; foliis oppositis lanceolatis vel anguste ovatis serratis subglabris 3 (–5)-nerviis crassiusculis basi cuneatis apice attenuatis; capitulis parvis saepius 4-floris laxo cymoso-corymbosis vel rarius in inflorescentia perlaxa racemiformi dispositis; involucri squamis ellipticis erosis margine tenuibus apice rotundatis mucronatis; corollis albis, tubo proprio brevi piloso, faucibus brevissimis, dentibus limbi 5 ovato-oblongis patentibus; achaeniis atrofuscis 5-angulatis basi oblique sigmoideo-callosis. — Ic. iii. 19, t. 235 (1794); Willd. Spec. iii. 1748 (1804); Pers. Syn. ii. 397 (1807); Jacq. f. Ecl. i. 70, t. 48; Bot. Mag. t. 2650 (1826); Cass. Dict. Sci. Nat. xli. 116 (1826); DC. Prod. v. 104 (1836); Hemsl. Biol. Cent.-Am. Bot. ii. (1881); Rose, Contrib. U. S. Nat. Herb. v. 231 (1899); Bailey, Cycl. Am. Hort. iii. 1357 (1901). *P. trinervis* J. E. Smith in Rees, Cycl. xxvii. n. 1 (1817). *P. ovata* G. Don in Loud. Hort. Brit. 337 (1830). *Ageratum febrifugum* Sess. ex DC. Prod. v. 104 (1836). *Stevia febrifuga* Moc. ex DC. l. c. *S. serrata* et *serratifolia* Hort. — MEXICO: vulgaris et late distributa praecipue in arvis et collinis ad 2900 m. alt. Exsiccatis visis: *Aschenborn*, nn. 201, 580; *Bates*; *Berlandier*, nn. 704, 1210, 1241; *Bilimek*, n. 578; *Botteri*, nn. 13, 391; *Bourgeau*, nn. 144, 149, 288, 1402; *Conzatti et González*, n. 1087; *Coulter*, n. 721; *Deam*; *Ehrenberg*, n. 480; *Galeotti*, nn. 2108, 2414

2482; *Graham*, nn. 22, 23; *Halsted*, n. 27; *Harris*; *Humboldt et Bonpland*, nn. 4228, 4258, 4401; *Karwinski*, n. 104; *Kerber*, n. 328; *Lagasca*, n. 128; *Liebmann*, n. 110; *Nelson*, nn. 1720, 1928, 3176, 3463; *Palmer*, nn. 85, 313, 496½, 596; *Parry et Palmer*, nn. 85, 314; *Pringle*, nn. 241, 1748, 5686, 9053, 9951; *Purpus*, n. 55; *Rose*, n. 2767; *Sartorius*; *Schaffner*, n. 235; *Schiede*, n. 303; *Schmitz*, n. 73; *Schumann*, n. 62; *Seaton*, n. 276; *C. et E. Seler*, n. 1153; *C. L. Smith*, n. 1664; *L. C. Smith*, n. 291; *Uhde*, nn. 349, 412, 413, 448. GUATEMALA: *Heyde et Lux*, n. 3399 pl. exsic. J. D. Smithii (hb. Kew., hb. U. S. Nat. Mus.). COSTA RICA: *Cooper*, n. 5811 pl. exsic. J. D. Smithii (hb. Gray, hb. Kew.). HAITI: in montibus Furcy, *Picarda*, n. 1521 (hb. Urb.), forma capitulis paullo majoribus ad var. luxuriantem spectans.

NOTA. — Herba a horticultoribus sub nomine "Stevia" late culta et ob inflorescentia eleganter ramosa bene amata, a Mexicanis pro febrifuga, etiam a Cubensibus ut dicitur loco condimenti usa.

NOMINA VERNACULA: Empueshta, Hierba de San Nicolas, Hierba del tabardillo, Xoxonitzal, Xoxonitztac, Yoloxiltic; omnia fide cl. G. V. Alcocer.

Var. VARIEGATA Hort. ex Bailey, Cycl. Am. Hort. iii. 1358 (1901), est forma calidariarum foliis albo-marginatis.

Var. NANA Hort. ex Bailey, l. c., 1357, humilior 2-3.5 dm. alta foliosissima. — Forma ut videtur mexicana in calidariis saepe culta. Specimina inculta sunt rara, e. g. MEXICO: *Méhédin*, 1864-5 (hb. Par.), Zacatecas, *Deam*, n. 141 (hb. Gray).

Var. LUXURIANS O. Kuntze, foliis ovatis argute serratis 4-9 cm. longis 2.3-4 cm. latis 5-nerviis glabriusculis basi rotundatis, petiolo ca. 1 cm. longo; capitulis quam ea formae typicae distincte majoribus; achaeniis 2.4 mm. longis. — Rev. Gen. i. 355 (1891). — COSTA RICA: silvis montanis in declivitatibus montis ignivomi Irazu, *C. Hoffmann*, n. 171 (hb. Gray); *Kuntze*; *Pittier*, n. 14,080 (hb. Gray).

✓ 6. P. SERRATA Gray, fruticosa ramosa primo aspectu glaberrima; caule tereti pallide viridi obsolete bifariam puberulo folioso; foliis oppositis ovati-oblongis acuminatis grosse arguteque serratis basi abrupte angustatis breviter petiolatis 7-9 cm. longis 2.5-4 cm. latis glaberrimis; capitulis cymoso-corymbosis numerosis 3-floris; involucri squamis elliptico-ovatis 3-nerviis apice rotundatis mucronatis margine ciliato-erosis dorso glabris; corollis albis, faucibus brevissimis, dentibus limbi oblongo-lanceolatis patentibus glabris, tubo proprio breviter subglanduloso-puberulo; achaeniis 5-angulatis glaberrimis annulo deciduo coronatis basi callosis parum obliquis. — Proc. Am. Acad. xv. 25 (1880). — MEXICO: in montibus Alvarez prope San Luis Potosi, *Parry et*

Palmer, n. 496 (hb. Gray, hb. U. S. Nat. Mus.), *Palmer*, n. 199 (hb. Gray).

Var. (?) *ANGUSTIFOLIA* Robinson & Greenman, foliis angustioribus lanceolatis obscure et remote serrato-crenatis basi cuneato-angustatis; capitulis eis formae typicae exacte similibus. — *Am. Jour. Sci.* l. 151 (1895). — MEXICO: in montibus Sierra de San Felipe, Oaxaca, alt. 2800–3300 m., *Pringle*, n. 4827 (hb. Gray, etc.), *Nelson*, n. 1049 (hb. Gray), *C. L. Smith*, n. 605 (hb. U. S. Nat. Mus.).

Subg. III. *ARTEMISIOIDES* DC. Capitula 3–4-flora, involucrio subcylindrico, squamis saepius 4 subaequalibus. Corollae externe glanduloso-punctatae, glandulis minutis rubescentibus brevissime stipitatis; faucibus cylindricis vel subcylindricis tubo proprio subaequantibus, quam dentes limbi distincte longioribus. Achaenia deorsum plus minusve angustata parum obliqua. — *Prod.* v. 105 (1836). — Frutices ramosi andini. Folia opposita vel alterna rhomboidea vel lanceolata vel linearia basi cuneata petiolata.

Clavis specierum.

- a. Folia alterna fasciculata. b.
 - b. Capitula in panicula laxiuscula subrigida disposita. Involucri squamae obtusiusculae. 7. *P. galioides*.
 - b. Capitula congesta. Involucri squamae breviter acuminatae vel attenuatae. Pappus e setis paucis brevissimis compositus vel nullus. c.
 - c. Inflorescentia thyrsoides. Involucri squamae lineari-lanceolatae. 8. *P. pinifolia*.
 - c. Inflorescentia cymosa. Involucri squamae rhomboideo-oblongae acutatae vel breviter acuminatae. 9. *P. Cumingii*.
- a. Folia opposita. d.
 - d. Involucri squamae 3.5–5 mm. longae. e.
 - e. Inflorescentia fulvo-tomentosa. Folia flabelliformi-ovata sinuato-dentata. 10. *P. pubescens*.
 - e. Inflorescentia obscure glanduloso-puberula. Folia ovata serrato-dentata. f.
 - f. Involucri squamae apice eroso-ciliatae. 11. *P. Mathewsii*.
 - f. Involucri squamae dorso granulatae nec erosae nec ciliatae. 12. *P. floribunda*.
 - d. Involucri squamae 2–2.7 mm. longae. g.
 - g. Capitula prope apices ramorum late patentium paniculae congesta. 13. *P. densiflora*.
 - g. Capitula (numerosissima) spicato-racemosa in panicula subfastigiata folioso-bracteata disposita. h.
 - h. Folia lanceolata dentata vel incisa. Capitula sessilia. 14. *P. peruviana*.
 - h. Folia caulina linearia subintegra. Capitula breviter pedicellata. 15. *P. Hartwegii*.

7. *P. GALIODES* DC., fruticosa ramosa glabriuscula; foliis alternis fasciculatis linearibus opacis utrinque attenuatis acutis sessilibus integris subnerviis 1.5–2 cm. longis 2 mm. latis; panicula rigidiuscula patente ramosa pyramidali nudiuscula; capitulis haud congestis racemoso-spicatis subdivaricatis 3-floris; involucri ca. 4 mm. longi squamis subobtusis. — Prod. v. 105 (1836). — PERU: in Cordilleriis, *Haenke*, 1834 (hb. DC.). Species ut videtur bene distincta sed vix satis nota.

8. *P. pinifolia* (Phil.) Hieron. in herb., fruticosa ramosa 6–12 dm. alta, novellis plus minusve glutinosis; ramis arcuato-ascendentibus teretibus foliosissimis cortice griseo-flavido tectis; foliis in fasciculis alternis vel irregulariter sparseque dispositis suberectis anguste lanceolatis integerrimis vel utroque cum 2–3 dentibus brevibus patentibus subremotis instructis apice modice acutis basi attenuatis 1.5–3 cm. longis 2–6 mm. latis utrinque puberulis; thyrsis ovoideo-cylindricis 6–12 cm. longis 3–5 cm. crassis, ramulis rigidiusculis patentibus; capitulis in apice ramuli saepius 2–3 approximatis sessilibus 4–5-floris; involucri squamis 5 lineari-lanceolatis attenuatis subaequalibus laxis stramineis dorso rotundatis 1-nerviis 6 mm. longis glanduloso-puberulis margine involutis; corollis roseis tubulosis 3.5 mm. longis glanduloso-puberulis in fauces plus minusve ampliatis, dentibus limbi ovato-deltoideis patentibus; achaeniis 5-angulatis basi attenuatis puberulis summo saepius calvis rarius obsolete setuliferis. — *Stevia pinifolia* Phil. Ann. Mus. Nac. Chil. sec. 2 (botanica), 37 (1891); Reiche, Fl. de Chil. iii. 262 (1902). *Piqueria pinifolia* Hieron. in herb. Berol. — CHILI: Atacama, *Philippi* (hb. Berol.). PERU: In montibus Andinis supra Palcam, *d'Orbigny* (hb. Par.): Pachia, alt. 1200–1900 m., *Pearce*, Sept. 1862 (hb. Kew.). Specimen *Pearcei* est a cl. *Benthamico* (Gen. Pl. ii. 238) ad hoc genus sed sine nomine relatum.

9. *P. Cumingii*, n. sp., fruticosa ramosa, novellis vernicosis, ramis teretibus flavidis foliosissimis valde patentibus juventate pulverulento-puberulis; foliis fasciculatis anguste oblanceolatis obtusis vel obtusiusculis integerrimis vel cum dentibus unicus vel pluribus munitis 1–1.6 cm. longis 2–4 mm. latis basi attenuatis uninerviis glaberrimis plus minusve viscosis; inflorescentiis arcte congestis corymbosis, ramulis valde patentibus arcuato-ascendentibus; capitulis constipatis 5-floris; involucri squamis oblongis vel subrhomboideis acutis saepe vernicosis 5 mm. longis; corollis 3 mm. longis, tubo proprio quam fauces tubulosi breviori glanduloso-pulverulento; achaeniis pallidis substramineis prismaticis 5-angulatis 3 mm. longis basi attenuatis callosis in faciebus puberulis. — PERU MERIDIONALIS et CHILI SEPTENTRIONALIS: Cobija,

Iquiqui, et Arica, 1831, *H. Cuming*, n. 953 (hb. Kew.); Cobija, 1841, *Gaudichaud* (hb. Berol.).

10. *P. PUBESCENS* J. E. Sm., fruticosa oppositiramea 1-2 m. alta; caulibus teretibus a cortice griseo tectis; ramulis foliosis glanduloso-tomentellis; foliis oppositis, late rhomboideis, grosse arguteque inaequaliter dentatis basi cuneatis vel abrupte angustatis graciliter petiolatis 1.4-3.3 cm. longis 1-3.6 cm. latis sub lente utrinque papilloso-granulosis, petiolo fulvo-tomentoso 8-18 mm. longo; capitulis numerosis congestis corymbosis 4-5-floris; involucri squamis anguste oblongis attenuatis dorso glanduloso-puberulis; corollis albis vel (?) flavidis. — J. E. Smith in Rees, Cycl. xxvii. n. 2 (1814); DC. Prod. v. 105 (1836). *P. quinqueflora* Cass. Bull. Soc. Philom. 1819, p. 128 (1819), et Dict. Sci. Nat. xli. 116 (1826); DC. Prod. v. 105 (1836). — PERU: spec. typ. in hb. L. f. (hb. Linn. Soc.); *Dombey* (hb. Par.); *Mathews*, n. 946 (hb. Gray); Obrajillo, *Wilkes* (hb. Gray, hb. U. S. Nat. Mus.); Lima, *Cuming*, n. 1045 (hb. Brit. Mus.); ad pedem montis Amancaes prope urbem Lima, 21 Julio, 1876 (floribus albis), *André*, n. 4117 (hb. Gray); in rupibus prope Lima, 30 Nov. 1901, *Weberbauer* n. 9 (hb. Berol.).

11. *P. Mathewsii*, n. sp., suffruticosa oppositiramea; ramis tenuibus rubescentibus glaberrimis; foliis oppositis membranaceis ovatis crenato-serratis vel grosse-dentatis acuminatis graciliter petiolatis 3-5-nerviis utrinque viridibus glabris 4-6 cm. longis 2-3 cm. latis, petiolo 7-10 mm. longo; panicula laxa ramosa, ramis gracilibus teretibus puberulis valde patentibus vel arcuato-ascendentibus prope apicem capitula subcorymbosa ferentibus; capitulis 4-5-floris; involucri squamis breviter acuminatis vel saepius obtusiusculis ca. 5 mm. longis apice ciliolatis; corollis valde exsertis, tubo proprio gracili glanduloso-puberulo, faucibus cylindricis bene distinctis quam dentes limbi longioribus. — PERU: Purruchuca, *Mathews*, n. 1015 (hb. Kew.).

12. *P. FLORIBUNDA* DC., fruticosa oppositiramosa minutissime puberula vel subglabra; ramis patentibus griseo-fuscis foliosis; foliis oppositis ovatis serrato-dentatis acutis basi rotundatis vel abrupte angustatis graciliter petiolatis subglabris 1-2 cm. longis; panicula patente ramosa pyramidali 7-11 cm. lata; capitulis numerosis 4-6-floris; involucri anguste cylindrici squamis oblanceolati-oblongis vel -linearibus 3-costatis dorso convexis et glanduloso-puberulis acutis; corollis albis, tubo proprio gracili dense glanduloso-atomifero quam fauces cylindrici subglabri breviori, limbi dentibus deltoideis brevibus; achaeniis gracillimis prismaticis 5-angulatis basi gradatim attenuatis subrectis, angulis glanduloso-hispidulis. — Prod. v. 105 (1836); Phil. Cat. Pl. Vasc. Chil. 174 (1881). — PERU: in montibus Andinis, *Haenke*,

1834 (hb. DC.); Obrajillo, *Wilkes* (hb. Gray, hb. U. S. Nat. Mus.); in rupibus inter Matucana et Tambo, alt. 2370–2650 m., *Weberbauer*, n. 115 (hb. Berol.). CHILI: *Haenke* sec. DC. sed dubitative.

NOTA. — Habitatio originalis a DC. data "montanis Oronocensibus" possit forsitan errore pro *montanis Huanocensibus*.

13. *P. DENSIFLORA* Benth., fruticosa vel paene herbacea glabriuscula; ramis plus minusve flexuosis gracilibus teretibus, internodiis quam folia saepius longioribus; foliis oppositis membranaceis ovatis vel rhomboideis graciliter petiolatis acuminatis serratis 3-nerviis 5–6 cm. longis, petiolo ca. 1 cm. longo; foliis superioribus lanceolati-oblongis integris; panicula pyramidali oppositiramea, ramis patentissimis basi nudis prope apicem capituliferis puberulis; capitulis congestis 4–5-floris cylindricis; involucri squamis oblongo-linearibus 2.5 mm. longis glabriusculis apice subobtusis eroso-ciliatis; corollis valde exsertis 2.5 mm. longis, tubo gracili glanduloso-puberulo, faucibus campanulato-ampliatis glabris vel obsolete granulatis, dentibus limbi 5 anguste oblongis revolutis acutis; achaeniis glaberrimis 1.6 mm. longis nigris lucidis summo disco annulari coronatis. — Bot. Sulph. 110 (1845); Jameson, Syn. Pl. Aequat. ii. 75 (1865). — ECUADOR: Insula Puna prope Guayaquil, 1841, *Hinds*, n. 401 (hb. Kew.); in terra pingui agrorum fruticiferorum Insulae Punae 1–2 m. alta floribus albis, Sept. 1838, *Barclay*, nn. 412, 2426 (hb. Brit. Mus.); reg. trop., *Sodi*, n. 3/4 (hb. Berol.). Specimen dubium ex herb. Thibaudii verosimiliter a Nééo lectum sed sine ullo indicio loci in hb. DC. invenitur.

NOTA. — Cl. Benthanius asseveravit in descriptione principali hujus speciei "antherae apice appendiculatae," sed dissectio a cl. Brittenio in herbario Musei Britannici benevolente permissa et ab auctore maxima cum cura facta flosculorum e specimine Barclayano antheras sine ulla dubitatione inappendiculatas exhibuit.

14. *P. peruviana* (Gmel.), n. comb., fruticosa 2–4 m. alta oppositiramea subglabra; foliis oppositis tenuibus rhomboideo-lanceolatis attenuatis inferioribus grosse arguteque serratis basi cuneatis 3-nerviis supra viridibus glaberrimis subtus vix pallidioribus in nerviis puberulis 6–10 cm. longis, petiolo 1.5 cm. longo, foliis superioribus multo minoribus vix serratis vel etiam integerrimis; panicula ramosissima pyramidali, ramis ascendentibus foliosis; capitulis parvis sessilibus basi unibracteolatis; bracteolis margine pubescentibus; involucri squamis 4 aequalibus anguste oblongis obtusis ciliatis basi calloso-incrassatis; flosculis saepius 4. — *Flaveria peruviana* [Juss.] Gmel. Syst. ii. 1269 (1791). *F. sp. Peruviana a Dombeyo data* Juss. Gen. 187 (1789). *F. spicata* J. E. Sm. in Rees, Cycl. xiv. n. 2 (1810). *Piqueria artemisioides* HBK. Nov.

Gen. et Spec. iv. 153 (1820); DC. Prod. v. 105 (1836); Loud. Hort. Brit. 337 (1830) ubi errore dicitur originem mexicanam habere. — PERU: Lima, *Dombey* (hb. Par., hb. Berol.); Lima et Peruvia septentrionali, *Cuming*, n. 1037 (hb. Kew.); *Mathews*, n. 413 (hb. Gray); *Besser* (hb. Berol.); *Wilkes* (hb. Gray); *Weberbauer*, nn. 8, 8a, 39, et 200 (hb. Berol.). ECUADOR: Alampi, *Humboldt et Bonpland*, n. 3229 (hb. Par.); in montibus Andium prope Alausi, Huataxi, etc., in fruticetis frequens, *Spruce*, n. 5965 (hb. Kew., hb. Par., hb. Vindob., hb. Gray), "floribus albis suaveolentibus."

15. *P. Hartwegi*, n. sp. fruticosa 9–12 dm. alta; ramis flexuosis teretibus juventate puberulis deinde glaberrimis a cortice griseo tectis; foliis oppositis saepius fasciculatis linearibus glabris obsolete crenulato-serratis subtus pallidioribus 4–5.5 cm. longis 4 mm. latis uninerviis et mediocriter reticulato-venulosis; capitulis numerosissimis 4-floris in panicula elongata ramosissima racemose dispositis, lateralibus breviter sed distincte pedicellatis, terminalibus plus minusve glomeratis sessilibus; corollis 1.7 mm. longis albis, tubo proprio puberulo fauces campanulato-ampliatos subaequantis, dentibus recurvis; styli ramis longe exsertis apice mediocriter incrassatis; achaeniis immaturis. — *P. artemisioides* Benth. Pl. Hartw. 136 (1844), non HBK. — PERU: El Catamayo, *Hartweg*, n. 762 (hb. Kew., hb. Par., hb. Vindob., hb. Berol.).

Subg. IV. PHALACRAEA Benth. et Hook. f. Capitula 15–∞ floracorymbosa, involucre campanulato, squamis 7–∞. Corolla externe glanduloso-punctata, glandulis parvis rubescentibus brevissime stipitata, tubo proprio brevi, faucibus campanulatis vel cylindricis quam dentes limbi longioribus. — Gen. ii. 238 (1873); Hoffm. in Engl. et Prantl, Nat. Pflanzenf. iv. Ab. 5, 133 (1895). *Phalacraea* DC. Prod. v. 105 (1838); Deless. Ic. iv. 3, t. 8 (1839); Regel, Gartenfl. iii. 388, t. 107 (1854). — Species andinae herbaceae vel suffruticentes pubescentes. Folia opposita ovata petiolata. Habitus *Agerati*.

Clavis specierum.

- a. Corollae fauces campanulati. b.
 b. Achaenia glabra basi valde obliqua sigmoidea. 16. *P. Sodiroi*.
 b. Achaenia in costis sursum hispidula basi parum obliqua. 17. *P. callitricha*.
- a. Corollae fauces cylindrici. c.
 c. Capitula ca. 18-flora. Involucri squamae ovatae obtusiusculae. 18. *P. latifolia*.
 c. Capitula ca. 100-flora. Involucri squamae lineari-lanceolatae, acuminatissimae. 19. *P. coelestina*.

16. *P. SODIROI* Hieron., herbacea tenuis decumbens basi repens; caule flexuoso oppositirameo omnifariam hirsutulo, internodiis elongatis quam folia multo longioribus; foliis oppositis parvis 1–1.4 cm. longis deltoideo-ovatis crenato-serratis; capitulis paucis graciliter pedicellatis subglobosis ca. 38-floris; corollis externe glandulis rubris sparsissimis munitis, tubo proprio brevissimo basi pilis multicellularibus valde recurvatis vel reflexis hirsuto, faucibus campanulatis; achaeniis glaberrimis obovoideis basi valde obliquis. — Hieron. in Engl. Bot. Jahrb. xxix. 3 (1900). — ECUADOR: Sarsarango, *Seemann* n. 705 (hb. Kew., hb. Gray); in umbrosis humidis juxta Quito, alt. 3000 m., floret Junio et Julio, *Jameson*, n. 205 (hb. Kew.), n. 307 (hb. Kew., hb. Par.) n. 760 (hb. Brit. Mus.); fruticetis superioribus regionis silvestris in declivitatibus occidentalibus Andium circa Mihuir, prov. Cuenca, alt. 2800–3300 m., floret in Oct., *Lehmann*, n. 5187 (hb. Berol.); inter virgulta in regione interandina, *Sodirol*, n. B/1 (hb. Berol.); Chilliquin, *Mathews*, n. 1401 (hb. Kew., hb. Brit. Mus.). PERU: Prov. Chachapoyas (hb. Kew.).

17. *P. callitricha*, n. sp., herbacea decumbens vel procumbens ramosa; caule elongato quadrangulari atropurpureo glabriusculo foliato; ramis ascendentibus; foliis oppositis ovato-deltoideis 3(–5)-nerviis petiolatis acutiusculis sed apice vero obtusis grosse crenato-dentatis 1–4 cm. longis 0.7–3 cm. latis supra atroviridibus pilis albis basi incrassatis scabriusculis subtus vix pallidioribus in nerviis venisque pubescentibus margine pilis conspicue septatis eleganter ciliatis; capitulis laxo cymoso-paniculatis graciliter pedicellatis ca. 15-floris; involucri squamis ca. 13 oblanceolatis acutiusculis carinatis in margine et carina ciliatis; corollis externe glanduloso-puberulis, tubo proprio brevissimo, faucibus campanulatis quam dentes limbi longioribus; achaeniis 5-angulatis obovoideo-prismaticis disco annulari coronatis basi subrectis. — COLOMBIA: in summo monte Quendin, Maio 1846, *Purdie* (hb. Kew., hb. Gray); inter Boquia et Volconcito, *Holton* (hb. Gray).

18. *P. LATIFOLIA* (DC.) Gardn., herbacea perennis; caulibus decumbentibus subsimplicibus vel paucirameis foliatis omnifariam puberulis; foliis oppositis ovatis acutiusculis crenato-serratis trinerviis utrinque viridibus subtus in nerviis pubescentibus; inflorescentia cymoso-corymbosa trichotoma paucicapitata; capitulis ca. 18-floris; involucri campanulati squamis ca. 7 ovatis obtusiusculis 3-nerviis dorso glanduloso-puberulis; corollis externe glanduliferis, faucibus cylindricis tubo proprio multo longioribus, dentibus limbi brevibus patentibus; achaeniis obovoideis 5-angulatis basi attenuatis subrectis summo disco annulari coronatis costis sursum hispidulis. — Gardn. in Hook. Lond. Jour. Bot. vi. 430 (1847); Nicholson, Dict. Gard. iii. 148 (1886) pro

parte. *Phalacraea latifolia* DC. Prod. v. 106 (1836); Deless. Ic. iv. 3, t. 8 (excl. syn. *Ageratum latifolium* Cav.); Regel, Gartenfl. iii. 388. — PERU: prope Lima, *Née* (hb. DC.), *Haenke*; Cuzco, *Gay* (hb. Gray).

Var. *glabra* (DC.), n. comb., caule glabro; foliis paullo majoribus ovatis cordatis ad 7 cm. longis; pedicellis vix apice puberulis. — *Phalacraea latifolia* β *glabra* DC. Prod. v. 106 (1836). — PERU? *Née* (hb. DC.).

19. *P. COELESTINA* (Regel) Hieron., suffruticosa ramosissima 1 m. alta pubescens; foliis oppositis ovatis subcordatis crenato-dentatis; capitulis in cymis saepius 5-capitulatis longe pedunculatis dispositis ca. 100-floris; involucri squamis numerosis lineari-lanceolatis subtriseriatis acutissimis; corollis externe in tubo proprio glanduloso-puberulis, faucibus cylindricis quam dentes limbi longioribus. — Hieron. in Engl. Bot. Jahrb. xxix. 3 (1900). *Phalacraea coelestina* Regel, Gartenfl. iii. 388, t. 107 (1854). *P. latifolia* Nicholson, Dict. Gard. iii. 148 (1886) pro parte. — PERU: casualiter in terra cum speciebus orchidaceis et bromeliaceis a Warscewiczio lectis in horticulturam europaeam introducta. Species inquirenda ut videtur ab herbariis absens.

Species excludendae.

P. ageratoides (HBK.) Gardn. in Hook. Lond. Jour. Bot. vi. 430 (1847) est *Alomia ageratoides* HBK.

P. angustata Gardn. l. c. 432 est *Alomia angustata* Benth.

P. attenuata Gardn. l. c. 430 est *Gymnocoronis spilanthoides* DC.

P. cinerea Gardn. l. c. 422 est *Alomia cinerea* Benth.

P. eupatorioides Gardn. l. c. 431 est *Trichogonia salviaefolia* Gardn. var. β *calva* Baker.

P. Eupatorium Gardn. l. c. 430 est *Clibadium rotundifolium* DC.

P. fastigiata Gardn. l. c. 431 est *Alomia fastigiata* Benth.

P. foliosa Gardn. l. c. 432 est *Alomia foliosa* Benth. et Hook. f.

P. latifolia Gardn. l. c. 430 est *Ageratum conyzoides* L.

P. longipetiolata Sch. Bip. ex. Bak. in Mart. Fl. Bras. vi. pt. 2, 183 (1876) est *Gymnocoronis spilanthoides* DC.

P. myriadenia Sch. Bip. l. c. 192 est *Alomia myriadenia* (Sch. Bip.) Bak.

P. polyphylla Sch. Bip. l. c. 191 est *Alomia polyphylla* (Sch. Bip.) Bak.

P. subcordata Gardn. l. c. 430 est *Gymnocoronis spilanthoides* DC.

II. REVISION OF THE GENUS OPHRYOSPORUS.

Ophryosporus is a natural but not sharply delimitable group of South American *Eupatorieae Piquerinæ*. It differs from *Piqueria* in the presence of a well developed barbellate or shortly plumose pappus of numerous capillary or rarely slightly thickened bristles. From *Eupatorium* it differs in the entire absence of the apical appendage of the anthers and usually may be distinguished furthermore by its subsimple involucre and rather conspicuously enlarged tips of the style branches. The boundary between the two genera has been variously drawn and must be regarded at best as a somewhat artificial line. To the writer it appears that if the genus *Ophryosporus* is to be maintained at all it must be restricted to those species in which the anthers are really destitute of any terminal appendage or trace of such a structure in any perceptible broadening or thickening of the connective at its summit. Close examination shows such rudimentary appendages in several species which recent authors have referred to *Ophryosporus*, plants which furthermore exhibit at least in some instances the more imbricated involucre and less enlarged style tips usual in *Eupatorium*. If these species were kept in *Ophryosporus* there would appear to be no single valid character and no combination of characters by which the two genera could be clearly divided. For this reason it seems best to refer these plants again to *Eupatorium*. *Ophryosporus* may be divided into two sections (scarcely of subgeneric rank) on the nature of the inflorescence and arrangement of the leaves. The typical section is Chilian, while the other and larger section has a wider distribution, occurring in Brazil, Argentina, Chili, Peru, Bolivia, and Ecuador. Most of the species of Brazil and Argentina are, so far as yet known, rather local. Those of the Andes, on the other hand, in some cases have a considerable north and south range. The writer has been able to examine the types or authentic specimens of all the species and varieties of the genus as here treated.

OPHRYOSPORUS Meyen. (Nomen ab ὄφρυς, *supercilium*, et σπορά, *semen*, derivatum, achaeniis in costis saepissime ciliatis.) — Capitula homogama parva numerosa paniculata vel thyrsoida 3-12-flora plus minusve pedicellata; involucri anguste campanulati vel cylindrici, squamis subaequalibus 1-2-seriatim laxe vel vix imbricatis, disco nudo parvo leviter convexo. Corollae albae tubulosae sursum gradatim ampliatæ vel in fauces distinctos dilatatae externe praesertim in tubo proprio et sub apicibus dentium glanduloso-puberulae vel atomiferae; limbi dentibus 5 brevibus triangulares patentibus. Filamenta gracilia glabra.

Antherae oblongae apice rotundatae vel truncatae vel retusae, connectivo angusto apice nullo modo expanso nec appendiculato. Achaenia 5-angulata prismatica vel saepius leviter deorsum angustata 5-costata saepius praesertim in costis hispidula vel glanduloso-ciliolata inter costis saepe glanduloso-puberula vel atomifera. Pappi setae 15-35 albae vel roseae barbellatae vel breviter plumosae quam corolla vix breviores. — Reise um die Erde, i. 402 (1834); DC. Prod. vii. 260 (1838); Walp. in Meyen, Beitr. zur Botan. 256 (1843); Benth. et Hook. f. Gen. ii. 239 (1873); Bak. in Mart. Fl. Bras. vi. pt. 2, 186 (1876) excl. spec. n. 1; Griseb. Abhandl. Gesellsch. Wiss. Goett. xxiv. 173 (1879); Hoffm. in Engl. et Prantl, Nat. Pflanzenf. iv. Ab. 5, 133 (1890); Löfgren, Comissão Geograph. e Geolog. de São Paulo, Boletim, xii. 139 (1897); Hieron. in Engl. Bot. Jahrb. xxii. 705 (1897); Reiche, Fl. de Chil. iii. 258 (1902). *Nothites* DC. Prod. v. 186 (1836) solum quoad spec. n. 5. *Pachychaeta* Sch. Bip. ex Bak. in Mart. Fl. Bras. vi. pt. 2, 186 (1876). — Frutices ramosi, foliis oppositis vel alternis saepius petiolatis rarius sessilibus triangulari-rhomboideis vel ovato-lanceolatis vel rarius linearibus dentatis vel serratis vel crenatis vel rarius integris.

Species 17 Americae australis incolae. Species aliae plurimae ab auctoribus adhuc relatae videntur ob involucri squamis valdius imbricatis et ob antheris plus minusve distincte (quamquam brevissime) apice appendiculatis melius ad *Eupatorium* referendae propterea quod his speciebus in *Ophryosporo* inclusis distinctio inter generibus omnino evanesceret.

Clavis sectionum.

Folia alterna parva, internodiis brevissimis. Panicula thyrsoides.

Sect. I. EUOPHRYOSPORUS.

Folia opposita majora, internodiis bene evolutis. Capitula in paniculis amplioribus vel in cymis axillaribus disposita. . . . Sect. II. OPHRYOCHAETA.

Sect. I. EUOPHRYOSPORUS, sect. nov. Capitula 5-12-flora in thyrsis angusto elongato folioso-bracteato disposita. Folia parva alterna triangulari-rhomboidea vel lanceolato-linearibus saepius fasciculata, internodiis brevissimis.

Clavis specierum.

Capitula ca. 5-flora. Folia lanceolati-oblonga vel linearibus subglabra.

1. *O. paradoxus*.

Capitula 7-12-flora. Folia rhomboidea vel anguste deltoidea tomentella.

2. *O. triangularis*.

1. *O. PARADOXUS* (Hook. et Arn.) Benth. et Hook. f., fruticosus ramosus glabriusculus; ramis teretibus foliosissimis erectis; foliis anguste lanceolati-oblongis vel linearibus utroque acutis 1.5-2.5 cm. longis te-

nibus subsessilibus subglabris viridibus margine hinc inde dentibus argutis solitariis vel paucis instructis; panicula thyrsoides ad 3 dm. longa, ramis ascendentibus foliosis subfastigiatis pluri- vel multi-capitulatis; capitulis numerosissimis 5-floris; involucri squamis oblongis apice rotundatis margine glanduloso-ciliolatis dorso sub-3-nerviis obscure glanduloso-puberulis; corollis 3.2 mm. longis, faucibus subcylindricis glabris, tubo proprio glanduloso-puberulo aequantibus; achaeniis in costis et inter costis glanduloso-puberulis; pappi setis ca. 20 subplumosis. — Gen. Pl. ii. 239 (1873) ex Hook. f. et Jacks. Ind. Kew. ii. 354 (1895). *O. triangularis* Reiche, Fl. de Chil. iii. 259 (1902), not Meyen. *Eupatorium paradoxum* Hook. et Arn. in Hook. Comp. Bot. Mag. i. 240 (1835). *Nothites baccharidea* DC. Prod. v. 187 (1836); Gay, Fl. Chil. iii. 476 (1847). *N. baccharoides* Meigen in Engl. Bot. Jahrb. xvii. 283 (1893). *Stevia polyphylla* DC. l. c. 123. *S. baccharoides* Meigen, l. c. — CHILI: in planitiebus incultis et locis saxosis prope marem vulgaris, Gay, n. 990 (hb. Gray); Valparaiso, Cuming, n. 337 (hb. Kew., hb. Brit. Mus., hb. Gray), Bridges, n. 52 (hb. Kew., hb. Brit. Mus., hb. Gray), Gillies (hb. Gray), Bertero (hb. Gray), Philippi, n. 406 (hb. Kew., hb. Brit. Mus.); Campana di Quillota, Edmonston (hb. Kew., hb. Gray), Bertero, n. 837 (hb. Gray, hb. Brit. Mus.), Germain (hb. Kew.).

2. *O. TRIANGULARIS* Meyen, fruticosus ramosus; ramis rectis vel saepius leviter arcuatis rigidiusculis foliosissimis teretibus tomentellis; foliis parvis saepe fasciculatis rhomboideis ca. 1 cm. longis crenatodentatis vel lobulatis basi cuneatis utrinque tomentellis; thyrsis subcylindricis terminalibus 5–10 cm. longis 2–4 cm. crassis multicapitulatis; capitulis 7–12-floris; involucri squamis 6–10 aequalibus oblongis dorso enerviis tomentellis; corollis externe glanduloso-puberulis; faucibus paullo ampliatis tubo proprio longioribus. — Reise um die Erde, i. 402 (1834); Gay, Fl. Chil. iii. 481 (1847); Benth. et Hook. f. Gen. ii. 239 (1873); Phil. Cat. Pl. Vasc. Chil. 174 (1881). *Eupatorium decipiens* Hook. et Arn. in Hook. Comp. Bot. Mag. i. 240 (1835). *E. foliolosum* DC. Prod. v. 174 (1836). *Kuhnia multiramea* Turcz. Bull. Soc. Nat. Mosc. xxiv. pt. 1, 168 (1851). *E. Volckmanni* Phil. Anal. Univ. Chil. xviii. 51 (1861). *Ophryosporus foliolosus* Reiche, Fl. de Chil. iii. 259 (1902). — CHILI: in planitiebus desiccatis, Coquimbo, Meyen, Gaudichaud, Macrae (hb. Kew., hb. DC.), Harvey (hb. Gray); Vallenar, Reed, n. 47 (hb. Kew.); Concepcion, Bridges, n. 1412 (hb. Kew., hb. Brit. Mus., hb. Gray); Copiapo, Gay (hb. Gray); Cobija, Gaudichaud (hb. Gray); desertis Atacamae, Morong. n. 1149 (hb. Gray).

Nomen vulgatum: *rabo de zorra* (fide Gayii).

Sect. II. OPHRYOCHAETA, sect. nov. Folia opposita, internodiis bene evolutis. Capitula in paniculis amplis vel in cymis axillaribus saepius laxe disposita.

Clavis specierum.

- a. Squamae involucri saltim exteriores dorso puberulae vel pubescentes. b.
 b. Achaenia glabra. Pubescentia involucri brevissima appressa. 3. *O. Charua*.
 b. Achaenia pubescentia vel glandulifera vel saltim in angulis hispidula. Pubescentia involucri squamarum laxior. c.
 c. Inflorescentiae axillares quam folia multo breviores. 4. *O. axilliflorus*.
 c. Inflorescentiae corymboso-paniculatae terminales. d.
 d. Flosculi minimi. Corollae ca. 2 mm. longae. e.
 e. Folia ovata haud attenuata. f.
 f. Inflorescentia laxa, capitulis graciliter pedicellatis. 5. *O. laxiflorus*.
 f. Inflorescentia densa, capitulis subsessilibus. 6. *O. Regnellii*.
 e. Folia ovato-lanceolata vel lanceolata conspicue attenuata. g.
 g. Stigmata nigrescentia. Achaenia 1.8 mm. longa. Species Brasiliae et Argentinae. 7. *O. Freyreysii*.
 g. Stigmata brunnea. Achaenia 1.5 mm. longa. Species andinae et Argentinae. 8. *O. piquerioides*.
 d. Flosculi majores. Corollae 3.3-5.5 mm. longae. h.
 h. Capitula 6-11-flora. Folia 1.6-4 cm. longa. 9. *O. origanoides*.
 h. Capitula 4-5-flora. Folia ca. 7 cm. longa. 10. *O. venosissimus*.
 a. Squamae involucri praeter marginem saepe eroso-ciliatam glabrae. i.
 i. Folia graciliter quamquam saepe breviter petiolata. j.
 j. Capitula saepissime 8-10-flora; involucri squamis ca. 5 mm. longis. 11. *O. macrodon*.
 j. Capitula 4-5-flora; involucri squamis 2-3.6 mm. longis. k.
 k. Involucri squamae lanceolati-oblongae vel ellipticae. l.
 l. Achaenia gracillima 3 mm. longa. Species Argentinae. 12. *O. Lorentzii*.
 l. Achaenia crassiora 2 mm. longa. Species bolivienses. m.
 m. Cymae axillares compositae quam folia breviores. 13. *O. Cumingii*.
 m. Cymae in corymbo convexo terminali aggregatae. 14. *O. Kuntzei*.
 k. Involucri squamae plus minusve obovatae apice rotundatae. n.
 n. Folia ovata subintegra. Species ecuadorensis. 15. *O. Sodiroi*.
 n. Folia lanceolata distincte serrata. Species argentinensis. 16. *O. clavulatus*.
 i. Folia sessilia. 17. *O. Pachychaeta*.

3. *O. CHARUA* (Griseb.) Hieron., fruticosus ramosus puberulus; ramis arcuato-ascendentibus; foliis oppositis petiolatis ovato-lanceolatis tenuibus acutis subgrosse serrato-dentatis margine utrinque cum dentibus 4-5 acutis instructis basi subcuneatis 2-3 cm. longis 1-1.5 cm. latis glabriusculis, petiolo ca. 8 mm. longo minutissime puberulo; cymis compositis ad axillas superiores glomeratis ca. 4-6 cm. diametro

rotundatis multicapitulatis; pedicellis puberulis gracilibus 2-5 mm. longis; capitulis 4-floris; involucri squamis 4 appresse puberulis anguste oblongis obtusis 3 mm. longis; corollis 3 mm. longis externe glanduloso-atomifero a tubo proprio brevi gracili in fauces longiores gradatim ampliatis; styli ramis brunneis longe exsertis apice modice incrassatis; achaeniis fusco-nigris maturitate glaberrimis; pappi setis ca. 30 barbellatis 2.5 mm. longis in specimine exsiccato sordide albis. — Hieron. in Engl. Bot. Jahrb. xxii. 705 (1897). *Mikania Charua*, Griseb. Abhandl. Gesellsch. Wiss. Goett. xxiv. 174 (1879). — ARGENTINA: Prov. de Catamarca, *Schickendantz*, n. 26 (hb. Berol.).

Nomen vulgatum: *charrua*.

4. *O. AXILLIFLORUS* (Griseb.) Hieron., suffruticosus; caulibus flexuosis teretibus striatis pilosiusculis; foliis oppositis membranaceis ovato-lanceolatis 3-nerviis argute serratis basi cuneatis apice acuminatis pilosiusculis; cymis axillaribus quam folia multo brevioribus; capitulis 5-floris; involucri squamis oblongis 3.5 mm. longis apice rotundatis dorso molliter pubescentibus margine ciliatis; corollis (immaturis) 4 mm. longis externe in tubo proprio glanduloso-puberulis in fauces leviter ampliatis, dentibus limbi 5 deltoideis; achaeniis 2 mm. longis in costis 5 sursum hispidulis disco crassiusculo depresso-hemisphaerico coronatis; pappi setis ca. 20 sursum barbellatis. — Hieron. in Engl. Bot. Jahrb. xxii. 706 (1897). *Eupatorium axilliflorum* Griseb. Abhandl. Gesellsch. Wiss. Goett. xix. 121 (1874). — ARGENTINA: Cordoba, prope Ascochinga, *Lorentz*.

5. *O. LAXIFLORUS* Bak., fruticosus ramosus erectus ad 1 m. altus; caule tereti glabrato a cortice brunneo tecto; ramulis dense fulvescenti-pubescentibus, pilis crispis; foliis oppositis ovatis breviter petiolatis grosse crenato-serratis a basi subintegra 3-nerviis obtusiusculis supra viridibus scabriusculis subtus paullo pallidioribus modice pubescentibus ca. 5 cm. longis ca. 2.7 cm. latis; inflorescentia laxa paniculata ampla; bracteis ellipticis vel linearibus, ramulis pedicellisque filiformibus, his ca. 4 mm. longis saepe arcuatis vel flexuosis; capitulis ca. 5-floris, squamis involucri 4-5 obovato-oblongis vel angustioribus 2.5 mm. longis apice rotundatis eroso-ciliatis dorso pubescentibus; corollis ca. 2.3 mm. longis, tubo proprio gracile subglabro; faucibus turbinato-campanulatis externe granulatis; achaeniis obovoideis 5-costatis in costis sparse hirsutis; pappi setis ca. 16 achaenio distincte longioribus firmissimis barbellato-plumosis. — BRASILIA: in campis, Prov. Minas Geraes prope Caldas, *Regnell*, n. III. 709 (herb. Berol.).

6. *O. REGNELLII* (Sch. Bip.) Bak., fruticosus erectus ramosus tomen-

toso-pubescentis 1-1.3 m. altus; ramis oppositis ascendentibus rectis vel leviter arcuatis foliatis, internodiis quam folia longioribus; foliis oppositis modice firmis ovatis obtusiusculis crenato-serratis 3-nerviis basi cuneatis supra scabriusculis subtus pallidioribus praecipue in nerviis molliter tomentosus 4-5 cm. longis 2-2.5 cm. latis, serraturis utrinque ca. 7; panicula ampla 3 dm. vel ultra longa folioso-bracteata, ramis cymiferis oppositis divergentibus tomentosus, cymis rotundatis; capitulis brevissime pedicellatis 5-floris; involucri squamis 4-6 oblongis 2.5 mm. longis erosociliatis nervoso-striatis dorso tomentosus apice rotundatis; corollis ca. 2.5 mm. longis, tubo proprio gracili puberulo, faucibus gradatim ampliatis tubum longitudine vix aequantibus subglabris, dentibus limbi 5 ovato-deltaideis patentibus; achaeniis 5-angulatis praecipue in costis valde hirsutis; pappi setis ca. 20 plumoso-barbatis. — Bak. in Mart. Fl. Bras. vi. pt. 2, 188, t. 53 (1876). *Eupatorium Regnellii* Sch. Bip. Linnaea, xxii. 572 (1849), xxx. 182 (1859), nomen solum. — BRASILIA: in planitiebus Prov. Minas Geraes prope Caldas, *Regnell*, n. 1. 237 (hb. Berol.); prope Villam Francam, *Riedel*, n. 1018 (hb. Gray).

7. O. FREYREYSII (Dallm.) Bak., fruticosus oppositirameus; caulibus teretibus juventate tomentosus maturitate glabriusculis; ramis patentibus foliatis; foliis oppositis ovato-lanceolatis vel saepius lanceolatis attenuatis basi breviter cuneatis 3-nerviis leviter sed distincte serratis cum dentibus utrinque ca. 8 instructis supra scabriusculis vel glabriusculis subtus vix pallidioribus pubescentibus 5-8.5 cm. longis 1.5-3.5 cm. latis, petiolo supra sulcato tomentello 3-7 mm. longo; capitulis ca. 5 mm. longis saepissime 5-floris; involucri squamis obovatis apice rotundatis dorso tomentosus 3 mm. longis; corollis 2.4 mm. longis externe glanduloso-puberulis, faucibus gradatim ampliatis turbinato-campanulatis tubum proprium gracilem fere aequantibus, dentibus limbi 5 brevibus patentibus; styli ramis bene exsertis nigrescentibus apice incrassatis rotundatis; achaeniis nigris 1.8 mm. longis sursum praesertim in costis hirsutulis. — Bak. in Mart. Fl. Bras. vi. pt. 2, 188 (1876), as *Freyreissii*. *Eupatorium Freyreysii* Dallm. in Thunb. Decad. Nov. Pl. Bras. n. 19, et Flora, 1821, i. 332; DC. Prod. v. 183 (1836). *E. Freyresii* DC. Prod. v. 169 (1836) in syn. *E. Freyreissii* Bak. in Mart. Fl. Bras. vi. pt. 2, 188 (1876) in syn. *E. Freyreysi* Hook. f. & Jacks. Ind. Kew. i. 917 (1893). *E. Riedelianum* Gardn. in Hook. Lond. Jour. Bot. v. 478 (1846). *Mikania clavellata* DC. Prod. v. 192 (1836). — BRASILIA: Prov. Minas Geraes, *Freyreiss* (hb. Thunb.) fide Bakeri; in silvis Serro Frio, *Gardner*, n. 4851 (hb. Kew.); prope Marianna, *Vauthier*, n. 287 (hb. Kew., hb. Gray), *Gardner*, n. 4852 (hb. Kew., hb. DC.), sub hoc numero etiam *Symphypappus polystachyus* (DC.) Bak. fide Bak. l. c. 368; prope Rio Janeiro et Ouro Preto,

Glaziou, n. 15,158 (hb. Kew.); *Riedel* (hb. Kew.); *Schuch*, n. 138 (hb. Vindob.).

8. *O. PIQUERIOIDES* (DC.) Benth., fruticosus erectus vel subscandens oppositirameus foliis et floribus precedenti simillimus; ramis juventate fulvescenti-tomentellis maturitate glabratis striatulis; foliis lanceolatis 3-nerviis serratis vel integerrimis breviter petiolatis 4–9 cm. longis, 1.2–3.3 cm. latis supra scabriusculis subtus in nerviis tomentosus vel pubescentibus; paniculis patente ramosissimis; capitulis numerosissimis 5–7-floris; involucri squamis oblongis vel elliptici-obovatis apice rotundatis erosis dorso laxe pubescentibus; corollis lutescenti-vel viridescenti-albis; styli ramis apice brevissime et modice incrassatis brunneis; achaeniis nigris 5-angulatis ca. 1.5 mm. longis pubescentibus. — Benth. ex Bak. in Mart. Fl. Bras. vi. pt. 2, 188 (1876). *Eupatorium piquerioides* DC. Prod. v. 175 (1836). *E. Tweedianum* Griseb. Abhandl. Gesellsch. Wiss. Goett. xxiv. 170 (1879), partim, non Hook. et Arn. *Mikania Mandonii* Sch. Bip. Linnaea, xxxiv. 536 (1865–6). *M. Mandoni* Bak. l. c. *Ophryosporus saltensis* Hieron. in Engl. Bot. Jahrb. xxii. 705 (1897). — PERUVIA: in montibus Guanoccensibus, *Haenke* (hb. DC.); Panahuanca, *Mathews*, n. 1122 (hb. Kew.); inter Palcam et Huacapistanam, Prov. Tarma, alt. 1700–2400 m., *Weberbauer*, n. 1776 (hb. Berol.). BOLIVIA: Yungas, *d'Orbigny*, n. 421 (hb. Vindob., hb. Gray); prope Soratam, Prov. Larecaja, regione temperata, alt. 2550 m., ad rivum in nemoribus, *Mandon*, n. 268 (hb. Kew., hb. Brit. Mus., hb. Gray); *Mandon*, n. 255 (hb. Kew., hb. Brit. Mus.); Calapampa, *Bang*, n. 2342 (hb. Gray), distrib. sub nomine “*Willoughbya* sp. n.” CHILI: Santa Cruz, Aug. 1865, *Pearce*, (hb. Kew., hb. Brit. Mus.). ARGENTINA: Salta prope Yacone, *Lorentz et Hieronymus*, n. 536 (hb. Berol.).

NOTA. — *O. saltensis* Hieron. l. c. est forma ut videtur vix distincta foliis firmiusculis saepe conduplicatis verosimiliter e loco aridiori.

9. *O. ORIGANOIDES* (Meyen et Walp.) Hieron., suffruticosus oppositirameus; caulibus teretibus striatulis; foliis oppositis ovatis vel elliptico-lanceolatis acutis vel acuminatis haud longe attenuatis 1.5–3 cm. longis 8–10 mm. latis 3-nerviis petiolo 4–6 mm. longo gracili et nerviis tomentellis margine utrinque cum dentibus saepissime 4–7 instructis; involucri squamis uniseriatis 8–10 lanceolati-oblongis acutiusculis saltem juventate dorso pubescentibus; capitulis in corymbo composito dispositis 9–11-floris; corollis 5.5 mm. longis; achaeniis nigrescentibus 3.5 mm. longis. — Hieron. in Engl. Bot. Jahrb. xxii. 707 (1897), excl. pl. *Rusbyi* et syn. *Eupatorium eleutherantherum*. *E. origanoides* Meyen et Walp. Nov. Act. Acad. Caes.-Leopold. xix. Suppl. I. 257 (1843);

Waip. Rep. vi. 113 (1846); non HBK. — PERUVIA: in planitie circa Tacoram, alt. 4300–5200 m., *Meyen* (hb. Berol.).

NOTA. — *Eupatorium eleutherantherum* Rusby, Mem. Torr. Bot. Club, iii. pt. 3, 53 (1893), huc a cl. Hieronymo relatum exhibet antheras plus minusve appendiculatas saltem connectivo apice expanso, etiam folia longiora magis apice attenuata cum dentibus numerosioribus (7–11) utrinque instructa. Quapropter planta Rusbyi videtur verosimiliter distincta et melius ad *Eupatorium* referenda.

Var. (?) MICROCEPHALUS Hieron., habitu formae typicae similis; foliis magis attenuatis; capitulis minoribus 6–7-floris, squamis involucri obovalibus apice rotundatis ciliatis dorso laxe pubescentibus; corollis 4 mm. longis; achaeniis (immaturis) 2–2.5 mm. longis. — Hieron. in Engl. Bot. Jahrb. xxii. 708 (1897). — BOLIVIA: prope Cochabambam, ca. 4000 m. alt., *Kuntze* (hb. Berol.).

10. O. VENOSISSIMUS (Rusby) Robinson, fruticosus oppositirameus; ramis subangulatis ascendentibus foliatis; foliis oppositis lanceolatis ca. 7 cm. longis ca. 2 cm. latis serratis 3-nerviis attenuatis basi cuneatis utrinque viridibus sparse pubescentibus; corymbis rotundatis folioso-bracteatis; capitulis numerosis brevissime pedicellatis vel subsessilibus; involucri pallide viridis subcylindrici squamis anguste oblongis acutiusculis dorso rotundatis sparse laxaque pilosis ca. 3 mm. longis; flosculis 4–5; corollis albis vel ochroleucis 3–4 mm. longis, tubo proprio glanduloso-puberulo quam fauces glabri cylindrici breviori; achaeniis valde immaturis pubescentibus; pappi setis ca. 28 barbellatis tenuibus albis. — Proc. Am. Acad. xli. 271 (1905). *Eupatorium venosissimum*, Rusby, Mem. Torr. Bot. Club, vi. 57 (1896). — BOLIVIA: prope Cochabambam, *Bang*, n. 1113 (hb. Gray).

11. O. MACRODON Griseb., frutescens in parte superiori oppositirameus; ramis subteretibus dense fulvo-puberulis; foliis oppositis ovatis magnis grosse et duplice dentato-serratis acutis basi subrotundatis vel cuneatis membranaceis 3–5-nerviis ad 14 cm. longis ad 7 cm. latis supra scabris subtus pallidioribus pubescentibus, petiolo ca. 1.3 cm. longo; inflorescentiis terminalibus corymbosis convexis subcongestis; capitulis saepissime 8–10-floris pro genere maximis; flosculis (styli ramis elongatis exclusis) ca. 7 mm. longis; corollis ca. 5 mm. longis, tubo proprio puberulo quam fauces cylindrici glabri multo breviori. — Abhandl. Gesellsch. Wiss. Goett. xxiv. 173 (1879). — ARGENTINA: Nevado del Castillo, Prov. de Salta, *Lorentz et Hieronymus*, n. 156 (hb. Berol.).

12. O. LORENTZII Hieron., fruticosus oppositirameus 1.5–2 m. altus; ramis teretibus flexuosis ascendenti-patentibus striatulis; foliis oppositis ovato-lanceolatis attenuati-acuminatis argute serratis ca. 5–10 cm. longis 2–4 cm. latis membranaceis 3-nerviis petiolatis juventate utrinque sparse pubescentibus deinde glabratis; corymbis numerosis

lateralibus in axillis superioribus et terminalibus rotundatis quam folia brevioribus ; capitulis 4-floris ; involucri squamis 4 aequalibus linearibus acutiusculis 4 mm. longis ; corollis 3.3 mm. longis fere a basi gradatim ampliatis in parte inferiori glanduloso-puberulis, dentibus limbi brevissimis erectis deltoideis ; achaeniis in parte inferiori glabris in parte superiori sparse hispidulis ; pappi setis ca. 23 albidis subplumosis 3 mm. longis. — Hieron. in Engl. Bot. Jahrb. xxii. 706 (1897). *Eupatorium laeve* Griseb. Abhandl. Gesellsch. Wiss. Goett. xxiv. 172 (1879), partim f. Hieron. l. c. — ARGENTINA : Cueste inter Yacone et Los Potreros, *Lorentz et Hieronymus*, nn. 333, 340 (hb. Berol.).

13. *O. CUMINGII* (Sch. Bip.) Benth., fruticosus glabriusculus ; ramis flexuosis elongatis subteretibus laevibus striatulis medullosis, internodiis 5–12 cm. longis, ramulis gracillimis puberulis ; foliis oppositis tenuibus lanceolatis longissime attenuatis acutissimis 3-nerviis argute serratis 3–10 cm. longis 7–20 mm. latis sparse in nerviis venulisque puberulis vel supra glaberrimis, petiolo 4–12 mm. longo gracili ; cymis axillaribus quam folia subtendentia multo brevioribus in parti superiori caulium et ramorum aggregatis et paniculam foliosam formantibus, pedicellis filiformibus 1–3 mm. longis ; capitulis 4-floris ca. 6 mm. altis ; involucri squamis oblongis tenuibus stramineo-viridibus ciliolatis 3–4 mm. longis apice rotundatis dorso 2–3-nerviis ; corollis albis 3.3 mm. longis, tubo proprio gracili externe glanduloso-puberulo fauces cylindrico-campanulatos sparsissime glanduliferos subaequanti, dentibus limbi 5 ovato-deltoideis plus minusve patentibus ; achaeniis 5-angulatis 1.6 mm. longis prismaticis modice deorsum angustatis in costis sursum hispidis inter costis glaberrimis summa parte cupulo brevissimo coronatis ; pappi setis capillaribus barbellatis. — Benth. ex Bak. in Mart. Fl. Bras. vi. pt. 2, 188 (1876) ; Hieron. in Engl. Bot. Jahrb. xxii. 705 (1897). *Mikania Cumingii* Sch. Bip. Bull. Soc. Bot. Fr. xii. 82 (1865) et Linnaea, xxxiv. 535 (1865–6), nomen nudum. — BOLIVIA : in nemoribus regionis temperatae 2700–2900 m. alt., inter Ladrilloni et Condurpata, Prov. Larecaja, *Mandon*, n. 264 (hb. Kew., hb. Gray) ; *Bridges*, 1847 (hb. Brit. Mus.) ; *Cuming*, n. 102 (f. Sch. Bip.).

14. *O. KUNTZEI* Hieron., fruticosus oppositirameus ; ramis gracilibus patenti-ascendentibus juventate puberulis deinde glabratis usque ad inflorescentias terminales corymbosas foliatis ; foliis oppositis lanceolatis vel ovato-lanceolatis acuminato-attenuatis serratis 3–7 cm. longis 1–2 cm. latis 3–5-nerviis utrinque sparse pubescentibus ; corymbis multicapitulatis valde convexis, pedicellis ca. 1 mm. longis ; capitulis 4-floris ; squamis involucri 4 subaequalibus 2.6–3.3 mm. longis fere a basi gradatim expansis in parte inferiori glanduloso-puberulis ; achaeniis nigris 5-angulatis cum vel absque angulis secundariis obscuris

2 mm. longis deorsum valde angustatis apice ab annulo albido coronatis; setis pappi ca. 25 sordido-albis. — Hieron. in Engl. Bot. Jahrb. xxii. 707 (1897). — BOLIVIA: Tunari australi, ca. 3000 m. alt., Apr. — Maio, 1892, *Kuntze* (hb. Berol.).

15. *O. SODIROI* Hieron., fruticosus verosimiliter scandens; ramis oppositis elongatis flexuosis puberulis, internodiis folia longitudine valde superantibus; foliis ovatis acutis petiolatis integris vel pauciserratis 3-4 cm. longis 1.7-2 cm. latis 3-nerviis tenuibus pellucide reticulato-venosis; capitulis sublaxe paniculatis 5-7-floris; pedicellis patentibus 2-3 mm. longis; involucri squamis 5-7 obovatis vel late spatulatis brunneis ciliatis apice rotundatis erosis dorso glabris ca. 2.8 mm. longis; corollis gradatim et modice apicem versus ampliatis ubique glanduloso-puberulis vel atomiferis; achaeniis (valde immaturis) brevissimis in angulis scabratis; pappi setis ca. 28 albidis inaequalibus barbellatis. — Hieron. in Engl. Bot. Jahrb. xxix. 3 (1900). — ECUADOR: in silvis subtropicis prope La Chima, *Sodiro*, n. 6/18 (hb. Berol.); Campamento Utañag in valle fluminis Chambo, alt. 3045 m., *Strübel*, n. 275 (hb. Berol.).

16. *O. CLAVULATUS* Griseb., fruticosus 2 m. altus superne puberulus laxe ramosus; ramis teretibus foliatis oppositis; foliis anguste ovato-lanceolatis longe acuminato-attenuatis 3-nerviis tenuibus serratis supra obscure puberulis subtus in nerviis pubescentibus 4-6 cm. longis 1.3-2.5 cm. latis; petiolis 6-11 mm. longis flexuosis planiusculis; paniculis ovalibus multicapitulatis, capitulis 4-5-floris; involucri squamis obovati-oblongis 2 mm. longis ciliolatis dorso glabris brunneis; corollis 2 mm. longis, tubo proprio gracili puberulo sursum in fauces subaequilongos gradatim expanso; achaeniis nigris 1.6 mm. longis 5-angulatis in angulis sursum hispidulis; pappi setis ca. 20 albidis subplumoso-barbatis. — Abhandl. Gesellsch. Wiss. Goett. xxiv. 173 (1879); Hieron. in Engl. Bot. Jahrb. xxii. 705 (1897). *Eupatorium clavulatum* Griseb. l. c. xix. 120 (1874). — ARGENTINA: Cuesta de Periquilla, *Lorentz*, n. 409; *Lorentz et Hieronymus*, n. 178 (hb. Berol.).

17. *O. PACHYCHAETA* Bak., suffruticosus erectus ramosus puberulus; ramulis angulatis viridibus foliatis flexuosis; foliis oppositis sessilibus lanceolatis firmissimis 3-nerviis utrinque viridibus punctatis subglabris 2-3 cm. longis 4-7 mm. latis utrinque 1-3-angulato-dentatis acutis; corymbis terminalibus pyramidatis alternirameis 4-5 cm. diametro, bracteis subulatis brevissimis, ramis puberulis apicem versus 3-7-capituliferis; capitulis saepissime 4-floris; involucri squamis 3-5 oblongis vel anguste obovatis vel ellipticis acutiusculis 2.5 mm. longis; corollis glabriusculis 2.5 mm. longis, tubo proprio gracillimo fauces campanulatos subaequantibus; achaeniis 1.2 mm. longis basin versus

attenuatis 5-angulatis fere glabris ; pappi setis aequalibus crassiusculis haud barbatis salmoneis vel roseis attenuatis subpatentibus. — Bak. in Mart. Fl. Bras. vi. pt. 2, 187 (1876). *Pachychaeta eupatorioides* Sch. Bip. mss. fide Bak. l. c. — BRASILIA : in planitiebus Prov. Minas Geraes, Lund ; Claussen (hb. Kew.) ; Riedel, n. 421 ; Rio Janeiro, Glaziou, n. 14,018 (hb. Kew., hb. Berol.), n. 14,019 (hb. Kew.).

Species reducendae vel excludendae.

O. Burchellii Bak. in Mart. Fl. Bras. vi. pt. 2, 187 (1876) est forma *Eupatorii tetranthii* Sch. Bip. quod videtur solum forma oppositifolia *E. dentati* Gardn.

O. Chilca (HBK.) Hieron. in Engl. Bot. Jahrb. xxii. 706 (1897) ob antheris distincte appendiculatis certe ex *Ophryosporo* excludendus est *E. Chilca* HBK.

O. Mandonii (Sch. Bip.) Benth. et Hook. f. ex Hook. f. et Jacks. Ind. Kew. ii. 354 (1895) est *O. piqueroides* (DC.) Benth.

O. ovatifolius (DC.) Benth. et Hook. f. ex Hemsl. Biol. Cent.-Am. Bot. ii. 79 (1881), ob antheris obscure appendiculatis et ob affinitate indubia cum aliis speciebus *Eupatorii* melius nunc ad hoc genus referendus, est vere ab *E. polybotryo* DC. Prod. v. 174 (1836) nullo modo distinctus.

O. solidaginoides (HBK.) Hieron. in Engl. Bot. Jahrb. xxix. 4 (1900) est eisdem rationibus *E. solidaginoides* HBK.

O. solidaginoides, var. *Bonplandianus* (Sch. Bip.) Hieron. l. c. = *Eupatorium solidaginoides*, var. *Bonplandianum* (Sch. Bip.), n. comb.

III. THE GENUS HELOGYNE AND ITS SYNONYMS.

Since its publication by Nuttall in 1841 the genus *Helogyne* has remained an obscure monotype known only from a single fragmentary specimen, collected in Peru and now preserved in the herbarium of the British Museum. The genus has been referred to the *Piquerinae* by all recent authors who have had occasion to classify it, but Bentham and Hooker, who first expressed this view as to its affinities, particularly state that they did not examine the anthers, which alone furnish the crucial character of the subtribe.

While at the herbarium of the British Museum, the author was kindly permitted to remove one of the very few flowers from a head and make a dissection. The anthers were found to be each supplied with a well-developed terminal appendage, showing clearly that the genus belongs not to the *Piquerinae* but to the *Ageratinae*. When transferred to the latter tribe, *Helogyne* is found to occupy the same

place as the later monotypic genus *Brachyandra* Phil., and there can be no doubt that these two plants are congeneric. They are both small-leaved glandular-pubescent xerophytic shrubs, with closely similar achenes and pappus, and both possess the peculiar narrowly tubular corollas with exceedingly short teeth and no expanded throat. The only difference between them which could possibly be regarded as of generic importance is that the involucre in *Helogyne* is about 2-seriate and of subequal bracts, while in *Brachyandra* it is about 3-seriate, the outer bracts being decidedly shorter. In view of the close correspondence in floral structure, achenes, leaf-arrangement, etc., this difference in the involucre, which finds frequent parallels within the limits of several other genera of the *Compositae*, seems by no means sufficient to warrant keeping these two genera separate. The later name proposed by Philippi must of course give way to the earlier one of Nuttall.

Leto Phil. is a third obscure Chilean xerophytic monotype of this affinity. Its generic relationship to *Brachyandra* was shrewdly surmised by Dr. O. Hoffmann (see Engl. & Prantl. Nat. Pflanzen. iv. Ab. 5, 334), notwithstanding a misleading statement in the original description to the effect that the corollas were irregular, which is not the case. More recently Reiche, Fl. de Chil. iii. 263 (1902), has formally transferred the single species to *Brachyandra*. While at Berlin, the writer had an opportunity to examine an authentic specimen of this plant (*Leto tenuifolius* Phil., *Brachyandra tenuifolia* Reiche), and failed to find even specific distinctions between it and the type of *Helogyne apaloidea* preserved at the British Museum. It is true that the specimen of *Leto* at Berlin shows some leaves much more deeply lobed than any on the specimen of *Helogyne* at the British Museum, but the latter consists only of a tip of a flowering branch on which the leaves, 3-toothed at the apex, correspond well with the uppermost leaves in the Berlin plant.

Still a fourth South American xerophytic monotype clearly belongs to the same group, namely, *Addisonia* Rusby, Bull. Torr. Bot. Club, xx. 432, t. 159 (1893). Like the three preceding, it is an erect viscid much-branched shrub with small narrow alternate glandular leaves, few-flowered heads, narrow subcylindric involucre, and disk free from pales. In common with them it has 5-angled achenes, slightly narrowed toward the base, and crowned with numerous purple-tinged barbellate setae. What is still more significant, it shares with them the peculiar very narrowly tubular corollas destitute of any distinct throat and provided with the same very short suberect teeth, of the same yellowish white color and exhibiting the same tendency to external gran-

ular puberulence. Like *Brachyandra*, *Addisonia* has an involucre with 3-4-seriate scales which are strongly imbricated and very unequal in length, but unlike any of the three other monotypes here discussed, *Addisonia* has its involucre scales arranged in four upright rows. This difference, if any, must be regarded as its claim to rank as a separate genus. It is a conspicuous characteristic, and at first sight might seem to be of considerable diagnostic importance. However, a second species, closely related to *Addisonia virgata* Rusby, has been collected in Peru by Weberbauer, and in it the scales are in five not always equidistant erect series, showing that the number of the series is not of generic significance. Furthermore, the tendency of closely imbricated, somewhat carinate involucre scales to assume more or less regularity in upright series is observable elsewhere in the *Compositae* in a way to cast much doubt upon the importance of the character as a sole basis for a generic separation. Thus, in the species of *Bigelovia*, of the *B. graveolens* group, an equally marked tendency of this sort is observable, but shows such inconstancy even in very nearly related forms, that it can scarcely be taken as a character of specific, not to mention generic, significance. In view, then, of the close correspondence of the four South American plants here discussed — a likeness which embraces, as we have seen, not merely habit, leaf-arrangement, etc., but all the more significant characters of flower and fruit — it seems best to unite them under the oldest name, both in order to show their obvious relationship and to avoid the adoption of a standard of generic classification solely on the basis of involucre differences, which would cause great difficulty and artificiality if applied to neighboring genera of the *Compositae*.

Attention may be called to the fact that all four of these plants maintain the chief distinction by which the genus *Brachyandra* has long been separated from the allied genus *Trichogonia*, namely, the very narrowly tubular corolla. The creation in botanical literature of these four successive genera for plants, which now appear to be of one generic type, is readily explained and to a great extent excused by the rarity of the plants concerned and by the natural misapprehensions which have arisen from mistakes in the original descriptions. Thus, the original *Helogyne*, founded on a small tip of a flowering branch, was thought by Nuttall to be probably an annual, and his description was likely to mislead the reader into supposing that the outer involucre was more foliaceous and the style-branches more expanded than is really the case. To this may be added the circumstance that Bentham long ago referred the genus to the *Piquerinae*, with which it has no close affinity. The original description of *Leto* states that the corolla

is irregular, a trait which, if it really were true, would place the genus in the *Mutisieae*. Finally *Addisonia* is described and figured as having corollas with campanulate throats. Under these circumstances, it is by no means remarkable that the real affinity of these plants has not been noticed until authentic specimens of each of them could be studied in relation to the others. The combined genus may be treated as follows :

HELOGYNE Nutt. (Nomen ab ἥλος, *clavis*, et γυνή, *mulier*, ob forma styli ramorum incrassatorum.) — Capitula parvula homogama 6-12-flora terminalia vel subcorymbosa vel spicato-racemosa; involucri subcylindrico vel anguste campanulato, squamis 2-4-seriatis imbricatis, receptaculo parvo nudo planiusculo. Corollae anguste tubulosae vel etiam angustissime fusiformes nullo modo in fauces ullos distinctos ampliatae externe glanduloso-puberulis vel pulverulis, limbi brevissime 5-dentati dentibus suberectis vel leviter patentibus. Antherae lineares inclusae apice obtuse appendiculatae basi integrae. Styli rami valde exserti plus minusve patentibus valde sed gradatim incrassati flavi vel saepius nigrescentes. Achaenia 5-costata prismatica deorsum leviter angustata. Pappi setae subaequales tenues achaeniis subaequilongae vel superantes barbellatae vel subplumosae. — Trans. Am. Phil. Soc. n. s. vii. 449 (1841); Walp. Rep. vi. 107 (1846); Benth. et Hook. f. Gen. ii. 239 (1873); Hoffm. in Engl. et Prantl. Nat. Pflanzenf. iv. Ab. 5, 133 (1890). *Brachyandra* Phil. Fl. Atac. 34, t. 4, f. D (1860); Benth. et Hook. f., l. c. 244 (1873); Hoffm. l. c. 138 (1890); Reiche, Fl. de Chil. iii. 263 (1902). *Leto* Phil. Ann. Mus. Nac. Chil. sec. 2 (botanica), 33, t. 1, f. 3 (1891); Hoffm. l. c. 334 (1893). *Addisonia* Rusby, Bull. Torr. Bot. Club, xx. 432, t. 169 (1893). — Frutices ramosissimi foliosi glanduloso-puberuli. Folia alterna parva integra vel dentata vel lobato-subpinnatifida sessilia.

Species 4 regionis desiccatae Peruviae et Boliviae australis et rei publicae Chilensis borealis incolae.

Sect. I. EUHELOGYNE, sect. nov., involucri squamis subaequalibus ca. 2-seriatim imbricatis. — *Helogyne* Nutt. l. c. *Leto* Phil. l. c. — Species unica.

1. H. APALOIDEA Nutt., ramis arcuato-ascendentibus foliosis, internodiis brevibus; foliis parvis 8-15 mm. longis cuneato-oblongatis integerrimis vel saepius irregulariter pinnatim 2-3-lobatis vel supremis solum apice 2-3-dentatis glanduloso-puberulis amaris; capitulis 8-12-floris paucis erectis corymbosis, pedicellis gracilibus erectis vel arcuato-ascendentibus; involucri squamis subaequalibus anguste ellipticis vel

lanceolatis ca. 6–8 apice obtusiusculis vel rotundatis ca. 6 mm. longis pubescentibus; corollis verosimiliter flavescenti- vel viridiscenti-albis 4.5 mm. longis externe minute granulosis; achaeniis 2.7 mm. longis; pappi setis ca. 20 barbellatis 2 mm. longis. — Trans. Am. Phil. Soc. n. s. vii. 449 (1841). *Leto tenuifolius* Phil. Ann. Mus. Nac. Chil. sec. 2 (botanica), 34, t. 1, f. 3 (1891). *Brachyandra tenuifolia* Reiche, Fl. de Chil. iii. 263 (1902). — PERU: Arequipa, *Curson* (hb. Brit. Mus.). — CHILI: inter Sibayam et Chiapam in provincia Tarapacá, *F. Philippi* (specimen in hb. Berol. a cl. Reicheo missum).

Sect. II. BRACHYANDRA (Phil.), sect. nov., involucri squamis valde inaequalibus spiraliter 3–4-seriatim imbricatis. — *Brachyandra* Phil. Fl. Atac. 34, t. 4, f. D (1860). — Species unica desertorum Atacamae incola.

2. *H. macrogyne* (Phil.), n. comb., fruticosa ramosissima viscoso-tomentella 1 m. alta parte inferiori delapsu foliorum denudata cortice griseo tecta; ramis ascendentibus foliosissimis furcatis prope apicem capituliferis; capitulis 6–7 mm. altis saepe 4-floris breviter pedicellatis; involucri squamis subscariosis tenuibus pubescentibus appressis exterioribus brevissimis ovatis acutis, intermediis gradatim longioribus oblongo-ovatis acutis, intimis lineari-lanceolatis; corollis albis vel ex sicco purpurascens 5 mm. longis ubique externe resinoso-granulosis; antheris linearibus 1.8–2 mm. longis; achaeniis nigricantibus sursum atomiferis 3 mm. longis; pappi setis ca. 25 sordide albidis vel etiam purpurascens breviter plumoso-barbatis 4.5 mm. longis subinaequalibus. — *Brachyandra macrogyne* Phil. Fl. Atac. 34, t. 4, f. D (1860); Reiche, Fl. de Chil. iii. 263 (1902). — CHILI: Prov. Atacama versus Tilopozo, alt. 2300 m., *Philippi*; in desertis Atacamae, *Philippi*, n. 504 (hb. Berol.), Aug. 1864, *Pearce* (hb. Kew.).

Sect. III. ADDISONIA (Rusby), sect. nov., involucri squamis valde inaequalibus in seriebus 4–5 erectis imbricatis. — *Addisonia* Rusby, l. c. — Species 2 quarum una Boliviae australis altera Peruviae australis.

3. *H. virgata* (Rusby), n. comb., fruticosa ramosissima glanduloso-subviscosa ad 1 m. alta basi delapsu foliorum denudata, ramis subfastigiatis foliosissimis saepius supra mediam partem capituliferis; foliis ascendentibus vel appressis ad 11 mm. longis ad 1.3 mm. latis glaberrimis integris glanduloso-punctatis firmissimis linearibus sessilibus subcarinatis 1-nerviis obtusis margine revolutis; capitulis spicato-racemosis breviter pedicellatis 4–5-floris; squamis involucri erecte 4-seriatim imbricatis subherbaceis acutissimis vel obtusiusculis et

argute mucronatis; corollis ocreoleucis 5.5 mm. longis externe basi et prope apicem granuliferis; antheris 2 mm. longis linearibus; achaeniis obtuse 5-angulatis deorsum leviter angustatis ubique sed praesertim in angulis granulosis; pappi setis purpureis ca. 25 paullulo rigidiusculis barbellatis ca. 5 mm. longis. — *Addisonia virgata* Rusby, Bull. Torr. Bot. Club, xx. 432, t. 169 (1893). — BOLIVIA: Songo, Nov. 1890, *Bang*, n. 868 (hb. Gray, hb. Acad. Philad.) sub nomine *Chiquiragua* distributa.

4. *H. Weberbaueri*, n. sp., fruticosa ad 1 m. alta ramosissima in parte inferiori delapsu foliorum denudata cortice griseo tecta, ramis subfastigiatis flexuosis erectis foliosissimis supra mediam partem capituliferis; foliis linearibus crassiusculis 1 cm. longis 2 mm. latis prope marginem hispidulis glanduloso-punctatis; capitulis spicato-racemosis breviter pedicellatis ca. 5-floris; involucri squamis in seriebus 5 erectis imbricatis valde inaequalibus fere omnino brunnescenti-stramineis nec herbaceis carinatis apice attenuatis; corollis exacte tubulosis ocreoleucis apice brevissime 5-dentatis externe solum versus basin granuliferis ca. 7 mm. longis; antheris linearibus 2.5 mm. longis; achaeniis prismatico-obpyramidatis ubique praesertim in angulis granuliferis 3 mm. longis; pappi setis subinaequalibus purpurascensibus rigidiusculis barbellatis ca. 7.5 mm. longis. — PERU: in arenosis subdesertis, Yura, alt. 2400 m., 31 Aug. 1902, *Weberbauer*, n. 1416 (hb. Berol.). Species praecedenti valde affinis differt foliis latioribus margine hispidulis, capitulis majoribus, involuero haud herbaceo, corollis longioribus basi tantum granuliferis.

IV. DIAGNOSES AND SYNONYMY OF EUPATORIEAE AND OF CERTAIN OTHER COMPOSITAE WHICH HAVE BEEN CLASSED WITH THEM.

APODOCEPHALA Bak. Jour. Linn. Soc. xxi. 417 (1885); S. Ell. *ibid.* xxix. 28 (1891); Hoffm. in Engl. & Prantl Nat. Pflanzenf. iv. Ab. 5, 134, 135 (1890), 388 (1894). Through the courtesy of Sir William Thiselton Dyer and Dr. Stapf. of the Royal Gardens at Kew the writer was permitted to make dissections of the flowers of both species of this problematic genus of Madagascar, which has been referred to the *Eupatorieae* by Mr. Baker and to the *Vernonieae* by Dr. Hoffmann. The anthers are clearly sagittate, the leaves alternate, the style-branches rather strongly recurved and acutish, and the involucre of a form and texture far more frequent in the *Vernonieae* than in the *Eupatorieae*. Indeed, all features observed seem to confirm fully the view of Dr. Hoffmann that the genus should be referred to the former tribe.

Alomia dubia, n. sp., herbacea erecta perennis sordide pubescens 4-7 dm. alta; radice lignescenti ramosa; caulibus 1 vel pluribus teretibus striatulis foliosissimis ad inflorescentiam corymbosam simplicissimis; foliis alternis oblanceolatis obtusiusculis crenato-serratis 2-3 cm. longis 4-10 mm. latis basi attenuatis subpetiolatis utrinque dense et sordide pubescentibus supra rugulosis subtus reticulatis; corymbis laxe ramosis 7-15 cm. latis supra modice planis, ramis ascendentibus saepius 3-5-capituliferis, bracteis linearibus 5-15 mm. longis; capitulis ca. 65-floris ca. 1 cm. diametro 8-10 mm. altis; involucri campanulati squamis subbiseriatis lanceolato-linearibus subaequalibus dorso puberulis nervosis apice attenuatis tomentellis; corollis roseis 4 mm. longis, tubo proprio gracili externe glanduloso-hirsutulo basi plus minusve expanso supra in fauces turbinato-campanulatos gradatim ampliatis, limbo purpurascenti-tomentello; achaeniis nigris 5-angulatis glaberrimis basi mediocriter angustatis apice rotundatis ab annulo albido cartilagineo coronatis omnino calvis. — Brazil, presumably from the Prov. Goyaz, *Dr. A. Glaziou*, n. 21579 (hb. Kew.).

Although there can be no doubt that this species is technically an *Alomia* and must be referred to that genus, as the genera of this affinity are now divided, it must be confessed that *Alomia* looks suspiciously like an artificial aggregate of species which may well have had a very different origin. Its species are varied in habit, and approach on the one hand so close to *Ageratum*, and on the other to *Trichogonia*, that it may well be doubted whether they are not, at least in some cases, "*formae epapposae*" of these genera. The present species closely resembles in habit and many of its features *Trichogonia*. It should be noted that forms of at least two species of *Trichogonia* have been found in which part or all the achenes were entirely destitute of pappus. The species here described, however, is clearly distinct from any hitherto characterized species of either genus. *Trichogonia* with its plumose setiform pappus is certainly very distinct from *Ageratum* with a pappus of few distinct or somewhat connate scales, yet the *Alomiae*, which are entirely destitute of pappus or have only an annular rudiment in its place, show such transitions of habit, involucre, pubescence, etc., that they neither carry conviction as a distinct genus, nor are they capable of satisfactory grouping as pappusless forms of the pappus-bearing genera. The genus *Alomia* is as yet very poorly represented in herbaria, and until further material has been collected, it seems impracticable to revise the generic limits of the three genera here concerned.

HARTWRIGHTIA FLORIDANA Gray, Proc. Am. Acad. xxiii. 265 (1888). In characterizing this monotypic genus from Florida, Dr. Gray un-

fortunately described the anthers as exappendiculate. This has led to some misapprehension as to its affinities, and it has been placed in the *Piquerinae* by Hoffmann in Engl. & Prantl, Nat. Pflanzenf. Nachtr. zu iv. Ab. 5, 321 (1897), who seems to have overlooked Professor J. M. Holzinger's notes on the subject, Bull. Torr. Bot. Club, xx, 287, t. 160 (1893). Careful dissection shows that the anthers are each provided with an ovate deeply retuse membranaceous apical appendage. This trait throws the genus into the *Ageratinae*, where it should probably be placed nearest *Alomia*, a conclusion long ago reached by Professor Holzinger.

AGERATUM SCORPIOIDEUM Bak. in Mart. Fl. Bras. vi. pt. 2, 197 (1876). Mr. Baker's description of this species was drawn from Schomburgk's no. 353 in the herbarium of the Royal Gardens at Kew. He states that the plant is an erect doubtfully perennial herb. While at the Royal Botanical Museum of Berlin, the writer had an opportunity to examine an authentic specimen of *Caelestina repens* Sch. Bip., mentioned in Schomb. Fauna et Flora Guy. 1134 (1848), which proves identical with Baker's species. Schultz's name, although earlier, cannot be taken up, as it is accompanied by no description. It was founded on Schomburgk's no. 1188, collected on a moist savanna near the Canuku Mountains, British Guiana. The specimen is more complete than the one at Kew, and shows that the plant has a horizontal, evidently perennial, and slightly lignescent rhizome, which roots at the nodes and sends up erect subsimple stems.

➤ *Stevia simulans*, n. sp., herbacea perennis fere a basi pauciramea erecta; caule et ramis simplicibus teretibus purpureis foliosissimis 3-3.5 dm. altis in summa parte glanduloso-puberulis; foliis linearibus crassiusculis firmissimis 3-5-nerviis glabris 2.8-3.5 cm. longis 2-5 mm. latis utrinque glanduloso-punctatis obtusiusculis ascendentibus; capitulis paucis corymbosis saepius longe rigidiuscule pedicellatis ca. 1.3 cm. altis 13-floris; involucri squamis lanceolati-oblongis 9 mm. longis atropurpureis glanduloso-puberulis vix nervosis; corollis laete purpureis 7-9 mm. longis, tubo proprio externe glanduloso-puberulo modice et gradatim in fauces longiusculos ampliato, dentibus limbi anguste oblongis acutis patentibus vel recurvatis; styli ramis planis; achaeniis 5 mm. longis 10-costatis subteretibus puberulis; pappo duplici e squamis 5 brevibus hyalinis apice rotundatis et aristis 5 atropurpureis 5 mm. longis erectis scabriusculis composito. — On the mesa de la Sandia, Durango, Mexico, alt. 3050 m., 14 Oct., 1905, C. G. Pringle, n. 10,144 (type, in hb. Gray). This species possesses a very close habitat similarity to *S. Pringlei* Wats., but may be readily distinguished by its copious glandular indumentum and especially

by the presence of the aristate pappus, which is quite lacking in *S. Pringlei*.

Fleischmannia arguta, n. comb. *Eupatorium argutum* HBK. Nov. Gen. et Spec. iv. 121 (1820). *E. quinquesetum* Benth. ex Oerst. Vidensk. Meddel. 1852, p. 79. *Fleischmannia rhodostyla* Sch. Bip. Flora, xxxii. 417 (1850). The type of *Eupatorium argutum* HBK. is still extant at the Museum of Natural History in Paris. It is clearly just the plant which has long passed as *Fleischmannia rhodostyla* and its much earlier specific name must accordingly be taken up.

Trichocoronis sessilifolia, n. comb. *Ageratum sessilifolium* Schauer, Linnaea, xix. 715 (1847); Hemsl. Biol. Cent.-Am. Bot. ii. 83 (1881). *Trichocoronis Greggii* Gray, Pl. Wright. i. 89 (1852). The type of Schauer's *Ageratum sessilifolium* is Aschenborn's no. 4, of which there is a well preserved specimen in the Royal Botanical Museum in Berlin. The habitat is given as Mexico, but without more particular locality, and the species has remained obscure. On examination it proves to be identical with the species later described as *Trichocoronis Greggii* by Dr. Gray. Gregg's plant (no. 807 of his last Mexican collection) is said to have come from the region between Mazatlan and the City of Mexico. Fortunately Mr. Pringle has rediscovered the species, and the fuller data of his label give definite information of at least one station, namely, marshes of Atequiza in the state of Jalisco. Priority necessitates the transference of the original specific name.

EUPATORIOPSIS HOFFMANNIANA Hieron. in Engl. Bot. Jahrb. xviii. Beibl. 43, p. 46 (1893). This Brazilian monotype was placed by its author in the subtribe *Piquerinae*. Dissection, however, shows that the anthers have distinct apical appendages quite as well developed as in many of the *Ageratinae*. There can be no doubt that the true affinity of the genus is with *Trichocoronis* Gray, Pl. Fendl. 65 (1849), with which it agrees closely in general habit, in its opposite sessile leaves, its long pedicelled heads, campanulate involucre with subequal subherbaceous bracts, its short purplish corollas with capanulate throat, and in its abortive setiform pappus. In fact, almost its only claim to generic separation is in its broad obovate quasi two-winged achenes, those of *Trichocoronis* being narrow and prismatically 4-5-angled.

Dissothrix imbricata, n. comb. *Stevia imbricata* Gardn. in Hook. Lond. Jour. Bot. v. 458 (1846). *Dissothrix Gardneri* Gray in Hook. Jour. Bot. & Kew Misc. iii. 223 (1851); Bak. in Mart. Fl. Bras. vi. pt. 2, 272 (1876). Dr. Gray's specific name, coined at a time of greater nomenclatorial laxity, must, according to priority, give place to the original name given by Gardner.

Trichogonia rhadinocarpa, n. sp., suffrutescens ramosa; ramis subsimplicibus teretibus striatis viridibus puberulis foliosis; foliis alternis lanceolati-oblongis crenato-serratis ad apicem obtusiusculum angustatis basi rotundatis vel breviter abrupteque cuneatis petiolatis utrinque pubescentibus et glanduloso-atomiferis viridibus subtus vix pallidioribus membranaceis 3-5.5 cm. longis 1.3-2.5 cm. latis, petiolo 8-15 mm. longo subtomentoso; inflorescentia terminali corymbosa ca. 16-capitulata, bracteis filiformibus 3 mm. longis, pedicellis filiformibus plus minusve flexuosis ca. 7 mm. longis; capitulis ca. 18-floris 8-10 mm. altis; involucri turbinato-campanulati squamis linearibus vel anguste oblanceolatis attenuatis ca. 7 mm. longis subuniseriatis dorso leviter nervatis puberulis apice tomentosus purpurascens; corollis angustis, tubo proprio gracili glaberrimo, faucibus brevissimis, limbo purpureo-tomentoso; achaeniis 4 mm. longis nigris 5-angulatis basi longe attenuato-stipitatis angulis obsolete scabratis; pappi setis plumosis sordide albis 4 mm. longis basi brevissime connatis. — *T. podocarpa* Bak. in Mart. Fl. Bras. vi. pt. 2, 216 (1876) pro parte, non Sch. Bip. — Near Tovar, Venezuela, *Fendler*, n. 651 (hb. Gray); Mariara, Venezuela, 800 m. alt., Aug. 1899, *Preuss*, n. 1508 (hb. Berol.); Ocaña, Prov. Ocaña, Colombia, *Schlim*, n. 178 (hb. Kew.). The Fendler specimen was taken to Geneva and carefully compared with the type of *T. podocarpa* Sch. Bip. (*Kuhnia podocarpa* DC.) and it was found to be clearly a distinct species, differing in various ways but most strikingly in its densely tomentose corollas. In the type of *T. podocarpa* the corollas are covered on the outside by large scattered waxy atoms but are otherwise glabrous. From *T. campestris* Gardn., *T. rhadinocarpa* differs in its much broader leaves, longer and more tapering achenes, etc.

EUPATORIUM ALTISSIMUM L. Syst. ed. 12, 537 (1767). By the Index Kewensis, i. 915, this is referred to *E. ageratoides* L. f., but this is clearly a mistake. In the 12th edition of the Systema, p. 537, the description of *E. altissimum* is identical with the description of the same species in the first edition of the Species Plantarum, and it can be construed only as relating to the lanceolate-leaved plant which still very properly bears the name *E. altissimum*.

Eupatorium auriculatum Vahl, Symb. Bot. iii. 95, t. 72 (1794); DC. Prod. v. 174 (1836); Bak. in Mart. Fl. Bras. vi. pt. 2, 340 (1876); not Lam. This species, said by Vahl to come from Brazil, was fully described and clearly figured by him. It has, however, not been rediscovered since its description a century ago and has remained entirely obscure. Suspecting from Vahl's figure that the plant was not really a *Eupatorium* but a *Senecio*, the writer, with the aid of Dr. Greenman, who has a special knowledge of the latter genus, made

some efforts to identify the species among the Brazilian *Senecioneae*. This search proved wholly unsuccessful, and accordingly a wish to examine the type of this problematic plant added no small incentive to a recent visit to Copenhagen, where many of Vahl's plants are preserved. The specimen of the plant in question was easily found and corresponded in all respects to Vahl's description and plate. It proved as anticipated a *Senecio*, but what was even more interesting, a faint but still quite legible label on the back of the sheet disclosed the fact that the specimen had not come from Brazil, but had been collected by Commerson on the Isle of Bourbon in the Indian Ocean. With this important clue, it has been easy to identify it positively with *Senecio penicillatus* (Cass.) Sch. Bip. The synonymy of the species is as follows:—

Eupatorium tomentosum Lam. Dict, ii. 410 (1786).

“ *auriculatum* Vahl, Symb. iii. 95, t. 72 (1794).

Mikania tomentosa Willd. Spec. Pl. iii. 1744 (1804).

Cacalia penicillata Cass. Dict. xlviii. 460 (1827).

Senecio penicillatus Sch. Bip. Flora, xxviii. 499 (1845).

Senecio tomentosus Cordemoy, Fl. de l'Île de la Réunion, 543 (1895), not Michx.

Although the specific names *tomentosus* and *auriculatus* are both earlier than *penicillatus* they have already been employed for other valid species of *Senecio* and are accordingly not available for this plant, which should continue to pass as *S. PENICILLATUS* (Cass.) Sch. Bip.

Vahl seems to have been quite aware of the identity between his *Eupatorium auriculatum* and the earlier *E. tomentosum* of Lam., as he has indicated this upon his label. Although Lamarck's species was also founded on material collected by Commerson on the Isle of Bourbon, he appends to his description the note “on la trouve aussi dans le Brésil,” having probably confused with the plant of the Indian Ocean some habitually similar species of South America. It was doubtless this circumstance which led Vahl to ascribe his *E. auriculatum* to Brazil, notwithstanding the fact that his type-sheet bears a note apparently in his own hand to the effect that the plant came from the Isle of Bourbon.

Eupatorium confertifolium Klatt, Abh. Naturf. Ges. Halle, xv. 324 (1881). This species does not differ essentially from *E. VACCINIIFOLIUM* Benth. Pl. Hartw. 200 (1845).

Eupatorium coperense Hieron. in Engl. Bot. Jahrb. xxi. 330 (1895). This species, examined and photographed at the Royal Botanical Museum at Berlin, appears identical with the earlier *E. ANGUSTIFOLIUM*

(HBK.) Spreng. Syst. iii. 415 (1826), the type of which was examined and photographed at the Museum of Natural History in Paris.

Eupatorium cremastum, n. sp., fruticosum 3-4 m. altum; ramis teretibus glabris fusco-brunneis laevibus; foliis magnis oppositis tenuibus 16 cm. longis 4.5-6.5 cm. latis utrinque viridibus sublucidis ovato-oblongis acuminatis serratis penninerviis supra glabris subtus in nerviis lanulosis basi breviter acuminatis; petiolo 3-3.5 cm. longo; internodiis ca. 3 cm. longis; inflorescentiis laxis lateralibus pendulis 5-8 cm. longis pauci- vel multi-capitulatis; pedicellis 2-2.5 cm. longis capillaribus flexuosis obscurissime puberulis; capitulis 1.3 cm. latis ca. 10-floris; involucro perlaxo, squamis linearibus attenuatis ca. 10 pilosulis viridibus subaequalibus ca. 5 mm. longis 3.5 mm. latis gracillimis nigris curvatis deorsum angustatis etiam apicem versus paululo decrescentibus; corollis 4.5 mm. longis glabris albis, tubo proprio gracili quam fauces anguste cylindrici breviori; pappi setis ca. 18 laete albis corollam subaequantibus. — Crest of the Sierra Madre in Michoacan or Guerrero, Mexico, alt. 2200 m., 17 Feb. 1899, *Langlassé*, n. 893 (hb. Gray, hb. Berol.).

Eupatorium Cursonii, n. sp., ramis atropurpureis teretibus fusco-tomentellis, internodiis brevibus 8 mm. longis; foliis oppositis lineari-oblongis attenuatis supra bullato-reticulatis sparse puberulis subtus reticulato-venosis tomentosus 9 cm. longis 8 mm. latis crassiusculis margine leviter crenulatis valde revolutis, petiolo ca. 1 mm. longo; capitulis 2-3 in summis ramorum axillaribus permagnis ca. 80-floris, involucri squamis subaequalibus lanceolatis, exterioribus subcoriaceis 2 cm. longis 4 mm. latis striatulis dorso granulati-puberulis apice subfiliformi-attenuatis, interioribus angustioribus et tenuioribus; receptaculo paleifero saltem ad marginem, paleis 2 cm. longis ad apicem fere capillaceum attenuatis; corollis anguste tubulosis glaberrimis 1 cm. longis, dentibus 5 brevissimis patentibus atropurpureis; antheris linearibus apice valde appendiculatis basi integerrimis; styli ramis clavatis planiusculis 6 mm. longis atropurpureis; achaeniis linearibus 7 mm. longis 5-angulatis in costis minute scabratis; pappi setis ca. 50 fere 1 cm. longis, plurimis exteriorum brevioribus. — Collected at Arequipa, Peru, by Mr. Curson. The sole specimen of this clearly marked species is in the herbarium of the British Museum of Natural History. It had evidently been in the herbarium of Nuttall, who had recognized its novelty and assigned it a specific name under the genus *Campuloclinium*. Unfortunately Nuttall's manuscript name has already been used in *Eupatorium* and therefore cannot be now taken up. In habit and probably in its affinities *E. Cursonii* approaches *E. Ballii* Oliv., from which, however, it differs decidedly in its subequal involucreal bracts.

Eupatorium gracilicaule Sch. Bip. in herb., fruticosum 3 m. altum oppositirameum; ramis teretibus glaberrimis gracilibus, internodiis ca. 5 cm. longis; foliis ovatis longe acuminatis basi rotundatis vel brevissime acuminatis 3-nerviis leviter serrato-dentatis plus minusve falcatis utrinque glabris subtus haud vel vix pallidioribus minute glanduloso-punctatis ad 8 cm. longis 3-4 cm. latis, venulis subtranslucentibus, petiolo gracili patenti 2-2.5 cm. longo; paniculis magnis 2-3 dm. diametro rotundato-corymbosis oppositirameis folioso-bracteatis multicapitulatis obscurissime puberulis vel granulosis, ramis laxe patentibus, pedicellis gracillimis saepe flexuosis minute bracteolatis; capitulis 6-8 mm. altis ca. 13-floris; involucri squamis laxissime imbricatis linearibus acutissimis dorso sordide puberulis, intimis ca. 3 mm. longis subaequalibus 6-9, exterioribus paucis (2-3) brevioribus angustissimis; achaeniis 5-angulatis gracilibus glabris fuscis deorsum levissime angustatis; corollis glabris 3 mm. longis verosimiliter albidis, tubo proprio gracili in fauces modice ampliatus gradatim expanso, dentibus limbi 5 brevibus patentibus; pappi setis ca. 20 tenuibus albidis aequalibus simplicissimis corollam fere aequantibus. — Tlacolula, Mexico, Dec. 1839, *Ehrenberg*, n. 11,711 (hb. Berol., hb. Gray). This species in habit somewhat suggests *E. stillingiaefolium* DC. and *E. Mendezii* DC., but differs from each of them in being nearly glabrous and in its much less imbricated involucre, etc.

Eupatorium hemipteropodum, n. sp., herbaceum robustum ad 3 m. altum; caule meduloso subtereti valde striato-costato glabrato in sicco stramineo-brunnescenti; foliis oppositis magnis tenuibus ovatis utrinque glabris et viridibus supra levissimis longe petiolatis, inferioribus ovatis subacuminatis 1.8-2.5 dm. longis 12-15 cm. latis argute grosseque dentatis basi acuminatis et breviter in petiolo decurrentibus, petiolo 4-6 cm. longo, foliis supremis deltoideo-ovatis 8-10 cm. longis 5-7 cm. latis subduplice crenato-serratis basi acuminatis, petiolo fere a media parte apicem versus alato; panicula ovoidea thyrsoida oppositiramea ca. 7 cm. diametro aequalta multicapitulata; capitulis ca. 10-floris; involucri squamis stramineis in apice obtuso vel rotundato brunneis pluriseriatim imbricatis, interioribus lineari-oblongis, exterioribus gradatim brevioribus ovatis ciliolatis; corollis anguste tubulosis glabris dentibus limbi brevissimis; pappi setis sordide albis corollam subaequantibus; achaeniis valde immaturis in et etiam inter costis pubentibus. — *E. quadrangulare* Millsp. Field Columb. Mus. Bot. i. 324 (1896), not DC. *E. populifolium* Millsp. l. c., not HBK. *E. aromatisans* Millsp. l. c. iii. 92, with figs. (1904), not DC. — YUCATAN: Izamal (where, acc. to Millspaugh, l. c., in general cultivation), *Gaumer*, n. 552 (hb. Field Mus., hb. Gray); Merida, *Valdez*, n. 92 (hb. Field Mus., hb.

Gray). This perplexing plant has several times been referred to the present writer, who may well be responsible for some of the several names under which it has passed. Renewed study of it shows that it possesses distinctions which appear to separate it from any described species. From *E. quadrangulare* it differs in its essentially terete stem; from *E. populifolium* (a species which should henceforth bear the name *E. morifolium* Mill.), it may be readily distinguished by its essentially membranaceous leaves of different dentation, and by its pubescent achenes, as well as by its half-winged petioles. Its nearest affinity is doubtless, as pointed out by Dr. Millspaugh, with the West Indian *E. aromatisans* DC., yet it cannot be satisfactorily placed in that species, as the leaves are much thinner, the upper ones crenate-dentate, not serrate, and the petioles only partially winged instead of being winged clear to the base, as is the case in *E. aromatisans*.

Eupatorium Holwayanum, n. sp., herbaceum gracile erectum vel decumbens subglabrum 3-5 dm. altum; caulibus teretibus plus minusve purpurascens striatulis obscurissime puberulis foliosis gracilibus haud 2 mm. diametro; foliis ternis vel oppositis vel praecipue in parte superiore caulis alternis ovatis vel rhomboideis acutiusculis pauciserratis 1.5-2 cm. longis 7-10 mm. latis 3-nerviis utrinque glabris viridibus basi cuneatis brevissime petiolatis; panicula laxa ramosa basi plus minusve folioso-bracteata, ramis gracilibus purpureis ascendenti-divergentibus saepius 1-5-capituliferis; capitulis 9 mm. diametro ca. 60-floris; involucri squamis valde inaequalibus lineari-lanceolatis pluriseriatim imbricatis attenuatis acutissimis striatis viridibus vel purpurascens; corollis albis 3.3 mm. longis tubulosis, tubo proprio brevissimo, faucibus anguste tubulosis multo longioribus glabris, dentibus limbi 5 externe puberulis; achaeniis 5-angulatis fuscescentibus 1.7 mm. longis in angulis scabratis; pappi setis ca. 20 albis tenuissimis scabratis. — Dry banks, Sierra de San Felipe, alt. 2150 m., 17 Nov. 1894, *C. G. Pringle*, n. 5683 (hb. Gray), 14 Nov. 1903, *E. D. W. Holway*, n. 5418 (hb. Gray). This plant was at first referred to *E. trinervium* Sch. Bip., to which it has considerable similarity. It may be readily distinguished, however, by its much smaller leaves of an ovate or rhombic form, and by the lack of pubescence regularly found in *E. trinervium*.

EUPATORIUM LEPTOPHYLLUM DC. Prod. v. 176 (1836). This species has long been misunderstood and neglected. It was originally described from material collected about Savannah, Georgia, by Herbemont, and was regarded by Torrey and Gray (Fl. ii. 83) as merely a smoothish variety (their var. *glabrum*, l. c.) of *E. foeniculaceum* Willd. Dr. Chapman and Dr. Small in their floras of the Southern States do not

mention the plant either as a species or variety. The material now available shows that *E. leptophyllum* was well grounded and is readily distinguishable from the related species. Among these, it most nearly approaches *E. capillifolium* (Lam.) Small (*E. foeniculaceum* Willd.), and has similar very fine filiform-linear entire, pinnate, or dissected leaves, but it differs in the long simple recurved-spreading secund-racemose branches of its inflorescence, the heads of *E. capillifolium* being borne in compound somewhat fastigate leafy panicles. In *E. capillifolium*, furthermore, the involucreal scales are green and oblong, rather abruptly pointed and but slightly scarious at the margins, while in *E. leptophyllum* they are inclined to be brown (in dried specimens) and have strongly contrasting white margins. In form they are linear-oblong or lance-linear and tend to be attenuate, often ending in a very sharp point. The simple recurved racemose branches of the inflorescence are 4–10 cm. long, and as DeCandolle remarks in the original description, the inflorescence suggests strongly that of some of the golden-rods. The following specimens of *E. leptophyllum* have been examined:—GEORGIA: near Savannah, *Herbemont* (hb. DC.). SOUTH CAROLINA: damp pine land, Santee Canal, September, *Ravenel* (hb. Gray). FLORIDA: without locality, *Leavenworth*; Braidenton, *Tracy*, n. 7099 (hb. Gray), distributed as *E. capillifolium*. The species shows some variation in its leaves. They are described as entire by DeCandolle, and this is true in the upper parts of the specimens at hand, but the lowermost leaves when shown are pinnately divided into filiform or narrowly linear segments. In a second specimen collected on the Santee Canal by Ravenel (October), the leaves are not only more dissected than in the others, but the segments, although still very narrow, are distinctly flat rather than filiform. The close correspondence of all these specimens, however, in the more essential characters of inflorescence, involucre, flowers, achenes, and pappus, confirm the belief that they are only individual or formal leaf-variations of *E. leptophyllum* DC.

Eupatorium loxense Klatt, Ann. k. k. Naturh. Hofmus. Wien, ix. 357 (1894). This species, founded on a plant collected by Jameson at Loxa, Ecuador, has been examined both as to its type preserved in the herbarium of the Imperial Natural History Museum at Vienna and the specimen in the herbarium of the late Dr. Klatt. It is clearly the staminate plant of a *Baccharis*, and so far as may be judged from the characters of *B. BERBERIFOLIA* HBK. Nov. Gen. et Spec. iv. 57 (1820), may well belong to that species.

Eupatorium menthaefolium Poepp. ex Spreng. Syst. iii. 412 (1826). Although this Cuban species is kept up as a *Eupatorium* by Hooker

and Jackson in the *Index Kewensis* i. 118 (1893), it was long ago transferred to *Vernonia* by Lessing, *Linnaea*, iv. 268, a disposition fully confirmed by a recent examination of the type preserved in the herbarium of the Imperial Natural History Museum at Vienna. Unless some earlier specific name is found, the plant should certainly stand as *VERNONIA MENTHAEFOLIA* Less.

EUPATORIUM MORIFOLIUM Mill. *Gard. Dict.* ed. 8, no. 10 (1768). The type-specimen of this hitherto obscure species was recently examined at the herbarium of the British Museum of Natural History. It was collected at Vera Cruz, Mexico, by Dr. Houston, and proves to be identical with the plant long familiar under the later name of *E. populifolium* HBK. *Nov. Gen. et Spec.* iv. 111 (1820). *E. morifolium* Mill. seems to have been overlooked by Mr. Hemsley, as it is omitted from the *Biologia Centrali-Americana*, but it is as well characterized as most species of its date and must be reinstated for the well-known plant to which the name was clearly applied.

Eupatorium myosotifolium Jacq. *Ic. Pl. Rar.* iii. 15, t. 582 (1786-1793), & *Coll.* ii. 341 (1788). This species was described from cultivated specimens which had been raised from seeds supposed to come from tropical America. The plant is well figured by Jacquin, and it is clear, even from his illustration, that it does not belong to the genus *Eupatorium* nor even to the *Eupatorieae*, for the style-branches are short and decidedly recurved. An examination of an authentic specimen preserved in the herbarium of the Imperial Natural History Museum at Vienna fully confirmed the correctness of the plate and showed that the plant belongs to the baccharoid *Astereae*, probably to the genus *Conyza*.

Eupatorium nubigenoides, n. sp., inflorescentia excepta glaberrimum ; ramis lignescentibus teretibus medulosis ; foliis oppositis longe petiolatis tenuissimis ovati-oblongis vel late lanceolatis penninerviis serratis utrinque glaberrimis viridibus utroque acuminatis ca. 13 cm. longis ca. 5 cm. latis, dentibus parvis incurvis tenuiter cuspidatis, petiolo obcompresso nudo ca. 5 cm. longo ; panicula oppositiramea ramosissima supra rotundata polycephala puberula vel tenuiter tomentella folioso-bracteata ; capitulis pedicellatis ca. 10-floris 6 mm. altis ; involucri campanulato-subcylindrici squamis albescentibus adpressis valde imbricatis ca. 4-seriatis multi-striatulis, exterioribus brevissimis ovatis acutiusculis ciliolatis intermediis ovato-oblongis apice rotundatis glabris gradatim longioribus, intimis similibus sed anguste oblongis obtusis ; corollis albis anguste tubulosis 3 mm. longis glabris sine faucibus ullis distinctis, dentibus limbi deltoideis brevissimis patentibus ; achaeniis 5-angulatis 1 mm. longis fuscis glabris ad basin leviter

attenuatis; pappi subsparsi setis tenuissimis albis. — Pansamalá, Depart. Alta Verapaz, Guatemala, June, 1886, alt. 1150 m., *H. von Tuerckheim*, n. 928 (distrib. by J. D. Smith). This specimen was first sent out as *E. aromatisans* DC. Its identification was then changed at the mistaken suggestion of the writer to *E. nubigenum* Benth. Compared at the Royal Gardens of Kew with Hartweg's n. 587, the type of Bentham's *E. nubigenum*, this plant proved to be distinct. *E. nubigenum* has larger flowers, longer achenes, closely sessile heads, and strongly angled branches.

Eupatorium nutans HBK. Nov. Gen. et Spec. iv. 105 (1820). This name has been regarded as a somewhat doubtful synonym of *Brickellia secunda* Gray. The type, however, when examined at the herbarium of the Museum of Natural History in Paris, proved to be *B. PENDULA* Gray, Pl. Wright. i. 85 (1852). *Bulbostylis pendula* DC. Prod. v. 138 (1836). *Eupatorium pendulum* Schrad. Cat. Sem. Hort. Goett. 1830, acc. to DC. l. c. Although the specific name *nutans* is earlier than *pendulum*, it is no longer applicable in *Brickellia* owing to the existence of the valid homonym *B. nutans* Robinson & Greenman, Am. Jour. Sci. l. 152 (1895).

EUPATORIUM OVALIFLORUM Hook. & Arn. Bot. Beech. 297 (1840). This species was long known to the writer from the original description only, and from the characters there given could not be positively distinguished from the plant, also of western Mexico, later described as *E. Bertholdii* Sch. Bip. in Seem. Bot. Herald. 299 (1856). As others may encounter difficulty in separating these nearly related and habitually similar species, it may be well to record the differences, which were found on a comparison of authentic specimens in the herbarium of the Royal Gardens at Kew. In *E. ovaliflorum* the leaves are permanently tomentulose above as well as below and they are decidedly pale beneath; the involucre are ovoid and 3.8 mm. in thickness. In *E. Bertholdii*, on the other hand, the leaves are somewhat scabrous with scattered hairs above and green beneath; while the involucre are more narrowly ovoid, 2.3 mm. in thickness.

EUPATORIUM PALMERI Gray, Proc. Am. Acad. xxi. 383 (1886). From the typical form of this species, which has its leaves grayish-tomentulose beneath and its involucre scales finely pubescent, the following smoothish caudate-attenuate leaved plant would appear quite distinct were it not for the existence in western Mexico of some intermediate forms, which appear to show that the differences, although conspicuous, are by no means constant.

Var. *tonsum*, n. var., foliis ovato-lanceolatis longissime attenuatis utrinque glabris remote serrulatis vel integris ad 14 cm. longis ad

4.2 cm. latis; capitulis pyramidato-paniculatis ca. 5-floris; involucri squamis viridibus striatis acutissimis vix pubescentibus; antheris apice brevissime appendiculatis. — El Ocote, Michoacan or Guerrero, alt. 300 m., 10 November, 1898, *Langlassé*, n. 616 (hb. Gray, hb. Berol.). Said to be a shrub 1.5 m. high with grayish flowers.

Eupatorium pelotrophum, n. sp., fruticosum 1.5 m. altum; ramis gracilibus teretibus fuscis puberulis; internodiis ca. 5 cm. longis; foliis oppositis petiolatis ovatis longe acuminatis serratis basi rotundata et apice caudato-attenuato integerrimis a basi 3(-5)-nerviis 7-10 cm. longis 2-4 cm. latis firmissculis utrinque viridibus scabriusculis, petiolo fusco-puberulo ca. 1 cm. longo; cymis axillaribus glomeruliformibus oppositis ca. 12-capitulatis 2-3 cm. diametro, pedicellis 1-5 mm. longis teretibus sordido-tomentellis, bracteolis minimis fuscis; involucri subcylindrici-campanulatis saepissime 4-floris, squamis ca. 9 valde inaequalibus appresse imbricatis lanceolato-linearibus obtusis brunneis dorso pilosiusculis, interioribus ca. 3 mm. longis; corollis albis ex involucri longe exsertis ca. 4 mm. longis glabris, tubo proprio gracili in fauces cylindricos subaequilongos leviter ampliatis, dentibus limbi brevissimis suberectis; achaeniis (immaturis) fuscis obscure granulatis quam corollae multo brevioribus; pappi setis albis rectis ca. 20 sursum scabriusculis corollam aequantibus. — In clayey soil on the crest of the Sierra Madre in Michoacan or Guerrero, alt. 2300 m., 16 February, 1899, *Langlassé*, n. 880 (hb. Gray). This species is clearly related to *E. tubiflorum* Benth. and *E. areolare* DC., but may be readily distinguished by its peculiar globular axillary inflorescences and by the fact that the pappus is fully as long as the corolla.

EUPATORIUM PURPUREUM L., var *Bruneri* (Gray), n. comb., foliis oblongo-lanceolatis ternis vel quaternis vel quinis serratis firmissculis subtus plus minusve cinerascens-puberulis vel tomentellis albescente reticulato-venulosis; corymbis planiusculis vel modice convexis. — *E. Bruneri* Gray, *Syn. Fl. i. pt. 2*, 96 (1884); *Coult. Man. Rocky Mt. Reg. 142* (1885). *E. atromontanum* Nelson, *Bot. Gaz. xxxi. 400* (June, 1901). *E. Rydbergi* Britton, *Man. 921* (Oct. 1901). — Dr. Gray's original characterization of *E. Bruneri* was drawn from a very poor specimen and is so misleading that it is by no means surprising that it has never been rightly understood. The leaves are not opposite, as described, but are in whorls of three. In pubescence, venation, tooth-ing, and texture, they correspond accurately with the widely distributed western form of *E. purpureum*, which as stated above has received two subsequent specific names. The form, although fairly well marked in its extreme, appears to pass by easy transitions into the typical form of *E. purpureum* and would therefore seem best treated as a variety.

In range it extends from Iowa to British Columbia and southward in the Rocky Mountains to New Mexico.

Eupatorium rapunculoides, n. comb. *Stevia rapunculoides* DC. Prod. v. 124 (1836). *Eupatorium dasycarpum* Gray, Proc. Am. Acad. xxii. 420 (1887); Robinson, *ibid.* xxxvi. 478 (1901).

EUPATORIUM REMOTIFOLIUM DC. Prod. v. 165 (1836). This species is reduced without comment by Baker in Mart. Fl. Bras. vi. pt. 2, 205 (1876) to *E. Vitalbae* DC., but the two species in question have not the smallest resemblance. It can only be inferred that Mr. Baker was misled through some transposition of labels or similar slip. The plants are by no means similar in habit, leaf texture, inflorescence, or involucre. The marked difference in the size of the heads is quite sufficient to show them distinct species. In *E. Vitalbae* the florets, including the mature achene, are 10–12 mm. long, while in *E. remotifolium* they are, when measured in the same manner, only 4–5 mm. long.

Eupatorium resinosum Poepp. [& Endl.] Nov. Gen. et Spec. iii. 54 (1845), not Torr. From an examination of the type-specimen of this obscure species, which is to be found in the herbarium of the Imperial Natural History Museum at Vienna, it is clear that it is identical with *E. LAEVIGATUM* Lam. Dict. ii. 408 (1786).

EUPATORIUM RUBRICAULE HBK. Nov. Gen. et Spec. iv. 124 (1820). Although excellently described by Kunth, this species appears never to have been recognized. Hemsley (Biol. Cent.-Am. Bot. ii. 100) refers no material to it beyond the original specimen collected by Humboldt & Bonpland, and no more recent collection of it seems to be on record. The type was found, however, to be exactly the plant for some years known as *E. amplifolium* Gray, Proc. Am. Acad. xv. 28 (1880), and well shown by the following exsiccatae: Parry & Palmer's no. 334 from San Luis Potosi, Pringle's no. 4272 from cool cañons near Pazcuaro, Michoacan, Palmer's no. 165 (coll. of 1902) from Alvarez, San Luis Potosi, and L. C. Smith's no. 858 from the mountains of Jayacatlan, alt. 2150 m., Oaxaca. Dr. Gray's later specific name must, of course, drop into synonymy. Why *E. rubricaule* HBK., which is a large-leaved perennial, should have been referred to *E. guadalupense* Spreng. by the Index Kewensis is not clear.

EUPATORIUM SAGITTATUM Gray, Pl. Wright. i. 88 (1852). This species has in general ovate-oblong sagittate or hastate leaves considerably longer than broad. In its wide deltoid leaves the following plant is strikingly different, although maintaining the essential characteristics of the species.

Var. *deltophyllum*, n. var., fruticosum oppositirameum habitu

capitulis involucris squamis formae typicae simile; foliis multo latioribus deltoideis 3-4 cm. longis 2-4.4! cm. latis apice et angulis inferioribus transverse divaricatis acutis. — Near Culiacan, Sinaloa, Mexico, coll. *Schaffner* (type, in hb. Gray).

EUPATORIUM THYRSOIDEUM Moc. ex DC. Prod. v. 150 (1836). Some years ago the writer (Proc. Am. Acad. xxxvi. 484) stated the belief that this plant was identical with *E. quadrangulare* DC. l. c. However, subsequent study of more copious material and a re-examination of the type specimens in the Prodromus Herbarium at Geneva have shown conclusively that the two species are wholly distinct notwithstanding considerable habital resemblance. To *E. thyrsoides*, which may be recognized by its roundish stem, more glomerate-thyrsoid inflorescence, and softer less stramineous involucreal scales, the following specimens may be referred: Dr. Palmer's no. 1048 (coll. of 1890) from Manzanillo, and his no. 1162 (coll. of 1891) from Colima, W. G. Wright's no. 1355 from San Blas, Langlassé's no. 650, collected on granitic soil at Cajinicular, alt. 300 m., in Michoacan or Guerrero, Baker's no. 2302, Volcan El Viejo, Dept. Chinandega, Nicaragua, and Barclay's no. 2719 from Tiger Island, Gulf of Fonseca.

Eupatorium tolimense Hieron. in Engl. Bot. Jahrb. xix. 45 (1894). The writer, after examining the type of this species at the Royal Botanical Museum at Berlin and the type of *E. PELLUCIDUM* HBK. Nov. Gen. et Spec. iv. 108 (1820), which is preserved in the herbarium of the Museum of Natural History at Paris, is unable to find any differences of importance between them.

EUPATORIUM URTICAEFOLIUM Reichard, Syst. iii. 719 (1780). *Ageratum altissimum* L. Spec. Pl. ii. 839 (1753). *Eupatorium altissimum* Murr. Syst. Veg. ed. 13, 614 (1774), not L., nor Murr. l. c. 613. *E. ageratoides* L. f. Suppl. 355 (1781). *Kyrstenia altissima* Greene, Leaf. i. 8 (1903). A consistent application of the rules of priority necessitates the reviving of Reichard's name for our common and attractive North American *Eupatorium* which has long passed as *E. ageratoides*. Furthermore, in consequence of this revival of Reichard's *E. urticaefolium*, it is necessary to suppress the later *E. urticaefolium* L. f. Suppl. 354 (1781). This, however, is no great misfortune, for the species of Linnaeus filius has been in recent times entirely misinterpreted, the name having been applied by English and German botanists to a coarse annual, widely distributed in tropical America, having rather long pedicels and ovate-lanceolate to lance-linear leaves. This plant has borne many names, of which the earliest appears to be the hitherto obscure *E. pauciflorum* HBK. Nov. Gen. et Spec. iv. 120 (1820). Very different from this is the type of *E. urticaefolium* L. f.,

which is still extant in the herbarium of the Linnean Society of London. It is a Colombian plant, apparently perennial, with deltoid-ovate, strongly cordate leaves and contracted inflorescence, the pedicels being very short. It is not yet certain whether this plant has received a later name, but it is pretty close to *E. ballotaeifolium* HBK. and of course has nothing whatever to do with the *E. urticifolium* of the Flora Brasiliensis or of recent writers on the flora of Argentina and Paraguay.

MIKANIA BADIERI DC. Prod. v. 194 (1896). This excellent species is well marked by its coriaceous glabrous essentially entire leaves, which are rather abruptly acuminate, ending in a caudate and often falcate tip. The petioles are furthermore much flattened and rather broad. The species, notwithstanding these distinctive characters, has been reduced by Grisebach (Veg. Karaib. 85) to *M. latifolia* J. E. Smith (Rees, Cyclop. xxiii. n. 8). Grisebach also implies that it is suspiciously close to *M. amara* Willd. However, the inflorescences in *M. Badieri* are pyramidal panicles in which the heads are subspicately arranged, while both in *M. amara* Willd. and in *M. latifolia* J. E. Smith (ex char.) the heads are borne in corymbs. In the herbarium of Lamarck there is a sheet of *M. Badieri* labelled in the hand of Lamarck himself "Eupatorium vincaefolium Lam. dict. no. 39 de Mr. Badier de la guadeloupe No 137." At first sight it would appear that this was an authentic type of *E. vincaefolium* Lam. and that his earlier specific name should take the place of DeCandolle's later *Badieri*. However, Lamarck did not cite the plant of Badier in his Dictionary, but on the other hand distinctly states that his *E. vincaefolium* was founded on South American material. Indeed, most of the characters are evidently drawn from Aublet's plate and description of *E. parviflorum*, which Lamarck reduces to a synonym of his own species. Although Badier's plant of Guadeloupe possesses some habitual similarity to the South American one, the latter lacks the broad petioles and the peculiar acumination and is doubtless a distinct species. Obviously, it is to the South American plant that Lamarck's name *E. vincaefolium* was applied.

Mikania Houstoniana, n. comb. *Eupatorium Houstonianum* L. Spec. ii. 836 (1753). *E. Houstonis* L. Syst. ed. 10, 1204 (1759). *E. fruticosum* Mill. Dict. ed. 8, no. 6 (1768). *Mikania Houstonis* Willd. Spec. iii. 1742 (1804). The rule of priority of the specific name requires the restoration of the earlier adjectival form.

BRICKELLIA ATRACTYLOIDES Gray, Proc. Am. Acad. viii. 290 (1870). Of this species, *Coleosanthus venulosus* A. Nelson, Bot. Gaz. xxxvii. 262 (1904), is an exact synonym.

BRICKELLIA MICROPHYLLA Gray, Pl. Wright. i. 85 (1852); *Bulbostylis microphylla* Nutt. Trans. Am. Phil. Soc. n. s. vii. 286 (1841). To the synonymy of this species may be added *B. cedrosensis* Greene, Bull. Torr. Bot. Club, x. 86 (1883); *Coleosanthus cedrosensis* Greene, Erythea, i. 54 (1893).

BRICKELLIA OBLONGIFOLIA Nutt. Trans. Am. Phil. Soc. n. s. vii. 286 (1841). Of this species, *Coleosanthus humilis* Greene, Pittonia, iv. 124 (1900), appears to be a synonym.

Brickellia paniculata, n. comb. *Eupatorium paniculatum* Mill. Gard. Dict. ed. 8, no. 15 (1768). *E. Verae-Crucis* Steud. Nom. ed. 2, i. 609 (1840). *Ageratum paniculatum* Hort. and *Eriopappus paniculatus* Hort. ex Steud. l. c. *Eupatorium rigidum* Benth. Pl. Hartw. 88 (1841), not Sw. *Brickellia Hartwegi* Gray, Pl. Wright. i. 85 (1852). Miller's *Eupatorium paniculatum* seems never to have been studied or accurately identified. It is evident that Steudel's renaming of the species was purely a bibliographical change incident to his compilation, and involving no personal examination of the plant. Miller's type, collected at Vera Cruz, Mexico, by Dr. Houston, is still extant in the herbarium of the British Museum of Natural History, and proves to be the plant which has for some time been passing under the name of *Brickellia Hartwegi* Gray. There seems no reason why Miller's name should not be restored and transferred to the correct genus. Steudel's purpose in renaming *E. paniculatum* Mill. (1768) was doubtless that he might maintain the better known but much later homonym of Schrader (1832), which, however, has since proved a synonym of *E. microstemon* Cass. Link, Enum. ii. 306 (1822), erroneously united under the name *E. paniculatum* the very different plants of Miller and Schrader, belonging as we now see to two distinct genera. The unwarranted name *E. Verae-Crucis* still persists in some botanical gardens.

Cacalia asclepiadea L. f. Suppl. 352 (1781). *Senecio* (?) *asclepiadeus* DC. Prod. vi. 422 (1837). This doubtful species from Colombia seems never to have been studied or accurately placed. Fortunately the type-specimen is still extant in the herbarium of the Linnean Society of London. It proves to be identical with *Eupatorium angustifolium* Spreng. Syst. iii. 415 (1826); *Mikania angustifolia* HBK. Nov. Gen. et Spec. iv. 138 (1820). Although the Linnaean specific name is older, it cannot be applied in *Eupatorium* because of the existing homonym, *E. asclepiadeum* DC. Prod. v. 148 (1836). *Cacalia asclepiadea* L. f. should therefore drop into the synonymy of *EUPATORIUM ANGUSTIFOLIUM* (HBK.) Spreng. and the genus *Cacalia* (or *Senecio*) may thus be freed from a dubious species.

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Presented by B. L. Robinson, October 10, 1906. Received November 10, 1906.

INTRODUCTION.

WHEN this revision was undertaken, the genus *Spilantes* was found to be in a very confused condition, and the work was greatly hampered by lack of abundant and authentic material; a lack, however, which it was in a large measure possible to overcome through the great generosity of numerous botanists in different parts of the world. But for the purpose of further study and for the more intelligent determination of ranges a great deal of material of the genus should be collected. The genus has been so little understood that it seemed more than usually desirable to base information regarding the ranges merely on actual specimens or reproductions examined rather than on published accounts. For habitat the labels give almost no data, and except in a few cases there were not specimens enough to form satisfactory conclusions as to the dates of flowering and fruiting, so that no mention of these subjects has been made. It is hoped, however, that such attention in the field will be accorded this interesting genus that the knowledge of all these matters may be supplied.

The species have proved to be almost entirely lacking in constant technical characters, so that it has seemed artificial to maintain many of the earlier ones in an independent rank. The genus thus contains several complex groups of interrelated types, the study of a considerable amount of material of which shows them to intergrade very strongly with each other. It is certainly very undesirable to attempt to distinguish species upon the basis of mere leaf and habital variations. Therefore in treating the genus it has been the plan to make the species stand for something definite, at least, so that they may represent an aggregation of variations more like each other than like

any other variations, and to relegate to the rank of varieties and forms, under species into which they converge, plants of less numerous or significant characters.

The nomenclature of the revision is strictly in accordance with the Vienna Rules.

To Dr. R. Chodat, of Geneva, Drs. C. F. Millspaugh and J. M. Greenman, of the Field Museum of Natural History, Dr. J. N. Rose, of the United States National Museum, Capt. J. D. Smith, of Baltimore, and Prof. William Trelease, of the Missouri Botanical Garden and Henry Shaw School of Botany, I desire to express my gratitude for their kind loan of valuable specimens. To Dr. N. L. Britton, of the New York Botanical Garden, and his associates, I owe special thanks for the courteous reception afforded me, and for permission to consult the fine herbaria of the Garden and of Columbia University. For photographs of type specimens important to the work, I am indebted to B. Daydon Jackson, Esq., Secretary of the Linnean Society, and Prof. F. O. Bower, of the University of Glasgow. Dr. Casimir de Candolle, of Geneva, Prof. A. Engler, of the Royal Botanical Garden in Berlin, Lieut.-Col. David Prain, F.L.S., F.R.S.E., of the Royal Gardens at Kew, and Dr. A. Zahlbruckner, of the Imperial Museum of Natural History in Vienna, were so kind as to contribute excellent tracings, drawings, and photographs. Dr. Otto Kuntze, of San Remo, Italy, and Alfred J. Swart, Esq., of the Victorian Department of Agriculture, Victoria, Australia, kindly contributed valuable authentic specimens. I wish to thank Dr. H. Pittier, of the Bureau of Plant Industry, Department of Agriculture, and Dr. H. H. Rusby, of the New York College of Pharmacy, for useful information in regard to geographical matters. I wish to express my special thanks also to the librarian of the Gray Herbarium, Miss Mary A. Day, for her untiring efforts in connection with the bibliographical work and for much other valuable assistance and advice. To Miss I. W. Anderson, of the Gray Herbarium, I am greatly indebted for assistance in preparing the material for study. Prof. M. L. Fernald and Mr. H. H. Bartlett, of the Gray Herbarium, have also given many useful suggestions, for which I wish to thank them very much. But above all I am indebted to the Curator, Dr. B. L. Robinson, for his constant advice and assistance throughout the work.

REVISIO GENERIS SPILANTHIS.

SPILANTHES Jacq. Plantae inter erectas et prostratas variantes herbaceae 6-15 dm. altae. Folia opposita inter sessilia et valde petiolata variantia. Capitula discoidea vel radiata (sed radiis saepius parvis)

inter subglobosa et oblonga variantia (regulariter conica) plerumque parva pedunculata. Involucri squamae 6-mult. obtusae vel acutae ovatae vel lanceolatae. Radii lutei aut albi vel nulli. Achaenia valde compressa raro vix triangulata nunquam columnaria inaequaliter biaristata aut inaristata (aristis rigidis aut saepius ciliis persimilibus) margine ciliata vel glabra raro superficiebus ciliata nonnunquam margine crassa sed plerumque (praeterquam in no. 1) inconstanter. — (Derivatio: *σπίλος*, macula + *-άνθης*, florens). — Enum. Syst. Pl. Carib. 8 (1762).

Genera praecedenti magis affinia (secundum Engl. et Prantl *Natürlichen Pfl.* iv, 5, 229, in clave) sunt *Lipochaeta* DC., *Flourensia* DC., *Salmea* DC., *Salmeopsis* Benth. *Lipochaeta* distinguitur achaeniis non valde compressis, plerumque multis capitulis minimis subglobosis et saepe foliis non simplicibus; *Flourensia* capitulis valde aromaticis et achaeniis longis pilis tectis, foliis alternis; *Salmea* *Salmeopsis*que inflorescentia cymose disposita distinguuntur; praeter *Lipochaeta*am, omnes habitu suffruticoso.

Aspectus *Isocarphae* R. Br. generi nostro simillima est at illius achaenia columnaria et 4-6-angulata sunt.

Generis nostri locus systematicus. — Tribus Heliantheae (DC.) Cass. incl. *Spilanthae* Cass. Dict. Sc. Nat. v, 419 (1825). Subtribus Verbesininae O. Hoffm. *Verbesinae* (Cass.) Lindl.

Synonymia. — Praelinnaeana :

Ceratocephalus Burm. Thes. Zeyl. 58 (1737); Ktze. Rev. Gen. Pl. i, 326 (1891).

ABCDaria Rumpf. Amb. Kruidb. (Herb. Amb. Burm. tr. latina) vi, 145, t. 65 (1750).

Postlinnaeana :

Spilanthus L. Syst. Nat. ed. XII, ii, 533 (1767).

Pyrethrum Med. Act. Acad. vel Hist. et Comment. . . . Theod. - Palat. (Phys.) iii, 237 (1775), in parte.

Spilantus R. W. Darw. Fam. Pl. ed. II, ii, 544 (1787).

Athronia Neck. Elem. Bot. i, 32 (1790).

Ceruchis Gaertn. ex L. - Schreb. Gen. Pl. ed. VIII, ii, 543 (1791).

Acmella Rich. in Pers. Syn. Pl. ii, 472 (1807).

Synonymum exclusum. — *Mendezia* DC. Prod. v, 532 (1836) = *Zinnia* L.

Distributio. — Per regiones tropicas hemisphaeriorum amborum et in Hemisphaerio Occidentali in regionibus Zonaе Temperatae calidioribus a Missouri ad Louisianam, Texas, Floridam in Civitatibus Foederatis Americae.

GENERIS CLAVIS.

- A. Capitula discoidea (praeterquam in no. 12). B. Sectio I. *Salivaria*.
- B. Folia sessilia (nonnunquam in no. 7 minute subpetiolata) inter linearia et lanceolata variantia integra. C.
- C. Achaenia margine crassa (margine ca. 1 mm. lata) uniaristata. 1. *S. chamaecaula*.
- C. Achaenia margine non crassa inaequaliter biaristata. D.
- D. Antherae apice nigrae; folia non spatulata; plantae Mundi Novi. E.
- E. Folia conspicue venata; radices fasciculatae. 2. *S. nervosa*.
- E. Folia tribus nervis plus minusve prominentibus; radices non fasciculatae. F.
- F. Plantae inter glabras et leviter pubescentes variantes. 3. *S. urens*.
- F. Plantae laneae. 4. *S. urens* f. *lanea*.
- F. Plantae hispidulae. 5. *S. urens* var. *hispidula*.
- D. Antherae apice nigrae; folia non spatulata; plantae australienses. 6. *S. anactina*.
- D. Antherae apice non nigrae; folia linearispatulata; plantae Mundi Novi. 7. *S. pusilla*.
- B. Folia petiolata obovata valde et saepe obtuse sinuatodentata. 8. *S. insipida*.
- B. Folia petiolata ovata subintegra vel crenata serrata vel incisa. G.
- G. Discus ovoideocolumnaris tempore maturitatis 1-1.7 cm. latus; capitula saepe apice fusco. 9. *S. oleracea*.
- G. Discus multo gracilior; capitula colore uniformi. H.
- H. Plantae Mundi Novi. I.
- I. Achaenia inaristata glabra; involucri bractee numerosae. 10. *S. leucantha*.
- I. Achaenia aristata vel ciliata; involucri bractee 4-8. K.
- K. Folia saepius integra vel subintegra sed nonnunquam serrata (raro conspicue); non multis capitibus brevipedunculatis.
- Capitula sine radiis. 11. *S. ocymifolia*.
- Capitula cum radiis. 12. *S. ocymifolia* f. *radiifera*.
- K. Folia serrata (plerumque conspicue); regulariter multis capitibus brevipedunculatis. 13. *S. ocymifolia* var. *acutiserrata*.
- H. Plantae Mundi Antiqui. L.
- L. Pedunculi 3-10 cm. longi (plerique ca. 6 cm.). M.
- M. Achaenia glabra calvaque. 14. *S. calva*.
- M. Achaenia aristata vel ciliata. N.
- N. Folia nervis longitudinalibus non conspicuis.
- Folia inter subintegra et serrata variantia non incisa.
- Folia plerumque 3-6 cm. longa non albescentia. 15. *S. Acabella*.
- Folia plerumque maiora fere semper infra albescentia. 16. *S. Acabella* var. *albescentifolia*.
- Folia incisa. 17. *S. Acabella* var. *lanceolata*.
- N. Folia nervis longitudinalibus prominentibus. 18. *S. costata*.
- L. Pedunculi 14-17.2 cm. longi (plerique ca. 15 cm.). 19. *S. callimorpha*.

- A. Capitula radiata. O. Sectio II. *Acmella*.
 .O. Radii capituli maturi involucrum vix superantes plerumque perminuti et paulo ovati. P. Subsectio I. *Parvoradiatae*.
 P. Involucri squamae inter late ovatas et suborbiculares variantes obtusae vel acutae nunquam acuminatae.
 Folia 1.1-2.5 cm. longa subintegra vel integra.
 Paleae apice violaceae. 20. *S. iodiscaea*.
 Paleae apice non violaceae. 21. *S. iodiscaea* f. *leucaena*.
 Folia 2.8-5 cm. longa plerumque serrata (raro subintegra).
 22. *S. uliginosa*.
- P. Involucri squamae inter ovatas et ovatolanceolatas variantes acuminatae. Q.
 Q. Plantae Mundi Novi. R.
 R. Capitula acute obtuseve conica. S.
 S. Folia nec integra nec subintegra. T.
 T. Folia non mucronuloide attenuata. U.
 U. Plantae non conspicue tomentulosae aut hispidulosae. V.
 V. Folia lanceolata; capitula pleraque 6 mm. longa 4 mm. lata. 23. *S. Lundii*.
 V. Folia inter anguste ovata et ovatolanceolata variantia; capitula pleraque 8 mm. longa 6 mm. lata vel minora.
 Plantae erectae vel ascendentes; folia inter late ovata et ovatolanceolata variantia.
 Folia plerumque integra aut crenata; achaenia fere semper margine valde ciliata. (Vide supra sub no. 12.)
 12. *S. ocymifolia* f. *radiifera*.
 Folia saepius dentata (nonnunquam irregulariter incisa); achaenia plerumque omnino non vel leviter margine ciliata. 24. *S. ciliata*.
 Plantae prostratae; folia ovata vel subrotunda quam in praecedentibus minora (ca. 2-3 cm. longa).
 25. *S. ciliata* var. *diffusa*?
- U. Plantae dense tomentulosae vel hispidulosae, maxime surculi recentiores. 26. *S. subhirsuta*.
 T. Folia abrupte mucronuloide attenuata. 27. *S. caespitosa*.
 S. Folia integra aut vix undulata.
 Plantae et maxime involucris squamae canescentes.
 28. *S. poliolepidica*.
 Plantae non conspicue canescentes.
 Folia linearilanceolata, nervo medio prominente, non ciliolata.
 29. *S. disciformis*.
 Folia ovatolanceolata, nervis aequaliter prominentibus tribus, margine ciliolata. 30. *S. limonica*.
 R. Capitula truncata fere planoconvexa. 31. *S. alpestris*.
- Q. Plantae Mundi Antiqui.
 Capitula subglobosa vel conica 5-8 mm. longa 5-9 mm. lata.
 32. *S. mauritiana*.
 Capitula oblonga 1.5 cm. longa 5-6 mm. lata.
 33. *S. mauritiana* f. *madagascariensis*.
- O. Radii capituli involucrum conspicue superantes plerumque magni atque liguliformes. X. Subsectio II. *Magnoradiatae*.
 X. Folia angustissima 2-2.5 cm. longa 1.5-2 mm. lata. 34. *S. stenophylla*.

- X. Folia non angustissima vel si angustissima multo breviora. Y.
- Y. Capitula 3.5–5.5 mm. longa (pleraque 4.7 mm.). 35. *S. filipes*.
- Y. Capitula non minus quam 6 mm. longa ac plerumque multo magis. Z.
- Z. Radii longitudine conspicue minus quam dimidia pars disci. 36. *S. iabadicensis*.
- Z. Radii longitudine non minus quam dimidia pars disci. a.
- a. Caules colore rubro tincti crassiores. 37. *S. phaneractis*.
- a. Caules non colore rubro tincti tenuiores. b.
- b. Plantae non radicibus rigidis aut crassissimis et nunquam radicibus fasciculis reptantes; radii saepius non latissimi. c.
- c. Folia integra undulata vel distanter sinuatodentata ovato-lanceolata.
- Folia longiacuminata 38. *S. macrophylla*.
- Folia non longiacuminata 39. *S. papposa*.
- c. Folia inter integra et valde serrata variantia; si integra tum late linearia vel lanceolata. d.
- d. Plantae Insularum Malayensium.
- Folia inter ovata et lanceolata variantia 3–7 cm. longa .7–2.5 cm. lata 40. *S. grandiflora*.
- Folia linearia 2.5–5.5 cm. longa .5–.8 cm. lata.
- Ligulae involucri multo superantes. 41. *S. grandiflora* var. *brachyglossa*.
- Ligulae involucri vix aut omnino non superantes. 42. *S. grandiflora* var. *calva*.
- d. Plantae Abyssiniae vel Mundi Novi. e.
- e. Folia minutissima 7–15 mm. longa (pleraque 8 mm.). 43. *S. pammicrophylla*.
- e. Folia non minus quam 2 cm. longa et plerumque multo magis (nri. 46, 47, 48, 49 nonnunquam minus quam 2 cm. longa sunt sed dentata non subintegra ut in no. 43). f.
- f. Radii colore albo puro; plantae abyssinicae. 44. *S. abyssinica*.
- f. Radii luteo saltem tincti; plantae Mundi Novi. g.
- g. Folia inter elliptica et ovato-lanceolata variantia. h.
- h. Folia saepius crenata quam serrata; plantae Mexico, et Americae Centralis Australisque. i.
- i. Plantae erectae aut deorsum repentes sursum ascendentes; folia maiora (6–18 cm. longa). 45. *S. americana*.
- i. Plantae magis prostratae plerumque omnino; folia minora (1.5–4.5 cm. longa). k.
- k. Discus parvus gracilisque (saepius .5 cm. longus 1 mm. crassus). 46. *S. americana* var. *ramosa*.
- k. Discus maior. l.
- l. Plantae glabrae aut vix pubescentes. 47. *S. americana* var. *parvula*.
- l. Plantae pubescentes. 48. *S. americana* var. *parvula* f. *parvifolia*.
- l. Plantae dense lanuginosae. 49. *S. americana* var. *parvula* f. *lanitecta*.
- h. Folia saepius serrata quam crenata; plantae Americae Borealis. 50. *S. americana* var. *repens*.

- g. Folia linearia. m.
 m. Folia non margine ciliata. n.
 n. Plantae non longissimis internodiis; folia integra vel distanter subserrata.
 51. *S. americana* var. *stolonifera*.
 n. Plantae longissimis internodiis; folia distanter serrata.
 52. *S. americana* var. *stolonifera* f. *longiinternodiata*.
 m. Folia margine ciliata. o.
 o. Folia obtusa; cilia minima non distantia.
 53. *S. americana* var. *stolonifera* f. *ciliatifolia*.
 o. Folia acuta; cilia conspicua distantia.
 54. *S. blepharicarpa*.
- b. Plantae radicibus rigidis aut crassissimis, saepius radicem fasciculis reptantes; radii saepius latissimi. p.
 p. Capitula non latissima; receptacula non crassissima. q.
 q. Folia caulina inconspicue vel omnino non serrata.
 Folia caulina 5-9 cm. longa lanceolata; folia basalia saepe foliis caulinis valde dissimilia semperque in rosulae forma disposita. 55. *S. decumbens*.
 Folia caulina 2.5-6 cm. longa foliis basalibus non valde dissimilia.
 Folia duarum formarum fieri inclinata (aliqua late lanceolata aliqua anguste lanceolata vel linearia) vel omnia late lanceolata.
 56. *S. decumbens* var. *macropoda*.
 Folia unius formae (linearia).
 57. *S. decumbens* var. *leptophylla*.
- q. Folia caulina conspicue sed non omnia valde serrata. r.
 r. Folia dense hispidulosa sed margines non valde ciliatae; folia basalia caulinis non similia. 58. *S. grisea*.
 r. Folia sparse vel omnino non hispidulosa sed margines valde ciliatae; folia basalia caulinis similia. s.
 s. Folia lanceolata; pedunculi longissimi (1-2.8 dm.). t.
 t. Folia 3-7 cm. longa 1.7-2 cm. lata.
 59. *S. grisea* var. *intermedia*.
 t. Folia 7-10 cm. longa 1-2.2 cm. lata.
 60. *S. grisea* var. *setosa*.
 t. Folia 4.8-8 cm. longa, .5-8 cm. lata; serrationes quam in praecedentibus prominentiores.
 61. *S. grisea* var. *Chodatana*.
 s. Folia ovata; pedunculi 5.5-7 cm. longi.
 62. *S. grisea* var. *micra*.
- p. Capitula latissima (1.1-2 cm.); receptacula crassissima (plerumque 3.5 mm.) 63. *S. eurycarena*.

Sectio I. SALIVARIA DC. capitulis discoideis. — Prod. v, 624 (1836).
 Distributio. — In India, Indiis Orientalibus Nederlandicis, Insulis Philippinis, Australia, Mexico, America Centrali Australique, Indiis Occidentalibus.

1. *S. chamaecaula* A. H. Moore spec. nov. glabra vel subglabra; longissimis caulibus diffusis prostratis; foliis late linearibus supra infraque paulum scabris plerumque ca. 3 cm. longis .4–.6 cm. latis margine non revolutis, nervo medio; capitulis globosis vel subglobosis; receptaculis ca. 4–5 mm. latis ca. 7 mm. longis; achaeniis crassis uniaristatis. Haec species a ceteris achaeniis uniaristatis margine constanter crassissimis longe abest.

Distributio. — In Borneo boreali.

Specimen typicum. — Borneo: *F. W. Burbidge*, ann. 1877–1878 (in Herb. Gray.).

2. *S. NERVOSA* Chod. 1.8–3 dm. alta sparse ciliata; caulibus erectis vel ascendentibus; foliis lanceolatis vel ovato lanceolatis obtusis sine squamulis valde pinninervatis, petiolis valde pilosis vel subtomentosis; capitulis semiglobosis, involucri squamis oblongis; radicibus fasciculatis. — In Bull. Herb. Boiss. ser. 2, iii, 724 (1903).

Distributio. — In regione cursus superioris fluminis Apa in Paraguay.

Specimen examinatum. — Paraguay: *E. Hassler*, 8274, in regione cursus superioris fluminis Apa.

3. *S. URENS* Jacq. 2–5 dm. alta glabra aut plus minusve ciliata; caulibus decumbentibus; foliis anguste vel late lanceolatis raro linearibus acutis acuminatisve 3.5–5.5 cm. longis, supra squamulis albis scabris infra glabris, margine saepe perminute revolutis saepius trinerviis; pedunculis plerumque 1.4–2 dm. longis; capitulis globosis vel subglobosis, involucri squamis ovatis; receptaculis ca. 2 mm. crassis et 5 mm. longis; achaeniis tenuissimis plerumque aristis duabus ciliis persimilibus et inaequalibus. — Enum. Syst. Pl. Carib. 28 (1762), et Select. Stirp. Am. Hist. 214, t. 126, f. 1 (1763); DC. Prod. v, 625 (1836): *Santolina pyrethri sapore humi fusa*, Plum. Cat. Pl. Am. 10 (1703).

Synonymia. —

Cotula Spilanthus L. Mant. Pl. 116 (1767).

Bidens angustifolia Lam. Encycl. Meth. (Bot.) i, 416 (1783).

Bidens angustifolia Lam. var. *minor* Poir. Lam.-Poir. Illustr.

Genres iii, 244, t. 668, f. 2 (1823).

Spilanthus repens Spreng. ex DC. Prod. v, 625 (1836).

Ceratocephalus urens (Jacq.) Ktze. Rev. Gen. Pl. i, 326 (1891).

Distributio. — In Jamaica, Martinica, litoribus colombianis borealibus, Brasilia, et adventive (?) Altatae in Mexico.

Specimina examinata. — Mexico: SINALOA: *T. S. Brandegee*, Altatae, Sept. 2, 1904. Jamaica: *A. S. Hitchcock*, Luceae, Jan. 3, 1891, Port Antonio, Dec. 26, 1890, Port Morant, Dec. 22, 1890; *J. Moulton-Barrett*, Jackson Tower, Jun. 15, 1902; *C. F. Millspaugh*,

2028, Bowden. **Martinica**: *L. Hahn*, 126, Fort de France, et 726, in valle St. Pierre; *P. Duss*, 1733 et 4077, Fort de France. **Brasilia**: *G. Gardner*, 4252. **Colombia**: **MAGDALENA**: *H. H. Smith*, 553, Santa Marta.

4. *S. URENS* Jacq. f. *lanea* A. H. Moore f. nov. praecedenti omnino similis sed caules lanei et nonnunquam folia.

Distributio. — Lagoa Santa in Brasilia.

Specimen typicum. — **Brasilia**: **MINAS GERAËS**: *E. Warming*, Lagoa Santa, Oct. 27, 1863 (in Herb. Hort. Bot. Novebor.).

5. *S. URENS* Jacq. var. *HISPIDULA* DC. *S. urenti* persimilis sed conspicue hispidula; foliis plerumque 2.5 cm. longis; pedunculis 1.5–2.5 cm. longis. — *S. urens* Jacq. β . *hispidula* DC. Prod. v, 625 (1836).

Synonymia. —

Spilanthes leiocarpa DC. Prod. v, 626 (1836).

Spilanthes Macraei H. et A. in Hook. Jour. Bot. iii, 317 (1841).

Spilanthes Macrali Ktze. Rev. Gen. Pl. i, 326 (1891).

Ceratocephalus leiocarpus (DC.) Ktze. l. c.

Distributio. — Per oram peruvianam et chilensem borealem.

Specimina examinata. — **Perua**: **CALLAO**: U. S. So. Pac. Explor. Exped., Callao. **Chile**: **TACNA**: *W. Lechler*, 1532, prope Aricam. **CONCEPCIÓN**: *J. D. Hooker*, Concepción (photographa).

6. *S. ANACTINA* F. Muell. glabra erecta vel raro decumbens; foliis linearibus aut linearilanceolatis non revolutis; nervo medio prominente; pedunculis 1.1–2 dm. longis; achaeniis inaequaliter biaristatis. — *Fragm. Phyt. Austr.* v, 63 (1865–1866).

Synonymia. —

Ceratocephalus anactinus (F. Muell.) Ktze. Rev. Gen. Pl. i, 326 (1891).

Distributio. — In Australia.

Specimina examinata. — **Australia**: **QUEENSLAND**: In insula Sweer in sinu Carpentariae (sine collectoris nomine). **WALLIA NOVA AUSTRALIS**: *S. Mossman*, 509, ad flumen Brisbane (planta per chartam delineata).

7. *S. PUSILLA* H. et A. 1.5–12 cm. alta; caulibus decumbentibus; foliis angustissime lanceolatis ad linearispatulata vergentibus ca. 2 cm. longis 3–5 mm. latis aliquando leviter petiolatis; capitulis globosis vel subglobosis ca. 5–7 mm. diametro; receptaculis ca. 5 mm. longis 1 mm. crassis; alioqui *S. urenti* Jacq. similis. — In Hook. Jour. Bot. iii, 317 (1841).

Synonymia. —

Spilanthes stolonifera DC. var. *pusilla* (H. et A.) Bak. in Mart. Fl. Bras. vi, 3, 235 (Maio 1, 1884).

Distributio. — Buenos Aires in Argentina.

Specimen examinatum. — Argentina: BUENOS AIRES: *J. Tweedie*, 223, Buenos Aires.

8. *S. INSIPIDA* Jacq. ad 3 dm. alta; foliis supra infraque hispidulis vel subtomentosis valde aut saepe obtuse sinuatodentatis petiola (quae ca. 1 cm. longa) decurrentibus; pedunculis ca. 10–15 cm. longis, textura crassa vel raro tenui; capitulis vel globosis subglobosis aut raro conicis in pedunculo singulo singulis vel plurimis; achaeniis fere vel omnino glabris calvisque. — Enum. Syst. Pl. Carib. 28 (1762), et Select. Stirp. Am. Hist. 215, t. 126, f. 2 (1763); DC. Prod. v, 626 (1836).

Synonymia. —

Bidens insipida (Jacq.) Lam. Encycl. Meth. (Bot.) i, 416 (1783).

Ceratocephalus insipidus (Jacq.) Ktze. Rev. Gen. Pl. i, 326 (1891).

Distributio. — In Cuba.

Specimina examinata. — Cuba: *C. Wright*, 3610; *E. Otto*, 94. MATANZAS: *J. W. Robbins*, prope Matanzas, Apr. 1864; *F. Rugel*, 6, Matanzas; *N. L. Britton*, *E. G. Britton*, *J. A. Shafer*, 206, in faucibus Sumuri prope Matanzas.

9. *S. OLERACEA* L. ad 4 vel 5 dm. alta; foliis deltoideis, basi 1.5–5.5 cm. lata inter cuneatam et subtruncatam variante, 2.4–7.5 cm. longis conspicue crenatis vel dentatis, petiolis quam in praecedentibus plerumque multo longioribus (1–4 cm. longis); capitulis plerumque ovoideocolumnaribus vel oblongis raro subglobosis 1–3 cm. longis 1–1.7 cm. latis, saepe apice fusco; receptaculis crassissimis ovoideocolumnaribus .8–2.3 cm. longis .5–1 cm. latis; achaeniis plerumque inaequaliter biaristatis conspicue ciliatis (ciliis saepe basi tuberculoidea) et margine crassa. — *Spilanthus oleracea* L. Syst. Nat. ed. XII, ii, 534 (1767); Regel Gartenfl. ii, t. 42 (1853), *Spilanthus oleracea* Jacq. secundum DC., et *β. fusca* (Hort. Par.) DC. Prod. v, 624, nr. 30 et 30β, cf. Jacq. Hort. Bot. Vind. ii, 63, t. 135 (1772).

Synonymia. —

Bidens acmelloides Berg in Kongl. Vetensk. Acad. Handl. xxix, 2, 245 (Jul.–Sept. 1768).

Pyrethrum Spilanthus Med. in Act. Acad. vel Hist. et Comment. . . . Theod.–Palat. (Phys.) iii, 242, t. 18 (1775).

Bidens fervida Lam. Encycl. Meth. (Bot.) i, 415 (1783); Lam.–Poir. Illustr. Genres iii, 244, t. 668, f. 1 (1823).

Bidens fusca Lam. l. c.

Spilanthus fusca Hort. Par. ex Lam. l. c.

Buphthalmum strigosum Spreng. N. Entd. ii, 140 (1821).

Spilanthus brasiliensis Spreng. L.–Spreng. Syst. Veg. iii, 444 (1826).

Acmella brasiliensis Spreng. l. c.

Buphthalmum heterophyllum Willd. ex L.–Spreng. l. c. 592.

Spilanthus oleraceus var. Bl. Bijdr. Fl. Nederl. Ind. xiv, 912 (1826).

Spilanthus oleracea L. β . ? *fusca* (Hort. Par.) DC. Prod. v, 624 (1836).

Bidens oleracea (L.) Cav. ex Steud. Nom. Bot. ed. II, i, 203 (1840).

Spilanthus Acmella (L.) Murr. var. *oleracea* (L.) Zoll. Syst. Verz. Ind. Arch. 123 (1854).

Bidens fixa Hook. f. Fl. Brit. Ind. iii, 307 (1882). Forsan etiam *Spilanthus oleracea* L. β . *rufa* Ott. ex Ind. Sem. Hort. Berol., an. 1858, collect. 10 (1858), nom. nud.

Distributio. — In India, Antilibus Minoribus, Brasilia orientali.

Specimina examinata. — Ex Mus. Bot. Berol.; *J. E. Teijsmann*, "ex horto bogoriensi Javae misit, 1869." Guadeloupe: *P. Duss*, 2498.

Martinica: *P. Duss*, 1449, Trois Ponts in St. Pierre. Brasilia: *W. J. Burchell*, 4734. MINAS GERAËS: *S. E. Henschen*, ser. I, 269, Caldas.

RIO DE JANEIRO: *C. Gaudichaud-Beaupré*, 681, Rio de Janeiro. India:

BEHAR in BENGALIA: *H. v. Schlagintweit-Sakünlinski*, sub catal. no. 12959, in alveo sicco fluminis Gandak prope Patnam. KONKAN in

BOMBAY: *J. D. Hooker*, ex "Herb. Ind. Or. Hook. fil. & Thomson" Bombay. Specimina culta: Ex Hort. Bot. Univ. Harv., an. 1874;

ex Herb. I. A. Lapham, e seminibus e Cuba missis cult.; *J. Gay*, Parisiis, Sept. 1835. *C. J. Maximowicz*, in itinere secundo, Yoko-

hamae, in Japonia, an. 1862; *G. Engelmann*, Berkeley in California in Civitatibus Foederatis Americae, Sept. 6, 1880.

10. *S. LEUCANTHA* HBK. foliis ovatolanceolatis acute vel obtuse dentatis 4.5–7.5 cm. longis 1.8–3 cm. latis, apice subacuminato, basi inter subcuneatam et subcordatam variante, petiolis inferiorum brevioribus superiorum saepius nullis; pedunculis 1.7–9 cm. longis; capitulis inter globosa et ovatoconica variantibus .7–1.5 cm. diametro, bracteis numerosis; achaeniis glabris calvisque; sequenti valde affinis. — Nov. Gen. et Sp. Pl. iv, 210, t. 370 (1820); DC. Prod. v, 625 (1836).

Synonymia. —

Isocarpha Kunthii Cass. in Dict. Sc. Nat. xxiv, 19 (1822).

Ceratocephalus leucanthus (HBK.) Ktze. Rev. Gen. Pl. i, 326 (1891).

Distributio. — In Andibus ecuadorensibus.

Specimen examinatum. — Ecuador: BOLÍVAR: *E. André*, Guarandae, Jul. 8, 1876.

11. *S. ocymifolia* (Lam.) A. H. Moore comb. nov. magnopere variabilis erecta vel prostrata fere semper pubescens; foliis regulariter ovatis inter subintegra et dentata vel crenata variantibus 1.5–9 cm. longis 5 mm.–5 cm. latis (saepius 5.5–6 cm. longis ca. 3.4 cm. latis) plerumque non valde acuminatis, textura tenui vel crassa (plerumque

crassiore), colore viridi aut alboviridi; pedunculis 1.5–10 cm. longis; capitulis 2–20 ovoideis (plerisque albis vel albidovirescentibus); achaeniis plerumque insigniter ciliatis.

Synonymia. —

Bidens ocymifolia Lam. Encycl. Meth. (Bot.) i, 416 (1783);

Lam.—Poir. Illustr. Genres iii, 244, t. 668, f. 3 (1823).

Spilanthus albus L'Hér. Stirp. Nov. i, 7, t. 4 (1784), *Spilanthus alba* Willd. secundum DC. Prod. v, 625 (1836), cf. Willd. iii, 3, 1714 (1804).

Spilanthus Salivaria Domb. ex L'Hér. l. c.

Spilanthus radicans Jacq. Collect. Bot. Chem. Hist. Nat. iii, 229 (1789).

Spilanthus exasperata Jacq. Ic. Pl. Rar. iii, 15, t. 584 (1781–1793) (“*Spilanthus radicans* mihi dicta fuit in Collectaneis vol. 3”); DC. Prod. v, 626 (1836).

Spilanthus radicans Schrad. ex DC. l. c. 624.

Spilanthus exasperata Jacq. β . *cayennensis* DC. l. c. 626.

Spilanthus leucophaea Hort. Berol. ? ex Klatt Leopold. xxiii, 5 (1887).

Spilanthus Botteri Wats. in Proc. Am. Acad. xxvi, 141 (1891).

Ceratocephalus Salivaria (Domb.) Ktze. Rev. Gen. Pl. i, 326 (1891).

Ceratocephalus exasperatus (Jacq.) Ktze. l. c.

Spilanthus Sodiroi Hieron. ex Sod. in Engl. Bot. Jahrb. xxix, 842 (Maio 22, 1900).

Distributio. — Per Mexico et Americam Centralem, in Venezuela, Colombia, Ecuadore, Perua. In Mexico haec species perabundans et constantior est.

Specimina examinata. — Mexico: *Friedr. Mueller*, 267 et 274. SINALOA: *T. S. Brandege*, Cafradae prope Culiacán, Oct. 20, 1904; *E. Palmer*, 1565, Lodiago. JALISCO: *C. G. Pringle*, 2946 et 4341, prope Guadalajaram. COLIMA: *E. Palmer*, 1192, Colimae. MICHOACÁN: *C. G. Pringle*, 4340, Monte León. MORELOS: *C. G. Pringle*, 11572 et *C. C. Deam*, Ian. 3, 1899, Cuernavacae. OAXACA: *C. Conzatti* et *V. González*, 647, Oaxacae. VERA CRUZ: *E. Bourgeau*, 3098, *M. Botteri*, 825, *Friedr. Mueller*, 4072, Orizabae. Guatemala: ZACAPA: *C. C. Deam*, 239, Gualán. AMATITLÁN: *H. v. Türckheim*, 8705, Amatitlán. SANTA ROSA: *H. T. Heyde* et *E. Lux*, 3812, prope Rio de Las Cañas. Salvador: SAN SALVADOR: *L. V. Velasco*, 8851, San Salvador. Costa Rica: GUANACASTE: *A. Tonduz*, 13628, Nicoyae. ALAJUELA: *A. Alfaro*, 5807 B, Alajuelae. Venezuela: MÉRIDA: *A. Fendler*, 691 et 691B, prope Tovar. CARÁCAS: *J. R. Johnston*, 102, ad flumen

Asunción in insula Margarita; . . . *Birschel*, Carácas. Panama: *B. Seemann*. Colombia: MAGDALENA: *H. H. Smith*, 591, prope Mamatocam prope Santa Marta. BOLÍVAR: *J. B. Boussingault*, Cartagenae, an. 1833 (planta per chartam delineata). Brasilia: RIO DE JANEIRO: *R. Spruce*, Rio de Janeiro, an. 1864. Ecuador: *A. Sodiro*, 39/1 (specimen per chartam delineatum). GUAYAS: *T. Hartweg*, 867, Guayaquil. Perua: Herb. Hook.; Plantae Schottianae. LIMA: U. S. So. Pac. Explor. Exped., infra Obrajillo. Cuzco: ? *J. Gay*, Oct. 1839–Feb. 1840. Specimen cultum: *M. S. Bebb*, Fountaindale in Illinois in Civitatibus Foederatis Americae.

12. *S. OCYMIFOLIA* (Lam.) A. H. Moore f. *radiifera* A. H. Moore f. nov. praecedenti omnino similis sed radiifera.

Distributio. — In Panama, Colombia, ora Americae Australis occidentali ab Ecuadore ad Chile, et in ora Brasiliae orientali.

Specimen typicum. — Colombia: MAGDALENA: *H. H. Smith*, 513, Santa Marta (in Herb. Hort. Bot. Novebor.) (specimina cum eodem lecta in Herbb. Gray., Mus. Hort. Bot. Mo., Mus. Hist. Nat. Field).

Specimina alia examinata. — Panama: *B. Seemann*; *A. Fendler*, 166, Chagres. Surinam: *W. H. De Vriese*. Colombia: BOLÍVAR: *E. André*, Armadae, Maio 22, 1876. Brasilia: RIO DE JANEIRO: *C. Gaudichaud-Beaupré*, 682, et *E. Warming*, Maio 16, 1863, Rio de Janeiro. Ecuador: MANABI: *H. F. A. v. Eggers*, 15646, Hacienda del Recreo. Bolivia: *M. Bang*, 2024. Chile: *J. Gay*. Specimen cultum: Hort. Bot. Univ. Harv., an. 1874.

13. *S. OCYMIFOLIA* (Lam.) A. H. Moore var. *acutiserrata* A. H. Moore var. nov. foliis valde acuminatis et subinaequaliter serratis; capitulis ovoideis aut saepius subglobosis fere semper numerosissimis (25–100).

Distributio. — In Mexico et per Costa Rica.

Specimen typicum. — Costa Rica: CARTAGO: *J. J. Cooper*, 5807, Cartago (in Herb. J. D. Sm.) (specimen cum eodem lectum in Herb. A. H. Moore).

Specimina alia examinata. — Mexico: TEPIC: *E. Palmer*, Ian. 5–Feb. 6, 1892. Costa Rica: SAN JOSÉ: *A. Tonduz*, 1429, circum San José, 8493, San Francisco de Guadalupe.

14. *S. CALVA* DC. decumbens vel repens, nodis saepius radicans, pubescens vel subtomentosa; foliis 1.5–3.5 cm. longis plerumque 1 cm. latis inter subintegra et dentata vel crenata variantibus brevipetiolatis; pedunculis 2.5–9 cm. longis; capitulis ovoideis vel subglobosis .5–1.3 cm. diametro; achaeniis glabris calvisque. — DC. ex *Wight Contr. Bot. Ind.* 19 (1834); DC. *Prod.* v, 625 (1836).

Synonymia. —

Spilanthes Acmella Bl. *Bijdr. Fl. Nederl. Ind.* (1826), non (L.) Murr.

Spilanthus rugosa Bl. ex DC. Prod. v, 625 (1836).

Spilanthus Acmella Wall. ex Steud. Nom. Bot. ed. II, ii, 622 (1841), non (L.) Murr.; nomen ex Wall. Cat. 3185/295 (Dec. 1, 1828).

Spilanthus rugosa Bl. var. *truncata* Miq. Fl. Ind. Bat. ii, 81 (1856-1859).

Spilanthus Acmella (L.) Murr. var. *calva* (DC.) Clarke ex Hook. f. Fl. Brit. Ind. iii, 307 (1882).

Spilanthus Pseudo-Acmella Wall. ex Hook. f. l. c.; nomen ex Wall. Cat. 3185/295 (Dec. 1, 1828).

Cotula conica Wall. ex Hook. f. l. c.; nomen ex Wall. l. c.

Distributio. — In India australi, Ceylonia, et ? Java.

Specimina examinata. — India: *R. Wight*, 1456. ORISSA in BENGALIA: Edidit *R. F. Hohenacker*, 1017, et *G. S. Perrottet*, 27, in collibus Nilgiri. MADRAS: "Herb. Ind. Or. Hook. fil. & Thomson," Madras. Ceylonia: *G. H. K. Thwaites*, 684. Java?: *F. W. Junghuhn*, 307.

15. *S. ACMELLA* (L.) Murr. erecta ascendens decumbensve plerumque non nodis radicans subpubescens vel pubescens vel subhispida nonnunquam glabra; foliis 1.5-5 cm. longis .7-3 cm. latis obtusis acutis acuminatisve subintegris aut acute vel obtuse plerumque non valde serratis brevipetiolatis; pedunculis 3-10 cm. longis; achaeniis inaequaliter biaristatis plerumque margine ciliatis. — *Spilanthus Acmella* (L.) Murr. L. — Murr. Syst. Veg. ed. XIII, 610 (1774).

Synonymia. —

Verbesina Acmella L. Sp. Pl. ed. I, ii, 901 (1753), et Mat. Med. 142 (1749); DC. Prod. v, 623 (1836); *Wight* Ic. Pl. Ind. Or. iii, 1109 (1843-1850); *Trim.* Hand Bk. Fl. Ceyl. iii, 40 (1895): *Chrysanthemum bidens zeylanicum Acmella dictum*, *Breyn.* f. Dissert. Bot.-Med. (1700); *Senecio ind. orient. ocymi majoris folio profunde crenato*, *Pluk.* Alm. Bot. Mant. 343 (1700) t. 315, f. 2 (1696).

Pyrethrum Acmella (L.) *Med.* in Act. Acad. vel Hist. et Comment. . . . *Theod.* — *Palat. (Phys.)* iii, 243, t. 19 (1775).

Bidens Acmella (L.) *Lam.* Encycl. Meth. (Bot.) i, 415 (1783).

Spilanthus Aemella *R. W. Darw.* Fam. Pl. ed. II, ii, 544 (1787).

Spilanthus melissaefolius *Salisb.* Prod. Stirp. Hort. Chap. Allert. 186 (1796).

Acemella Linnaei *Cass.* in Dict. Sc. Nat. xxiv, 330 (1822), *A.*

Linnaea *Cass.* secundum *Hook. f.* Fl. Brit. Ind. iii, 307 (1882).

Spilanthus Amella *Roxb.* Fl. Ind. iii, 410 (1832).

Verbisina Amella *Roxb.* l. c.

Spilanthus paniculata Wall. ex DC. Prod. v, 624 (1836); Hook. f. Fl. Brit. Ind. iii, 307 (1882); nomen ex Wall. Cat. 3186/296 (Dec. 1, 1828).

Spilanthus peregrina Blanc. Fl. Filip. ed. I, 622 (1837).

Spilanthus lobata Blanc. l. c.

Spilanthus Acmele (L.) Murr. var. *paniculata* (Wall.) Clarke ex Hook. f. Fl. Brit. Ind. iii, 307 (1882).

Ceratocephalus Acmele (L.) Ktze. Rev. Gen. Pl. i, 326 (1891).

Distributio. — In India orientali, China, Formosa, Insulis Philippinis, Australia.

Specimina examinata. — *J. E. Teijsmann*, "ex horto bogoriensi misit, 1869"; India: *R. Wight*, 449 et 1607. BENGALIA: *J. D. Hooker*, Sikkim. MADRAS: "Herb. Ind. Or. Hook. fil. & Thomson," sine collectoris nomine, Madras. TENASSERIM in BURMA aut INSULAE ANDAMAN: *J. W. Helfer*, 3186. Formosa: *R. Oldham*, an. 1864; *A. Henry*, 812, sine localitate, et 219, in Garampi (qui locus etiam Promunturium Australe appellatus est). Insulae Philippinae: *H. Cuming*, *Malacca* 2361; Herb. U. S. So. Pac. Explor. Exped., Manilae. China: YUNNAN: *A. Henry*, 12706, Sze-mao.

16. *S. ACMELE* (L.) Murr. var. *albescentifolia* A. H. Moore var. nov. foliis quam in praecedente plerumque maioribus (4.5–9.5 cm. longis 2–3.5 cm. latis) fere semper infra albescentibus.

Distributio. — Incognita sed sine dubio in Mundo Antiquo.

Specimen typicum. — "The Bernhardi Herbarium" nullis notis adiectis (in Herb. Hort. Bot. Mo.).

Specimina alia examinata. — Tria specimina alia "The Bernhardi Herbarium" nullis notis adiectis.

17. *S. ACMELE* (L.) Murr. var. *lanceolata* (Lk.) A. H. Moore comb. nov. erecta vel basi decumbente; foliis ovato-lanceolatis longiacuminatis incisus 3–7 cm. longis 1–4.5 cm. latis, petiolis 6.5–10.5 cm. longis numerosis; capitulis .8–1.3 cm. longis .7–1 cm. latis.

Synonymia. —

Spilanthus Pseudacmele Spreng. L. — Spreng. Syst. Veg. iii, 444 (1826), non (L.) Murr.

Verbesina Pseudacmele Spreng. l. c., non L.

Acmele lanceolata Lk. var. ex Spreng. l. c.

Distributio. — Incognita sed sine dubio in Mundo Antiquo.

Specimina examinata. — Ex Mus. Bot. Berol.; ex Hort. Bot. Petropol.

18. *S. COSTATA* Benth. ascendens nodis radicans; foliis 4–6.2 cm. longis 2–3 cm. latis saepius obtusis brevipetiolatis subintegris fere integris; pedunculis ca. 9 cm. longis. — Ex Hook. et Benth. Fl. Nigr. 436 (1849).

Distributio. — In promunturio Palmas in Africa.

Specimen examinatum. — Liberia: *J. B. T. Vogel*, in promunturio Palmas.

19. *S. callimorpha* A. H. Moore spec. nov. laxa longe decumbens vel prostrata, longis internodiis, nodis distantibus radicans, subpubescens vel glabra; foliis plerumque 4.7 cm. longis 1 cm. latis longe acuminatis, apice obtuse mucronuloideo, acute serratis aut saepius subincisis, petiolis plerisque 1 cm. longis; pedunculis 14–17 cm. longis; capitulis ovoideoconicis .9–1.1 cm. longis 6–8 mm. latis, involucri squamis 4–8 subacutis subciliatis; achaeniis inaequaliter biaristatis subciliatis vel glabris calvisque. Nostra species a ceteris sectionis longe distat foliis valde serratis, pedunculis internodiisque longissimis.

Distributio. — Sze-mao, China.

Specimen typicum. — China: YUN-NAN: *A. Henry*, 12260A, Sze-mao (in Herb. Hort. Bot. Novebor.) (specimen cum eodem lectum in Herb. Gray.).

Sectio II. *ACMELLA* (Rich.) DC. capitulis radiatis. — Prod. v, 620 (1836).

Synonymia. —

Genus *Acmella* Rich. in Pers. Syn. Pl. ii, 473 (1807).

Genus *Athronia* Neck. Elem. Bot. i, 32 (1790).

Subgenus *Acmellae* Rich. *Erpota* Raf. New Fl. N. Am. i, 51 (1836).

Sectio *Spilanthis* Jacq. *Megaglottis* F. Muell. Fragm. Phyt. Austr. v, 63 (1865–1866).

Distributio. — Per Indiam, Indias Orientales Nederlandicas, in Insulis Philippinis, in Abyssinia aliisque Africae regionibus, in Civitatibus Foederatis Americae a Carolina Boreali ad Floridam, in Texas et adventive in Nova Caesarea, per Mexico et Americam Centralem, in Indiis Occidentalibus, et in variis locis per totam oram Americae Australis.

Subsectio I. *Parvoradiatae* A. H. Moore subsect. nov. Radii involucri vix superantes plerumque perminuti et paulo ovati.

Distributio. — In Indiis Occidentalibus, in Mexico, Costa Rica, et per oram Americae Australis occidentalem a Colombia ad Chile et Argentinam, et in Africa orientali occidentalique.

20. *S. iodiscaeae* A. H. Moore spec. nov. decumbens vel prostrata sparse pubescens; caulibus tenuioribus. Folia 2.4–3.6 cm. longa .9–1.2 cm. lata, textura tenui, minute et sparse dentata, petiolis brevissimis vel nonnunquam nullis. Pedunculi 1.5–5 cm. longi (plerique ca.

2.5 cm.). Capitula ovoidea saepius acuta parva (5.7 mm. longa 4–5 mm. lata), paleis sursum violaceis deorsum luteis ad virides vergentibus, nihil praeter partem violaceam manifestum; radii minutissimi albi vel paulo luteotincti, apices ovate expansi; involucri squamae ovatae, margine ciliata. Receptacula tenuissima acutissimaque ca. 4–5 mm. longa 1 mm. minusve lata breve inaequaliterque biaristata. Radices tenues fasciculatque.

Haec species a ceteris longe distat palearum apicibus valde violaceis.

Distributio. — In insula Porto Rico.

Specimen typicum. — Porto Rico: MAYAGUEZ: *P. E. E. Sintenis*, 718, Cabo Rojo, locis cultis (in Herb. Gray.) (specimen cum eodem lectum in Herb. Mus. Hist. Nat. Field).

Specimina alia examinata. — Porto Rico: BAYAMÓN: *P. E. E. Sintenis*, 1149, "ad vias locis cultis" Palo-seco, Bayamón. PONCE aut GUAYAMA: *A. A. Heller et uxor*, 548, inter Aibonito et Cayey.

21. *S. IODISCAEA* A. H. Moore f. *leucaena* A. H. Moore f. nov. praecedenti omnino similis sed paleis albidovirescentibus.

Specimen typicum. — Porto Rico: PONCE aut GUAYAMA: *A. A. Heller et uxor*, 550a, inter Aibonito et Cayey. Annotatio in titulo dicit "unique" (in Herb. Hort. Bot. Novebor.).

22. *S. ULIGINOSA* Sw. pervariabilis ascendens laxa vel prostrata; foliis lanceolatis distanter irregulariterque serratis crenatisve 1.5–4.5 cm. longis .3–1.6 cm. latis, textura inter tenuem et crassam variante; pedunculis 1.1–5.2 cm. longis, discorum radiorumque colore inter luteum fere album et aureum variante; receptaculis tenuibus acutisque. — *Spilanthus uliginosa* Sw. Nov. Gen. Pl. seu Prod. Descr. Veg. Ind. Occ. 110 (1788); DC. Prod. v, 624 (1836).

Synonymia. —

Acmella uliginosa (Sw.) Cass. in Dict. Sc. Nat. xxiv, 331 (1822).

Jaegeria uliginosa (Sw.) Spreng. L. — Spreng. Syst. Veg. iii, 590 (1826).

Spilanthus Acmella (L.) Murr. var. *uliginosa* (Sw.) Bak. in Mart. Fl. Bras. vi, 3, 233 (Maio 1, 1884).

Ceratocephalus Acmella (L.) Ktze. var. *uliginosa* (Sw.) Ktze. Rev. Gen. Pl. i, 326 (1891), var. *uliginosus* l. c. iii, 140 (1898).

Ceratocephalus Acmella (L.) Ktze. var. *depauperata* Ktze. Rev. Gen. Pl. i, 326 (1891).

Distributio. — In Jamaica, per Antilles Minores a St. Christopher ad Grenadam, Tobago, Trinidad, et in Panama, et in Sierra Leone in Africa occidentali.

Specimina examinata. — Jamaica: *J. R. Churchill*, St. Ann's Bay, Mart. 19, 1897; *A. S. Hitchcock*, Luceae, Ian. 3, 1891, et Port Morant,

Dec. 20, 1890; *N. L. Britton*, 830, inter Constant Spring et Annotta Bay; *A. Fredholm*, 3059, prope Port Antonio; *A. E. Wight*, 35, Port Antonio; *W. Fawcett*, 8005, Castleton; *C. F. Millspaugh*, 1888, in paeninsula Tichfield. St. Christopher. *N. L. Britton* et *J. F. Cowell*, 678, in fundo Molyneaux. Guadeloupe: *P. Duss*, 2521, Basse-terre, 2822, apud castra Jacob, et 893 et 4447, Adonis prope castra Balata. Dominica: *H. F. A. v. Eggers*, 74, Goodville: *F. E. Lloyd*, 473, Petite Soufrière. Martinica: Herb. Rich, in arvis campestribus; *C. P. Belanger*, 179, prope St. Pierre; *P. Duss*, 930, St. Pierre; *L. Hahn*, 1107, in palude du Lamantin. St. Vincent: *H. H. et G. W. Smith*, 96. Grenada: *W. E. Broadway*, in fossa ad montem Parnassum, St. George's, Ian. 16, 1905; *H. F. A. v. Eggers*, 6063, Belvidere. Tobago: *H. F. A. v. Eggers*, 5760, ad flumen Great Dog. Trinidad: *O. Kuntze*, Apr. 1874. Panama: *J. F. Cowell*, 392, inter Ahorca Lagarto et Culebram. Sierra Leone: *W. H. et A. H. Brown*, 32a, Freetown.

23. *S. LUNDII* DC. erecta; foliis lanceolatis obtuse vel plerumque acute et saepius aequaliter serratis acuminatis brevipetiolatis, petiolis non ciliatis; capitulis saepius in planta multis (8 vel pluribus) plerisque 6 mm. longis 4 mm. latis, ligulis minimis. Plantae precedenti aspectu non dissimiles sed involucri squamis lanceolatis non late ovatis. — *Prod. v*, 622 (1836).

Synonymia. —

Spilanthes Salzmanni DC. *Prod. v*, 623 (1836).

Distributio. — In Brasilia.

Specimina examinata. — Brasilia: *L. Riedel*; *W. J. Burchell*, 7956-2. BAHIA: *K. F. P. v. Martius*, 438, Bahiae; *I. Blanchet*, circa Bahiam, an. 1831. RIO DE JANEIRO: *G. Gardner*, ser. I, 70, prope Rio de Janeiro.

24. *S. CILIATA* HBK. pervariabilis erecta vel ascendens; foliis lanceolatis vel plerumque ovato-lanceolatis crenatis vel serratis (saepe inaequaliter) acutis vel breviacuminatis, petiolis plus minusve brevibus nonnunquam fimbriatis vel ciliatis; capitulis .7-1.9 cm. longis 6-9 mm. latis, ligulis quam in praecedente plerumque paulo maioribus. Plantae aspectu *S. uliginosae Sw.* dissimiles. — *Nov. Gen. et Sp. Pl. iv*, 208 (1820); DC. *Prod. v*, 621 (1836).

Synonymia. —

Spilanthes fimbriata HBK. *Nov. Gen. et Sp. Pl. iv*, 208 (1820); DC. *Prod. v*, 621 (1836).

Spilanthes debilis HBK. l. c.; DC. l. c. 624.

Spilanthes tenella HBK. l. c.; DC. l. c.

Acmella ciliata (HBK.) Cass. in *Dict. Sc. Nat.* xxiv, 331 (1822).

Acmella fimbriata (HBK.) Cass. l. c.

Acmella debilis (HBK.) Cass. l. c.

Acmella tenella (HBK.) Cass. l. c.

Acmella brachyglossa Cass. l. c. l, 258 (1827).

Spilanthes grandis DC. Prod. v, 622 (1836).

Spilanthes Poeppigii DC. l. c.

Spilanthes Mariannae DC. l. c. 623.

Spilanthes arrayana Gardn. in Hook. Lond. Jour. Bot. vii, 408 (1848).

Spilanthes Mandonii Sch. Bip. in Linnaea xxxiv, 529 (1866).

Ceratocephalus ciliatus (HBK.) Ktze. Rev. Gen. Pl. i, 326 (1891).

Ceratocephalus fimbriatus (HBK.) Ktze. l. c.

Ceratocephalus debilis (HBK.) Ktze. l. c.

Ceratocephalus tenellus (HBK.) Ktze. l. c.

Ceratocephalus Poeppigii (DC.) Ktze. l. c.

Spilanthes Eggersii Hieron. in Engl. Bot. Jahrb. xxviii, 608 (Jan. 11, 1901).

Distributio. — In Brasilia et Mexico, et per oram Americae Australis occidentalem a Colombia ad Boliviam.

Specimina examinata. — "The Bernhardi Herbarium," 229.* **Mexico:**

Herb. Humboldt, apud montem Jurullo (planta per chartam delineata).

Brasilia: *W. J. Burchell*, 1025 et 9236; *F. Sellow*, 848 et 1078;

Herb. U. S. So. Pac. Explor. Exped., ad basim montium Organ. **GOYAZ:**

G. Gardner, ser. VIII, 3866, Arrayas. **Colombia aut Ecuador:** *F. C.*

Lehmann, 7987. **Colombia:** CUNDINAMARCA: ? *I. F. Holton*, Fusa-

gasugae, Dec. 21, 1852. **Ecuador:** MANABI: *H. F. A. v. Eggers*,

14931, Hacienda el Recreo (specimen per chartam delineatum).

Perua: LIMA: U. S. So. Pac. Explor. Exped., Limae et Obrajillo.

Bolivia: LA PAZ: *G. Mandon*, 63, prope Soratam. **YUNGAS:** *H. H.*

Rusby, 919.

25. *S. CILIATA* HBK. var. *diffusa* (Poepp.) A. H. Moore comb. nov. praecedenti persimilis sed prostrata; foliis ovatis, basi subcuneata, margine regulariter acute dentata, ca. 2.3 cm. longis 1.7 cm. latis; pedunculis singulis.

Synonymia. —

Spilanthes diffusa Poepp. Nov. Gen. et Sp. Pl. iii, 50 (1845).

Ceratocephalus diffusus (Poepp.) Ktze. Rev. Gen. Pl. i, 326 (1891).

Distributio. — In Andibus ecuadorensibus peruvianisque.

Specimina examinata. — **Ecuador:** *J. P. Couthouy*, in Andibus qui-

tensibus, an. 1855. **Perua:** *W. E. Stafford*, ad flumen Rimac, Aug.

29, 1887.

26. *S. SUBHIRSUTA* DC. decumbens; surculis maxime recentioribus subhirsutis vel dense tomentulosis aut saltem valde pubescentibus;

* This is Schiede * 229 = S. americana

foliis ovatis irregulariter sed saepius acute serratis acutis non mucronuloide attenuatis brevipetiolatis, petiolis subhirsutis; capitulis radiis minimis. — Prod. v, 622 (1836).

Synonymia. —

Ceratocephalus subhirsutus (DC.) Ktze. Rev. Gen. Pl. i, 326 (1891).

Spilanthes popayanensis Hieron. in Engl. Bot. Jahrb. xxviii, 608 (1901).

Distributio. — In Mexico et Colombia.

Specimina examinata. — Mexico: TAMAUlipas: *J. D. Berlandier*, Tampico (pars speciminis typici et eiusdem habitus per chartam delineatus). Colombia: CAUCA: *F. C. Lehmann*, 8010, Popayán.

27. *S. CAESPITOSA* DC. laxa prostrata vel subglabra; foliis anguste ovatis parvis, apice conspicue mucronuloide attenuato; capitulis radiis minimis. — Prod. v, 622 (1836).

Synonymia. —

Ceratocephalus caespitosus (DC.) Ktze. Rev. Gen. Pl. i, 326 (1891).

Distributio. — In Minas Geraës in Brasilia.

Specimen examinatum. — Brasilia: MINAS GERAËS: . . . *Vauthier*, 308 (pars speciminis typici et habitus photographa).

28. *S. poliolepidica* A. H. Moore spec. nov. erecta canescens pilosula. Folia lanceolata 3–5 cm. longa .7–1.4 cm. lata brevipetiolata vel subsessilia, supra obscuriora infra pallidiora canescentia saltem colore, margine integra nisi vero minutissime undulata subrevoluta. Capitula ovoidea 6–8 mm. longa; radii subaurei; involucri squamae valde pilosulae; paleae membranaceae deorsum albae sursum luteae vel subaureae. Achaenia ciliata fere aequaliter biaristata.

Distributio. — Chilamate prope flumen Sarapiqui in Costa Rica.

Specimen typicum. — Costa Rica: HEREDIA: *P. Biolley*, 7420, Chilamate prope flumen Sarapiqui (in Herb. Gray.) (specimen cum eodem lectum in Herb. J. D. Sm.).

29. *S. DISCIFORMIS* Rob. procumbens cum ramis ascendentibus (parte erecta 1.8–2.5 dm. alta), caulibus maxime prostratis lignosis maxime erectis rubrotinctis, nodis radicanibus; radicibus crassis in fasciculis dispositis; foliis integris subacutis subsessilibus aut brevipetiolatis, nervo medio prominente albicante, internodiis non longissimis et foliis quam internodiis plerumque longioribus. Pedunculi 5–7 cm. longi (plerumque 5.5 cm.). Capitula elongatoconica; radii quam capitula multo breviores minimi. Achaenia parum ciliata inaristata. — In Proc. Am. Acad. xxvii, 176 (Nov. 2, 1892).

Distributio. — Prope Guadalajaram in Mexico.

Specimen examinatum. — Mexico: JALISCO: *C. G. Pringle*, 3489, prope Guadalajaram (specimen typicum).

30. *S. limonica* A. H. Moore spec. nov. laxa sed erecta 3–5 dm. alta, caulibus nunquam rubrotinctis sparse pubescentibus; foliis ovato-lanceolatis integris vel subintegris (vix undulatis vel dentatis) obtusis aut vix acutis tenuibus, margine ciliolata; pedunculis 8–16 cm. longis (plerumque 10 cm.); capitulis elongatoconicis, radiis quam capitulis multo brevioribus minimis.

Distributio. — Limones in Santa Clara, Cuba.

Specimen typicum. — Cuba: SANTA CLARA: *C. G. Pringle*, 75, Limones (in Herb. Gray.) (specimina cum eodem lecta in Herbb. Hort. Bot. Mo., Hort. Bot. Novebor., Mus. Hist. Nat. Field).

Appellatio. — Ex nomine localitatis in qua specimen typicum lectum est.

31. *S. ALPESTRIS* Griseb. erecta ad 7.3 dm. alta; foliis late lanceolatis 1.5–6.6 cm. longis 1.5–2.6 cm. latis acute distanterque serratis, petiolis nullis; pedunculis ca. 11 cm. longis; capitulis subhemisphaericis supra planioribus fere planoconvexis. — In Gött. Gel. Abh. xix, 185 (1874).

Distributio. — In Argentina.

Specimen examinatum. — Argentina: TUCUMAN: *P. G. Lorentz* et *G. Hieronymus*, 903, Siambon (regione typica) (specimen per chartam delineatum).

32. *S. MAURITIANA* (Rich.) DC. erecta aut saepius decumbens procumbensque nodis saepe radicans puberula; foliis deltoideis vel ovatis serratis 2.3–3.2 cm. longis 1.5–2.8 cm. latis; pedunculis 1–1.5 cm. longis, bracteis late ovatis; capitulis subglobosis vel conicis 5 mm.–1.5 cm. longis 5–9 mm. latis, radiis latitudine saepe eis subsectionis sequentis aequantibus; involucri squamis angustioribus discos superantibus vel aequantibus. — Prod. v, 625 (1836).

Synonymia. —

Acmella mauritiana Rich. in Pers. Syn. Pl. ii, 472 (1807).

Acmella caulirhiza Del. Cent. Pl. d'Afr. du Voy. à Meroé, 45, t. 3, f. 7 (1826).

Spilanthes caulirhiza (Del.) DC. Prod. v, 623 (1836).

Spilanthes africana DC. l. c.

Spilanthes caulorrhiza Benth. Fl. Austr. iii, 541 (1866).

Acmella caulorrhiza (Benth.) Hook. f. et Jack. Ind. Kew. i, 29 (1895).

Acmella mauritanica Hook. f. et Jack. l. c.

Distributio. — In Pondoland in Africa, in Madagascare, et in Mauritio. Specimina examinata. — Africa?: "The Bernhardt Herbarium," 303.* Pondoland: *W. Tyson*, 1057, in cultis, Enshlewzi. Madagascar: . . . *Blackburn*, "comm. Admiral W. Bowles," Jul. 17, 1863. Mauritius: Sine collectoris nomine (planta per chartam delineata).

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33. *S. MAURITIANA* (Rich.) DC. f. *madagascariensis* (DC.) A. H. Moore comb. nov. capitulis maturis oblongis quam in praecedente magis elongatis 1.5 cm. longis 5-6 mm. latis.

Synonymia. —

Spilanthes caulirhiza (Del.) DC. β . *madagascariensis* DC. Prod. v, 623 (1836).

Distributio. — In Madagascare.

Specimen examinatum. — Madagascar: *M. A. Shufeldt*, 105.

Subsectio II. *Magnoradiatae* A. H. Moore subsect. nov. Radii capituli maturi involucrum conspicue superantes plerumque magni atque liguliformes.

Synonymia. —

Sectio *Spilanthis* *Jacq. Megaglottis* F. Muell. Fragm. Phyt. Austr. v, 63 (1865-1866).

Distributio. — In Civitatibus Foederatis Americae a Missouri ad Floridam et Texas, per Mexico et Americam Centralem, et in America Australi a Colombia ad Patagoniam borealem in Argentina, etiam in Mundo Antiquo in Java, Insulis Philippinis, Australia, et in Abyssinia in Africa.

34. *S. STENOPHYLLA* H. et A. procumbens; foliis angustissimis 2-2.5 cm. longis 1.5-2 mm. latis densissimis; pedunculis ca. 5.5 cm. longis; radiis discum aequantibus vel paulo superantibus. — In Hook. Jour. Bot. iii, 317 (1841).

Distributio. — Apud Buenos Aires in Argentina.

Specimen examinatum. — Argentina: BUENOS AIRES: *J. Tweedie*, 861, Buenos Aires.

35. *S. FILIPES* Greenm. erecta; foliis ovatis, basi in petiolum cuneato-attenuato, conspicue et valde aequaliter crenatoserratis, apice vix acuto aut vix mucronuloideo, petiolis plerisque ca. 2.5 cm. longis; pedunculis gracillimis; capitulis minimis (3.5-5.5 mm. longis plerisque 4.7 mm. latis), regulariter multis, radiis conspicuis quam capitulis longioribus; achaeniis ciliatis inaequaliter biaristatis. — In Proc. Am. Acad. xxxv, 314 (Mart. 16, 1900).

Distributio. — In civitate Yucatan in Mexico.

Specimina examinata. — Mexico: YUCATAN: "Allison V. Armour Expedition," 43; *G. F. Gaumer*, 2502, Izamal, 1122, Buena Vista (specimen typicum), 1257, 1465, 2185, Chichankanab, 3835, in insula Cozumel; *C. F. Millspaugh*, 1494, San Miguel in insula dicta.

36. *S. iabadicensis* A. H. Moore spec. nov. erecta saltem 2.8 dm. alta; foliis lanceolatis distanter sed acute et saepius inaequaliter

serratis, basi acuta, apice valde acuto nunquam mucronuloideo, petiolis brevissimis; pedunculis non gracillimis; capitulis .8–1.4 mm. longis, radiis quam capitulis brevioribus ac quam in praecedente multo minus abundantibus; achaeniis ciliatis inaequaliter biaristatis.

Distributio. — In Java.

Specimen typicum. — Java: *J. E. Teijsmann*, "ex horto bogoriensi Javae misit, 1869." (in Herb. Gray.).

37. *S. phaneractis* (Greenm.) A. H. Moore comb. nov. prostrata decumbensve nodis radicans, radicibus tenuioribus; caulibus crassis rubrotinctis sed nunquam lignosis; foliis late linearibus aut linearilanceolatis, nervo medio prominente plerumque non albicante, internodiis plerumque longis quam foliis multo longioribus; pedunculis 8.2–14 cm. longis (plerumque ca. 11 cm.); capitulis radiis magnis (cf. no. 29).

Synonymia. —

Spilanthus disciformis Rob. var. *phaneractis* Greenm. in Proc. Am. Acad. xxxix, 108 (Sept. 25, 1903).

Distributio. — In civitatibus Jalisco et Michoacán in Mexico.

Specimina examinata. — Mexico: JALISCO: *C. G. Pringle*, 11312, apud aquae deiectum Juanacatlán prope Guadalajaram. MICHOACÁN: *C. G. Pringle*, 8637 et 9539, Zamorae.

38. *S. MACROPHYLLA* Greenm. foliis ovatolanceolatis inter integra et distanter inaequaliterque dentata vel undulata variantibus, basi cuneata, apice acuminato, margine ciliolata; involucri squamis valde pubescentibus; radiis capitula aequantibus vel superantibus. — In Proc. Am. Acad. xxxix, 109 (Sept. 25, 1903).

Distributio. — In Honduras et Costa Rica.

Specimina examinata. — Honduras: SANTA BARBARA: *C. Thieme*, 5309, San Pedro. Costa Rica: SAN JOSÉ: *H. Pittier*, 3717, in ripis fluminis Volcan, 10546, Alto del Zacatal (specimen typicum) (planta per chartam delineata). SAN MARCOS: *A. Tonduz*, 7831, San Marcos.

39. *S. PAPPOSA* Hemsl. foliis ovatolanceolatis inter integra et paulum undulata variantibus, basi subcuneata, apice longe acuto sed non acuminato, margine non ciliolata; involucri squamis pilosulis; radiis capitula fere vel omnino aequantibus. — Biol. Centr.-Am. Bot. ii, 193 (Oct. 1881)

Distributio. — In Nicaragua.

Specimen examinatum: Nicaragua: CHONTALES: *R. Tate*, 1867–1868.

Synonymia. —

Ceratocephalus papposus (Hemsl.) Ktze. Rev. Gen. Pl. i, 326 (1891).

40. *S. GRANDIFLORA* Turcz. foliis inter ovata et ovatolanceolata

variantibus plerumque irregulariter serratis; radiis involucrium vix superantibus. — In Bull. Soc. Nat. Mosc. xxiv, 1, 185 (1851).

Synonymia. —

Ceratocephalus grandiflora (Turcz.) Ktze. Rev. Gen. Pl. i, 326 (1891).

Distributio. — In insula Luzon in Insulis Philippinis et in Queensland in Australia.

Specimina examinata. — Insulae Philippinae: *H. Cuming*, 1154, in insula Luzon (cum specimine typico lectum). Australia: QUEENSLAND: *E. M. Bowman*, Rockhampton.

41. *S. GRANDIFLORA* Turcz. var. *BRACHYGLOSSA* Benth. praecedenti similis sed ligulis involucrium vix superantibus et foliis 2.5–5.5 cm. longis .5–.8 cm. latis. — Fl. Austr. iii, 541 (1866).

Synonymia. —

Spilanthus Acmella F. Muell. Fragm. Phyt. Austr. v, 63 (1865–1866), non L.

Distributio. — Ad rivum Sturt in Australia Occidentali.

Specimen examinatum. — Australia: AUSTRALIA OCCIDENTALIS: *Ferd. Mueller*, ad rivum Sturt (planta per chartam delineata).

42. *S. GRANDIFLORA* Turcz. var. *CALVA* Benth. praecedenti similis sed ligulis involucrium multo superantibus. — Fl. Austr. iii, 541 (1866).

Synonymia. —

Spilanthus macroglossa F. Muell. Fragm. Phyt. Austr. v, 63 (1865–1866).

Distributio. — Apud sinum Moreton in Queensland in Australia.

Specimen examinatum. — Australia: QUEENSLAND: Sine collectoris nomine, apud sinum Moreton.

43. *S. pammicrophylla* A. H. Moore spec. nov. erecta 15.5–18.5 cm. alta; caulibus glabris, surculis foliosis brevibus, radicibus fasciculatis; foliis minutissimis 7–15 mm. longis integris aut vix et sparse serratis sparse pubescentibus densis, internodiis inferioribus plerumque 1.5 cm. longis superioribus plerumque .4–1.3 cm. longis (regulariter ca. 8 cm.), petiolis 2–5 mm. longis; capitulis ovoideis .7–1 cm. longis, pedunculis 2.5–4.5 cm. longis tenuioribus; achaeniis margine ciliolatis inaequaliter biaristatis.

Distributio. — In Nicaragua.

Specimen typicum. — Nicaragua: *C. Wright*, Herb. U. S. No. Pac. Explor. Exped. (in Herb. Gray.) (specimen cum eodem lectum in Herb. Mus. Nat. Civ. Foeder. Am.).

44. *S. ABYSSINICA* Sch. Bip. prostrata vel ascendens dense sed minute pubescens vel subglabra, radicibus fasciculatis; foliis ovatis 1.5–4.5 cm. longis .8–3 cm. latis subsessilibus vel petiolatis usque ad 1.5 cm. longis;

radiis fere colore albo puro, pedunculis 2-8 cm. longis; achaeniis margine plerumque crassa. — In Théoph. Lefèbvre Voy. en Abyss. iv (Rich. Tent. Fl. Abyss. i), 415 (1847); nomen ex Hochst. in Flora xxiv, 1, "Intellbl." 26 (1841).

Distributio. — Prope Adowa in Abyssinia.

Specimen examinatum. — Abyssinia: TIGRÉ: *W. Schimper*, 134, prope Adowa (cum specimine typico lectum).

7 45. *S. AMERICANA* (Mut.) Hieron. pervariabilis erecta, radicibus non fasciculatis; foliis inter ovata et ovatolanceolata variantibus saepius crenatis quam serratis nonnunquam subintegris vel paulo serratis, apice inter obtusum et acutum variante (saepius obtuso), nunquam tam longis quam in no. 50 sed quam in nr. 46, 47, 48, 49 maioribus, petiolis brevibus vel longis. — Ex Sod. in Engl. Bot. Jahrb. xxix, 42 (Majo 22, 1900).

Synonymia. —

Anthemis americana Mut. ex L. f. Suppl. Syst. Veg. 378 (1781).

Anthemis oppositifolia Lam. Encycl. Meth. (Bot.) i, 576 (1783).

Anthemis occidentalis Willd. L. — Willd. Sp. Pl. iii, 2185 (1804).

Acmella occidentalis (Willd.) Rich. in Pers. Syn. Pl. ii, 473 (1807).

Spilanthes Mutisii HBK. Nov. Gen. et Sp. Pl. iv, 209 (1820); DC. Prod. v, 622 (1836).

Acmella ? Mutisii (HBK.) Cass. in Dict. Sc. Nat. xxiv, 331 (1822).

Spilanthes Beccabunga DC. Prod. v, 622 (1836).

Spilanthes Lehmanniana Klatt in Engl. Bot. Jahrb. viii, 43 (1886).

Spilanthes orizabaensis Sch. Bip. ex Klatt Leopold. xxiii, 5 (1887).

Spilanthes uliginosa var. Sch. Bip. ex Klatt l. c.

Spilanthes Sartorii Sch. Bip. ex Klatt l. c.

Ceratocephalus americanus (Mut.) Ktze. Rev. Gen. Pl. i, 326 (1891).

Ceratocephalus Beccabunga (DC.) Ktze. l. c.

Distributio. — In Cuba, Mexico, America Centrali, Colombia.

Specimina examinata. — Mexico: *T. Coulter*, 324; *C. J. W. Schiede*, 229; comm. *C. Schaffner*, det. Sch. Bip. SAN LUIS POTOSÍ: *J. G. Schaffner*, 338, "ex convalli San Luis Potosí," et 763, "San Luis Potosí"; *C. C. Parry* et *E. Palmer*, 464, maxime in regione San Luis Potosí. JALISCO: *C. G. Pringle*, 1821, Guadalajaræ. REGIO FOEDERALIS: *C. G. Pringle*, 9964, prope Tlalpam; *E. Bourgeau*, 154, Chapultepec. MORELOS: *C. G. Pringle*, 9546, prope Cuautlam. VERA CRUZ: *M. B. Halsted*, 32, et *C. R. Barnes*, *C. J. Chamberlain*, *W. J. G. Land*, 9, prope Jalapam; *J. M. Greenman*, 25, La Laguna prope Vera Cruz, et 134, prope Cordobam; *E. Bourgeau*, 603 et 603 bis, prope Santa Fé, et 1630, in valle Cordobæ; *A. Gray*, "Journey to Mexico and California, Feb., May, 1885," Cordobæ; *C. Sartorius*, Mi-

rador prope Huatucam ; *H. E. Seaton*, 73, Orizabae. OAXACA : *E. W. Nelson*, 1032, prope La Parada ; *L. C. Smith*, 131, Rancho de Calderas ; *J. N. Rose*, *J. H. Painter*, *J. S. Rose*, 10055, prope Tomellin ; *C. Conzatti* et *V. González*, 1241, Oaxacae. CHIAPAS : *A. Ghiesbreght*, 557. Guatemala : ALTA VERA PAZ : *H. v. Türckheim*, 758, Cobán, et 124 et *J. D. Smith*, 1604, prope Cobán. QUICHÉ : *H. T. Heyde* et *E. Lux*, 4501, Nebáj. QUEZELTENANGO : *F. C. Lehmann*, 1596, Quezeltenango. Costa Rica : SAN JOSÉ : *A. Tonduz*, 3030, San José. Cuba : HABANA : *A. H. Curtiss*, 684, et *J. W. Robbins*, Mart. 1864, prope Habanam ; *J. A. Shafer*, 420, Habanae. Colombia : *J. Triana*, 1391. CAUCA : *F. C. Lehmann*, 3487, circum Puracé, et 3599, Chapae. Colombia aut Ecuador : *F. C. Lehmann*, 6446.

46. *S. AMERICANA* (Mut.) Hieron. var. *ramosa* (Hemsl.) A. H. Moore comb. nov. prostrata laxa vel procumbens ; foliis 1.5–2.2 cm. longis ca. 7 mm. latis denticulatis ; capitulis subglobosis (ca. 5 mm. diametro), discis gracillimis.

Synonymia. —

Spilanthes ramosa Hemsl. Biol. Centr.-Am. ii, 193 (Oct. 1881).

Ceratocephalus ramosus (Hemsl.) Ktze. Rev. Gen. Pl. i, 326 (1891).

Distributio. — In valle Cordobae in Mexico.

Specimina examinata. — Mexico : VERA CRUZ : *E. Bourgeau*, 2284, in valle Cordobae ; *H. E. Seaton*, 445, Cordobae.

47. *S. AMERICANA* (Mut.) Hieron. var. *parvula* (Rob.) A. H. Moore comb. nov. prostrata vel laxa vel procumbens glabra aut vix pubescens ; foliis ovatis raro ellipticis crenatulis vel serratulis plerumque 1.8 cm. longis 1 cm. latis minoribus ; capitulis plerumque 7–14 mm. longis.

Synonymia. —

Spilanthes Beccabunga DC. var. *parvula* Rob. in Proc. Am. Acad. xxvii, 176 (Nov. 2, 1892).

Distributio. — In Mexico, Guatemala, Costa Rica.

Specimina examinata. — Mexico : MEXICO : *C. G. Pringle*, 3643, Flor de Maria. Guatemala : ZACATEPÉQUEZ : *J. D. Smith*, 2125, Dueñas. SANTA ROSA : *H. T. Heyde* et *E. Lux*, 4209, Naranjo. Costa Rica : SAN JOSÉ : *A. Tonduz*, 449, San José.

48. *S. AMERICANA* (Mut.) Hieron. var. *PARVULA* (Rob.) A. H. Moore f. *parvifolia* (Benth.) A. H. Moore comb. nov. praecedenti omnino similis sed plus minusve conspicue pubescens.

Synonymia. —

Spilanthes parvifolia Benth. ex Oerst. in Vidensk. Meddel. Nat. For. Kjoeb. 100 (1852).

Spilanthes lateraliflora Klatt in Engl. Bot. Jahrb. viii, 43 (1886).

Ceratocephalus parvifolius (Benth.) Ktze. Rev. Gen. Pl. i, 326 (1891).

Distributio. — In Guatemala et Costa Rica.

Specimina examinata. — Guatemala: ALTA VERA PAZ: *F. C. Lehmann*, 1319, circum Cobán; *H. v. Türckheim*, 8418, Cobán. Costa Rica: SAN JOSÉ: *A. Tonduz*, 12241, in pascuis Santa Rosa du Copey.

49. *S. AMERICANA* (Mut.) Hieron. var. *PARVULA* (Rob.) A. H. Moore f. *lanitecta* A. H. Moore f. nov. *S. americanae* (Mut.) Hieron. var. *parvulae* (Rob.) A. H. Moore omnino similis sed dense lanuginosa, maxime caules.

Distributio. — San Siguán in Guatemala.

Specimen typicum. — Guatemala: QUICHÉ: *H. T. Heyde* et *E. Lux*, 3381, San Siguán, alt. ca. 1770 m. (in Herb. Gray.) (specimen cum eodem lectum in Herb. J. D. Sm.).

50. *S. AMERICANA* (Mut.) Hieron. var. *repens* (Walt.) A. H. Moore comb. nov. magnopere variabilis pubescens vel glabra erecta vel laxa ascendens decumbens raro prostrata; foliis plerumque inter elliptica et lanceolata variantibus saepius serratis quam crenatis (inter subintegra et valde sed aequaliter serrata variantibus), apice inter obtusum et acuminatum variante saepius acuto vel acuminato, 2–12 cm. longis .7–4.5 cm. latis subsessilibus vel petiolis usque ad 4 cm. longis; pedunculis 3–12 cm. longis; capitulis plerumque 9–16 mm. longis. Haec varietas *S. americanae* (Mut.) Hieron. valde affinis est.

Synonymia. —

Anthemis repens Walt. Fl. Car. 211 (1788).

Spilanthes repens (Walt.) Michx. Fl. Bor.-Am. ed. I, ii, 131 (1803); DC. Prod. v, 623 (1836).

Acmella repens (Walt.) Rich. in Pers. Syn. Pl. ii, 473 (1807).

Acmella occidentalis? Nutt. Gen. N. Am. Pl. ii, 171 (1818).

Acmella Nuttalliana Raf. New Fl. N. Am. i, 52 (1836).

Spilanthes Nuttallii T. et G. Fl. N. Am. ii, 356 (Apr. 1842).

Ceratocephalus repens (Walt.) Ktze. Rev. Gen. Pl. i, 326 (1891).

Distributio. — In civitatibus australibus Civitatum Foederatorum Americae, Missouri, Arkansas, Louisiana, Mississippi, Texas, Carolina Australi, Florida.

Specimina examinata. — Civitates Foederatae Americae: *A. Gray*, in Civitatibus Australibus, 1846; Mexican Boundary Survey, 587 (Civ. Foeder. Am. ?). MISSOURI: *G. W. Letterman*, Aug. 15, 1875, et *C. Russell*, Sept. 1897, Poplarbluff; *F. W. Dewart*, Poplarbluff, Aug. 14, 1892, et Neeleysville, Oct. 2, 1892; *H. Eggert*, prope Neeleysville, Aug. 8, 1893, et prope Asheville, Aug. 19, 1892; *B. F. Bush*, 176, Malden, et *Campbell*, Sept. 18, 1893, 178, Kennett, et *Iunct. Paw Paw*, Sept. 15, 1893, et 82, in comitatu New Madrid; *W. Trelease*, 544, Bertig. ARKANSAS: *F. V. Coville*, 99; *B. F. Bush*, 248, Marked Tree; *W. Tre-*

lease, in insula Rattlesnake in flumine St. Francis, Aug. 29, 1897; *G. W. Letterman*, Little Rock, Aug. 29, 1879. LOUISIANA: *M. C. Leavenworth*; *J. Gregg*, prope Shreveport, Sept. 14, 1847; *E. L. Moseley*, in parochia West Carroll, Iul. 17, 1903; *J. D. Smith*, in parochia Concordia, Sept. 9, 1885; *C. R. Ball*, 639, prope Alexandriam; Baton Rouge, Sept. 14, 1867, comm. *W. R. Dodson*, an. 1896; *K. K. Mackenzie*, 477, prope lacum Charles; *S. M. Tracy*, 2485, 8586, et "ex Herb. J. F. Joor," Nov. 1870, New Orleans. MISSISSIPPI: *J. D. Smith*; *T. Nuttall*, comm. *E. Durand*, an. 1866. TEXAS: *J. Reverchon*, 161, "W. Texas"; *S. M. Tracy*, 7329, Pierce; *B. F. Bush*, 118, 295, 712, 941, 1287, Columbiae; *E. Hall*, 348, *B. F. Bush*, 252, *L. F. Ward*, Sept. 12, 1877, *F. Lindheimer*, Aug., et Sept. 1842, Houston; *J. Reverchon*, Sept. 6, 1903, et 1535, in comitatu Ellis; *J. M. Bigelow*, Las Moros. CAROLINA AUSTRALIS: *W. Ravenel*, ad flumen Santee (regionem typicam), Sept. 1846. FLORIDA: *M. C. Leavenworth*, "Florida," et "E. Florida"; *A. S. Hitchcock*, in comitatu Columbia, Iun.-Iul. 1898; *F. Rugel*, prope St. Marks; *M. C. Reynolds*, St. Augustine, Sept.-Oct. 1875; *A. H. Curtiss*, 6000, prope Chattahoochee, et prope Daytonam, Feb. 1881; *A. P. Garber*, in comitatu Levy, Nov. 1877, et Tampae, Maio 1876 et Oct. 1877; *S. M. Tracy*, 7148, Braidentown (forma extrema); *J. H. Simpson*, Manatee, an. 1889; *A. W. Chapman*, ad flumen Caloosahatchee.

51. S. AMERICANA (Mut.) Hieron. var. *stolonifera* (DC.) A. H. Moore comb. nov. S. *americanae* (Mut.) Hieron. var. *repenti* (Walt.) A. H. Moore valde persimilis sed foliis linearibus integris aut vix denticulatis (saepius integris) 1.7-5.5 cm. longis .2-1 cm. latis subsessilibus vel sessilibus (petiolis quam in varietate dicta plerumque brevioribus); pedunculis 4.5-17.5 cm. longis. Per varietatem dictam S. *americanae* (Mut.) Hieron. affinis.

Synonymia. —

Spilanthes stolonifera DC. Prod. v, 621 (1836).

Distributio. — In Paraguay et in Civitatibus Foederatis Americae adventive in Nova Caesarea et probabiliter adventive in Carolina Boreali Australique et Florida.

Specimina examinata. — Civitates Foederatae Americae: NOVA CAESAREA: *G. A. Gross*, adventive Camden, Iul. 3, 1891. CAROLINA BOREALIS: *G. McCarthy* 5, et *F. V. Coville*, 166, Wilmington. CAROLINA AUSTRALIS: *G. McCarthy*, xxxi, "in oriente Carolina Australis." FLORIDA: *A. H. Curtiss*, 5882, in parte, Carrabelle. Paraguay: *E. Hassler*, 1639, et 3370, San Bernardino; *T. Morong*, 89, Asunción; *K. Fiebrig*, 345, in Cordillera de Altos. Specimen cultum: *J. Gay*, Parisiis, Sept. 1839.

52. *S. AMERICANA* (Mut.) Hieron. var. *STOLONIFERA* (DC.) A. H. Moore f. *longiinternodiata* A. H. Moore f. nov. glabra; internodiis longis (plerumque 3.5 cm.); foliis conspicue acute et distanter dentata (spatia interdentalia .5–1 cm. longa).

Distributio. — Apud Carrabelle in Florida in Civitatibus Foederatis Americae.

Specimen typicum. — Civitates Foederatae Americae: FLORIDA: *A. H. Curtiss*, 5882, in parte, Carrabelle (in Herb. Gray.) (specimina cum eodem lecta in Herbb. Hort. Bot. Mo., Mus. Nat. Civ. Foeder. Am., Hort. Bot. Novebor., Mus. Hist. Nat. Field).

53. *S. AMERICANA* (Mut.) Hieron. var. *STOLONIFERA* (DC.) A. H. Moore f. *ciliatifolia* A. H. Moore f. nov. pubescens; foliis margine plus minusve ciliata.

Distributio. — In Argentina.

Specimen typicum. — Argentina: *P. G. Lorentz*, 76 (in Herb. Gray.).

54. *S. BLEPHARICARPA* DC. foliis linearilanceolatis angustioribus distanter margine ciliatis, apice acuto; achaeniis valde ciliatis. — DC. Prod. v, 621 (1836).

Distributio. — In provincia Rio Grande in Brasilia.

Specimen examinatum. — Brasilia: RIO GRANDE: Herb. Mus. Imp. Bras., 1030 (planta per chartam delineata).

55. *S. decumbens* (Sm.) A. H. Moore comb. nov. sparse pubescens, maxime in foliis, radicum fasciculis reptans; foliis basalibus saepe quam caulinis maioribus ovatis crenatis, caulinis ovatis vel lanceolatis vel linearispatulatis angustioribus et subintegris vel integris, basi saepe attenuata; capitulis radiis latis, pedunculis 14.5–23 cm. longis.

Synonymia. —

Rudbeckia decumbens Sm. in Rees Cycl. vel Univ. Dict. Art. Sc. Litt. ed. anglica, xxx, sect. ii, parte 60, no. 11 (1815).

Rudbeckia bellioides Sm. l. c. no. 12.

Verbesina bupthalmoides Lk. et Ott. Ic. Pl. Select. Hort. Reg. Bot. Berol. 105, t. 49 (1828).

Spilanthes arnicoides DC. Prod. v, 620 (1836).

Spilanthes daronicoides DC. l. c.

Spilanthes helenioides H. et A. in Hook. Journ. Bot. iii, 317 (1841).

Ceratocephalus decumbens (Sm.) Ktze. Rev. Gen. Pl. i, 326 (1891).

Ceratocephalus arnicoides (DC.) Ktze. l. c.

Ceratocephalus decumbens (Sm.) Ktze. var. *daronicoides* (DC.) Ktze. l. c. iii, 140 (1898).

Distributio. — In Brasilia et Uruguay.

Specimina examinata. — Brasilia: *F. Sellow*, 1969. Uruguay: MONTEVIDEO: *A. Isabelle*, Montevideo, an. 1838.

56. *S. DECUMBENS* (Sm.) A. H. Moore var. *macropoda* (DC.) A. H. Moore comb. nov. foliis quam in praecedente plerumque paulo angustioribus duarum formarum fieri inclinatis, linearibus (4–8 cm. latis), lanceolatis (plerumque 1.5 cm. latis), ambabus 4.5–6 cm. longis; sine foliis basalibus formae peculiaris; pedunculis 11–17 cm. longis. Plantae nonnunquam folia latiora solum habent.

Synonymia. —

Spilanthes macropoda DC. Prod. v, 621 (1836).

Spilanthes arnicoides DC. var. *macropoda* (DC.) Bak. in Mart. Fl. Bras. vi, 3, 234 (Maio 1, 1884).

Ceratocephalus decumbens (DC.) Ktze. β . *macropodus* (DC.) Ktze. Rev. Gen. Pl. iii, 140 (1898).

Distributio. — In Brasilia.

Specimina examinata. — Brasilia: *F. Sellow*, 1764 et 3522; *A. F. Regnell*, ser. II, 168.

57. *S. DECUMBENS* (Sm.) A. H. Moore var. *leptophylla* (DC.) A. H. Moore comb. nov. repens; foliis densis anguste linearibus (2–4 mm. latis 1.5–2.5 cm. longis) sessilibus subsessilibusve; pedunculis 5.4–8.5 cm. longis.

Synonymia. —

Spilanthes leptophylla DC. Prod. v, 621 (1836).

Spilanthes arnicoides DC. var. *leptophylla* (DC.) Bak. in Mart. Fl. Bras. vi, 3, 234 (Maio 1, 1884).

Distributio. — In Brasilia.

Specimen examinatum. — Brasilia: *F. Sellow*, 2796.

58. *S. grisea* (Chod.) A. H. Moore comb. nov. erecta vel ascendens valde subpubescens, maxime folia et involucri squamae. Folia inter lanceolata et ovata variantia obtusa vel subacuta dentata dense hispidulosa. Capitula maxima; radii maximi (cf. no. 62).

Synonymia. —

Spilanthes arnicoides DC. f. *grisea* Chod. in Bull. Herb. Boiss. ser. 2, i, 417 (1901).

Spilanthes arnicoides DC. var. *grisea* Chod. l. c. iii, 725 (1903).

Distributio. — In Paraguay.

Specimina examinata. — Paraguay: *E. Hassler*, 1211, prope Tacuaral, et 4659, prope flumen Jejui Guazu.

59. *S. GRISEA* (Chod.) A. H. Moore var. *intermedia* (Chod.) A. H. Moore comb. nov. sparse ciliata; foliis quam in praecedente angustioribus 3–7 cm. longis .7–2 cm. latis.

Synonymia. —

S. arnicoides DC. var. *intermedia* Chod. in Bull. Herb. Boiss. ser. 2, iii, 725 (1903).

Distributio. — In regione cursus superioris fluminis Apa in Paraguay.
Specimen examinatum. — Paraguay: *E. Hassler*, 8273, in regione cursus superioris fluminis Apa.

60. *S. GRISEA* (Chod.) A. H. Moore var. **setosa** (Chod.) A. H. Moore comb. nov. maxime foliis margine conspicue ciliatis; foliis quam in no. 58 longioribus 7–10 cm. longis 1–2.2 cm. latis.

Synonymia. —

S. arnicoides DC. var. **setosa** Chod. in Bull. Herb. Boiss. ser. 2, iii, 725 (1903).

Distributio. — Prope flumen Capibary in Paraguay.

Specimen examinatum. — Paraguay: *E. Hassler*, 4475, prope flumen Capibary.

61. *S. GRISEA* (Chod.) A. H. Moore var. **Chodatana** A. H. Moore var. nov. foliis minute ciliatis distanter serratis quam in no. 59 angustioribus 4.8–8 cm. longis .5–8 cm. latis, serrationibus quam in duabus praecedentibus prominentioribus.

Distributio. — In regione cursus superioris fluminis Apa in Paraguay.

Specimen typicum. — Paraguay: *E. Hassler*, 7651, in regione cursus superioris fluminis Apa (in Herb. Chod.).

Appellatio. — Ex nomine doctoris R. Chodat, qui hanc novam esse varietatem iudicavit, derivata. Nota in titulo dicit “var. acced. ad var. macropoda.”

62. *S. GRISEA* (Chod.) A. H. Moore var. **micra** A. H. Moore var. nov. Caules pendunculique pubescentes. Folia margine ciliata et praeterquam nervum medium glabriuscula ad basin subconserta. Pedunculi 5.5–7 cm. longi. Capitula maiora; radii maiores (cf. no. 58).

Distributio. — Prope Tacuaral in Paraguay.

Specimen typicum. — Paraguay: *E. Hassler*, 925, prope Tacuaral (in Herb. Hort. Bot. Novebor.).

63. *S. eurycarena* A. H. Moore spec. nov. erecta vel ascendens, basi procumbente; foliis anguste linearibus (2–5 mm. latis 2–3.8 cm. longis) sessilibus vel brevipedunculatis densioribus; capitulis latissimis (1.5–2.5 cm.) 1–1.8 cm. longis, discis crassissimis (plerumque 4 mm. latis 1 cm. longis), radiis brevibus latisque ca. 7 mm. longis 4–5 mm. latis; pedunculis 12–19.5 cm. longis; achaeniis margine ciliatis inaequaliter biaristatis.

Distributio. — Rio Negro in Patagonia boreali in Argentina et circum Buenos Aires.

Specimen typicum. — Argentina: DEL RIO NEGRO: U. S. So. Pac. Explor. Exped., Rio Negro (in Herb. Gray.) (specimen cum eodem lectum in Herb. Hort. Bot. Novebor.).

Specimen alium examinatum. — Argentina: BUENOS AIRES: “*Miss Parker*,” Buenos Aires.

ANNOTATIONES.

SPILANTHES Jacq. Nomen in forma Spilantes primo a Jacquin usurpatum est, sed a Linnaeo in editione duodecima Systemae Naturae sub forma Spilanthus datum est et postea hac forma Jacquin ipse usus est. Descriptio autem originalis, quamquam brevis, formam Spilantes certam facit. *S. urens* et *S. insipida* primo a Jacquin descriptae sunt, quamobrem *S. urens* generis species typica est. DeCandolle duas sectiones recognovit, viz. Salivariam et Acmellam, quarum posterior imprimis a Richard pro genere descripta erat.

Sectio I. SALIVARIA DC.

1. *S. CHAMAECAULA* A. H. Moore. Haec species inter insignissimas generis nostri est, non solum habitu prostrato, quem paucae species aliae saltem in parte habent, sed etiam quod achaenia aristam singulam ferunt. Species generis ceterae aut biaristatae aut inaristatae sunt. Specimen typicum sub nomine *S. anactinae* *F. Muell.* distributum est, a qua tamen characteribus technicis habituque valde differt.

2. *S. NERVOSA* Chod. Haec species foliis magis ovatis et nervis anastomosantibus prominentibus a sequente differt.

3. *S. URENS* Jacq. Huius speciei tabula optima, *Jacq. Select. Stirp. Am. Hist. t. 126, f. 1*, hanc plantam esse quam Jacquin indicaverit sine dubio ostendit. Variationes duae notatae sunt:—

4. *S. URENS* Jacq. f. *LANEA* A. H. Moore forma lanea et

5. *S. URENS* Jacq. var. *HISPIDULA* DC. imprimis natura plus hispidulosa sed etiam habitus differentiis paucis, foliorum formis, etc., discriminatur.

6. *S. ANACTINA* *F. Muell.* Haec species *S. urenti* *Jacq.* antheris apice nigris foliisque integris similis est, sed foliis plus acuminatis plerumque angustioribus nunquam revolutis differt. Iudicare licet hanc speciem, cuius natura specimine a *F. Mueller* authenticato certa fiat, *S. urenti* *Jacq.*, speciei maxime Indiarum Occidentalium, respondere.

7. *S. PUSILLA* *H. et A.* Haec species parva gracilisque a praecedentibus omnibus caulibus tenuibus parvisque et foliis angustis linearispatulatis differt. Figura speciminis originalis per chartam delineata huius speciei characteres noti sunt.

8. *S. INSIPIDA* *Jacq.* Haec species foliis valde et maxime obtuse sinuatodentatis in sectione unica est. E tabula, *Jacq. Select. Stirp. Am. Hist. t. 126, f. 2*, quamquam imperfectissima, cum descriptione bona, *l. c. 215*, *S. insipidae* natura certa est.

9. *S. OLERACEA* *L.*, saepe sed errore cum auctoritate *Jacq.* citata, species a ceteris discis magnis oblongis (vero in genere maximis) foliis-

que deltoideis longe abest. Figura prima bona, quod sciam, est *Jacq. Hort. Bot. Vind. ii, t. 135*. Recenter nomen *S. oleracea* pro synonymo *S. Acmellae* (L.) Murr. habitum est, potius, crediderim, quia haec ignoscebatur quam illa.

10. *S. LEUCANTHA* HBK. sequenti valde affinis est et caractere solum tecnico differt, eo nempe quod multas bracteas habet.

11. *S. OCYMIFOLIA* (Lam.) A. H. Moore. Haec species communiter *S. alba* Willd. (errore incertae originis pro L'Hér.) appellata est. *Spilanthus Salivaria* Domb., re vera a L'Héritier una cum *Spilante alba* anno 1874 editus, falso dicitur iam antea publicatus esse. Anno 1873 Lamarck in encyclopaedia sua *Bidentem ocymifoliam* pro synonymo *S. albae* edidit. Apud *Lam.-Poir. Illustr. Genres iii, t. 668* tabula invenitur quae sine dubio *S. albam* typicam repraesentat. Inde *Bidens ocymifolia* combinatio prima speciei nostri est. *S. ocymifolia* habitu pervariabilis praecedentibus multo latius distributa est.

12. *S. OCYMIFOLIA* (Lam.) A. H. Moore f. *RADIIFERA* A. H. Moore inter sectiones Salivariam et Acmellam radiis intermedia est. Haec forma, cum specie coextensa, multas eiusdem variationes participat.

13. *S. OCYMIFOLIA* (Lam.) A. H. Moore var. *ACUTISERRATA* A. H. Moore. Haec varietas a specie plerumque capitibus abundantioribus et foliorum serrationibus prominentioribus magis acutis differt, sensim in eandem transgreditur.

14. *S. CALVA* DC. a sequente achaeniis inaristatis habitu tenuiori et foliis minoribus differt. Nulla species alia inaristata descripta esse videtur. *S. calvae* natura e figura per chartam delineata ex Herbario DeCandolle mihi transmissa certa fit. (Vide etiam infra sub no. 15.)

15. *S. ACMELLA* (L.) Murr. Huius speciei naturam excogitare difficillimum erat. Figurae a Linnaeo citatae rudes sunt ac speciei status ab auctoribus disputatur. Nonnunquam etiam in sectione specierum radiatarum inclusa est. Specimina multa e regione typica examinata nullas species radiatas ibi inveniri ostendunt. Quod Hooker in *Flora of British India* de natura *S. Acmellae* radiatorum scripsit contrarium non probat, nam infra sub titulo "var. *Acmella* proper," *Wight Ic. Pl. Ind. Or. iii, 1109*, tabulam citat quae sine dubio ligulas nullas exhibet. Quod ad discrimen inter *S. Acmellam* et *S. calvam* attinet, figurae a Linnaeo citatae plantam habitu crasso repraesentare videntur. (Vide etiam sub no. 14.)

16. *S. ACMELLA* (L.) Murr. var. *ALBESCENTIFOLIA* A. H. Moore a praecedente foliis plerumque maioribus infra pallescentibus vel albescentibus differt.

17. *S. ACMELLA* (L.) Murr. var. *LANCEOLATA* (Lk.) A. H. Moore. Haec varietas a specie foliis magnis valde et irregulariter incis

differt. Descriptio *S. Pseudacmellae* Spreng., non (L.) Murr., huic varietati *S. Acmellae* simillima est. Nomen *S. Pseudo-Acmella* aut *Pseudacmella* ad tam multas species diversas pertinet ut usurpari non oporteat. Nomen *Acmella lanceolata* Lk. var. a Sprengel pro synonymo superioris editum est et nomen primum est quae usurpari potest.

18. *S. COSTATA* Benth. a *S. Acmella* foliis integris vix margine undulatis facile distinguitur.

19. *S. CALLIMORPHA* A. H. Moore species nova pulcherrima chinensis est. Internodiis longis laxis sed gracilibus et foliis serratis vel subincisis (quam in *S. Acmella* (L.) Murr. var. *lanceolata* (Lk.) A. H. Moore multo angustioribus) a speciebus sectionis ceteris longe abest.

Sectio II. ACMELLA (Rich.) DC.

Subsectio I. PARVORADIATAE A. H. Moore.

20. *S. IODISCAEA* A. H. Moore. Haec species lepidissima capitulis minimis, radiis minimis et foliis parvis tenuibus minute et sparse denticulatis necnon (praeter formam leucaenam) paleis sursum violaceis, disco toto visum violaceum praebentibus, a speciebus generis ceteris valde differt.

21. *S. IODISCAEA* A. H. Moore f. *LEUCAENA* A. H. Moore. Haec forma variationem probabiliter raram et certe insignificantem exhibet.

22. *S. ULIGINOSA* Sw. habitu pervariabilis est, sed folia et plerumque capitula crassiora quam in duabus praecedentibus habet. Una cum eisdem characterem habet qui turmam totam distinguit, viz. quod involucri squamae inter late ovatas et suborbiculares variant. Sicut paucae species aliae Indiarum Occidentalium et Americae Centralis, *S. uliginosa* distributionem miram habet, viz. in Indiis Occidentalibus, America Centrali, Africa occidentali.

23. *S. LUNDII* DC. praecedenti simillima est, sed involucri squamae magis lanceolatae sunt.

24. *S. CILIATA* HBK. Haec species inter totum genus maxime variabilis et forsan difficillima est, et in futuro studium diligentissimum exiget.

25. *S. CILIATA* HBK. var. *DIFFUSA* (Poepp.) A. H. Moore a praecedente forma prostrata et foliis ovatis, basi paulum subcuneata, differt.

26. *S. SUBHIRSUTA* DC. Haec species a praecedente caractere subtomentoso praesertim differt.

27. *S. CAESPITOSA* DC. a *S. subhirsuta* natura leviori, et a *S. ciliata* foliis parvis, apice mucronuloideo, differt.

28. *S. POLIOLEPIDICA* A. H. Moore a praecedentibus involuero canescente ligulisque subaureis facile distinguitur.

29. *S. DISCIFORMIS* Rob. species procumbens; caulibus ascendentibus, maxime caulibus erectis rubrotinctis caulibus prostratis nodis radicantibus; foliis nervo medio prominente albicante.

30. *S. LIMONICA* A. H. Moore a praecedente habitu laxo sed erecto et foliis latioribus margine ciliolatis differt.

31. *S. ALPESTRIS* Griseb. Haec species capitula fere planoconvexa et folia sine ciliolis in margine habet. Eiusdem speciei natura tantummodo a specimine, cum descriptione originali congruente, a P. G. Lorentz et G. Hieronymo in regione typica lecto determinabilis erat.

32. *S. MAURITIANA* (Rich.) DC. a praecedente facile distinguitur foliis non integris vel fere integris. Nec illi speciei nec ulli coniuncte affinis est.

33. *S. MAURITIANA* (Rich.) DC. f. *MADAGASCARIENSIS* (DC.) A. H. Moore a specie solum capitulis oblongis nec globosis truncatis nec conicis differt.

Subsectio II. MAGNORADIATAE A. H. Moore.

34. *S. STENOPHYLLA* H. et A. foliis linearibus angustissimis facile dinoscitur.

35. *S. FILIPES* Greenm. capitula parva pedunculos tenuissimos et foliorum bases cuneatoattenuatas habet, sed radii ad magnitudinem disci relati longissimi sunt. Species pulcherrima est.

36. *S. LABADICENSIS* A. H. Moore. In hac specie capitula bis tantum longiora quam in praecedente sed radii ad magnitudinem disci relati breviores quam in generis speciebus ceteris sunt.

37. *S. PHANERACTIS* (Greenm.) A. H. Moore *S. disciformi* Rob. habitu simillima est, sed praesertim radiis multo maioribus Magnoradiatis magis affinis esse videtur.

38. *S. MACROPHYLLA* Greenm. foliorum basibus longicuneatis apicibusque acuminatis facile distinguitur.

39. *S. PAPPOSA* Hemsl. radios maximos habet, sed a sequente involucri natura pilosulata longe abest.

40. *S. GRANDIFLORA* Turcz. Haec species radios maximos habet, sed a turmis *S. decumbentis* (Sm.) A. H. Moore et *S. griseae* (Chod.) A. H. Moore radicibus tenuioribus non fasciculatis distinguitur. A varietatibus sequentibus foliis non linearibus differt. (Vide etiam sub no. 39.)

41. *S. GRANDIFLORA* Turcz. var. *BRACHYGLOSSA* Benth. a specie et

varietate sequente radiis involucrum vix superantibus differt. (Vide etiam sub no. 40.)

42. *S. GRANDIFLORA* Turcz. var. *CALVA* Benth. a praecedente radiis involucrum multo superantibus differt. Character calvus probabiliter inconstans est, sed e figura singula per chartam delineata hoc factum indeterminabile erat.

43. *S. PAMMICROPHYLLA* A. H. Moore. Haec species unica plantas tenuissimas et folia in genere toto minima habet.

44. *S. ABYSSINICA* Sch. Bip. habitu *S. americanae* (Mut.) Hieron. var. *parvulae* (Rob.) A. H. Moore similis est, sed radii albissimi non lutei sunt.

45. *S. AMERICANA* (Mut.) Hieron. sub nomine *Anthemidis americanae* Mut. ex L. f. Supplemento primo descripta et recentius a Humboldt, Bonpland, et Kunth in honore Mutis *S. Mutisii* appellata plerumque sub nomine *S. Beccabungae* DC. nota est. In hac turma *Anthemis americana* nomen vetustissimum et inde primarium est. Inter specimina plurima, quae a me examinata sunt, gradationes perspicuae inventae sunt, quae distinctiones inter species varietatesque huius turmae olim habitas, quamquam in formis extremis diversissimas, innaturales et eapropter reiiciendas esse ostendunt.

46. *S. AMERICANA* (Mut.) Hieron. var. *RAMOSA* (Hemsl.) A. H. Moore a praecedente receptaculis tenuibus habituque prostrato differt.

47. *S. AMERICANA* (Mut.) Hieron. var. *PARVULA* (Rob.) A. H. Moore. Haec varietas a specie habitu prostrato et foliis parvis differt. Descriptio prima sub nomine *S. Beccabungae* DC. var. *parvulae* Rob. edita est. Nomen mutavi nomenclaturae rationibus solum adductus.

48. *S. AMERICANA* (Mut.) Hieron. var. *PARVULA* (Rob.) A. H. Moore f. *PARVIFOLIA* (Benth.) A. H. Moore a praecedente modo natura paulum hispidulosa differt. Hanc esse formam primo a Bentham sub nomine *S. parvifoliae* descriptam a specimine originali per chartam delineato manifestum est. Combinatio autem infelix est, nam folia non minora sunt quam in varietate, sed nomenclaturae rationibus facta est.

49. *S. AMERICANA* (Mut.) Hieron. var. *PARVULA* (Rob.) A. H. Moore f. *LANITECTA* A. H. Moore. Haec forma lanuginosa est.

50. *S. AMERICANA* (Mut.) Hieron. var. *REPENS* (Walt.) A. H. Moore a specie fere foliis magis acuminatis, serrationibus magis acutis, differt. Distributio etiam maxima in parte distincta est. Varietates autem formaeque praecedentes saltem in parte eadem in regione inventae sunt. Formae extremae facile dinotae sunt, sed formae aliquae intermediae sine notitia distributionis difficile distinguuntur.

51. *S. AMERICANA* (Mut.) Hieron. var. *STOLONIFERA* (DC.) A. H. Moore. Inter hanc varietatem et praecedentem, per quam tantummodo

speciei affinis est, gradationes aequales intersunt, quamquam formae extremae duarum varietatum atque distributio earundem omnino dissimiles sunt. Forma typica folia linearia integra habet.

52. *S. AMERICANA* (Mut.) Hieron. var. *STOLONIFERA* (DC.) A. H. Moore f. *LONGIINTERNODIATA* A. H. Moore a varietate internodiis longis et foliorum serrationibus distantibus prominentibusque differt.

53. *S. AMERICANA* (Mut.) Hieron. var. *STOLONIFERA* (DC.) A. H. Moore f. *CILIATIFOLIA* A. H. Moore a no. 51 foliis ciliatis differt.

54. *S. BLEPHARICARPA* DC. quoque folia linearia aut linearilanceolata ciliis margine distantibus sed habitum erectum habet. (Vide etiam sub nr. 51 et 53.)

55. *S. DECUMBENS* (Sm.) A. H. Moore. Huius speciei et varietatum sequentium nomina solum rationibus nomenclaturae mutata sunt. Nomen *Rudbeckia decumbens* Sm. plerumque pro synonymo *S. arnicoidis* DC. ductum est. Haec opinio sine dubio vera est, nam, quamquam specimen originale inspicere non potuit, descriptio originalis lucidissima est. Haec turma radiis magnis et radicibus fasciculatis distinguitur. Folia basalia, dummodo extant, in forma rosulae disposita a caulinis valde differunt.

56. *S. DECUMBENS* (Sm.) A. H. Moore var. *MACROPODA* (DC.) A. H. Moore. Haec varietas plerumque foliis diversis et basi subterranea magna distinguitur, sed ambo characteres variabiles inconstantesque sunt.

57. *S. DECUMBENS* (Sm.) A. H. Moore var. *LEPTOPHYLLA* (DC.) A. H. Moore foliis linearibus a praecedentibus dinoscitur.

58. *S. GRISEA* (Chod.) A. H. Moore. Haec species primo a Chodat pro varietati *S. arnicoidis* DC. habita est; Chodat etiam iuste existimat varietates sequentes *griseae* valde affines esse. Mihi autem haec species propius accedere ad varietates sequentes quam ad *S. decumbentem* (Sm.) A. H. Moore (*S. arnicoidem* DC.) varietatesque eiusdem videtur. Inde optimum puto eam speciem typicam facere turmae, affinis sane *S. decumbenti*, paulo tamen discrepantis. *S. grisea* a praecedentibus natura pubescente facile distinguitur.

59. *S. GRISEA* (Chod.) A. H. Moore var. *INTERMEDIA* (Chod.) A. H. Moore. In hac varietate folia angustiora quam in praecedente et sparse ciliata sunt.

60. *S. GRISEA* (Chod.) A. H. Moore var. *SETOSA* (Chod.) A. H. Moore. Folia longiora quam in specie sed latiora quam in varietate praecedente margine valde ciliata, sunt.

61. *S. GRISEA* (Chod.) A. H. Moore var. *CHODATANA* A. H. Moore. Haec varietas folia quam in ceteris varietatibus angustiora cum serrationibus distantibus habet.

62. *S. GRISEA* (Chod.) A. H. Moore var. *MICRA* A. H. Moore. In hac varietate folia foliis speciei similia sunt, sed minora et maxime in marginibus et nervo medio ciliolata.

63. *S. EURYCARENA* A. H. Moore capitulis latissimis longipedunculatis a ceteris generis speciebus facile distinguitur.

NOMINA NUDA QUORUM SYNONYMIA IGNOTA EST.

Spilanthes Arrabidae Hort. ex Teijsm. et Binnend. Cat. Pl. Hort. Bot. Bogor. 105 (1866).

S. deltoidea Wall. Cat. 3185 / 295 (Dec. 1, 1828).

S. leucocephala Ott. Ind. Sem. Hort. Bot. Berol., an. 1845, collect. 6 (1845).

S. multiflora Ott. ex Sweet Hort. Brit. ed. II, 306 (1830).

S. mysurensis Wall. Cat. 3185 / 295 (Dec. 1, 1828).

S. pallida Sweet Hort. Brit. ed. II, 306 (1830).

S. Pseudo-Acmella H. et A. Bot. Capt. Beech. Voy. 150 (1841), non (L.) Murr. secundum Hook. f. et Jack. Ind. Kew. iv, 963 (1895).

S. rhombifolia Zipp. ex Span. Prod. Fl. Timor. in Linnaea xv, 323 (1841).

SPECIES FORMAEQUE NON SATIS COGNITAE SPILANTHIS VEL AD
SPILANTHEM ATTRIBUTAE.

Sectio I. SALIVARIA DC.

Spilanthes diffusa Hook. f. in Trans. Linn. Soc. xx, 214 (1847).

S. diffusa Hook. f. f. minor Hook. f. l. c.

S. grandifolia Miq. Fl. Ind. Bat. ii, 80 (1856).

S. intermedia (Rich.) DC. Prod. v, 624 (1836).

Acmella intermedia Rich. in Pers. Syn. Pl. ii, 472 (1807).

S. javanica Sch. Bip. ex Miq. Fl. Ind. Bat. (1856-1859); nomen Sch. Bip. in Zoll. Syst. Verz. Ind. Arch. 123 (1854-1855); descriptio "Spilanthes sp. n." Zoll. in Nat. en Geneesk. Arch. ii, 255 (1845) secundum Miq. l. c.

Ceratocephalus javanicus (Sch. Bip.) Ktze. Rev. Gen. Pl. i, 326 (1891).

S. macropoda Turcz. in Bull. Soc. Nat. Mosc. xxiv, 2, 71 (1851).

Ceratocephalus macropodus (Turcz.) Ktze. Rev. Gen. Pl. i, 326 (1891).

S. portoricensis Spreng. L. - Spreng. Syst. Veg. iii, 444 (1826); *S. portoricensis* Spreng. secundum DC. Prod. v, 625 (1836), secundum DC. autem probabiliter = *S. urens* Jacq.

Sectio II. ACMELLA (Rich.) DC.

- S. sp. Lor. et Nederl.* in Inf. Off. Exped. Rio Negr. (Patag.) Entr. ii, Bot. 238 (1881).
S. affinis H. et A. in Hook. Jour. Bot. iii, 317 (1841).
S. arnicoides DC. f. minor Chod. in Bull. Herb. Boiss. ser. 2, iii, 725 (1903).
S. arnicoides DC. f. nervosa Chod. l. c.
S. commutata Koch ex Ind. Sem. Hort. Berol. App. 14 (1855).
S. repens Hort. Par. et Berol. ex Koch l. c.
Ceratocephalus commutatus (Koch) Ktze. Rev. Gen. Pl. i, 326 (1891).
Eclipta filicaulis Schumach. Beskr. Guin. Pl. ii, 164 (1827).
Feaea linearis Spreng. L.—Spreng. Syst. Veg. iii, 581 (1826).
Selloa? linearis (Spreng.) DC. Prod. v. 612 (1836).
Spilanthus longifolia DC. Prod. v, 621 (1836).
S. melampodioides Gardn. in Hook. Lond. Jour. Bot. vii, 407 (1848).
S. sphaerocephala DC. Prod. v, 621 (1836).

SUBGENUS EXCLUSUM.

- Helepta* Raf., subgenus *Acmellae* Rich., New Fl. N. Am. i, 52 (1836) =
Heliopsis Pers. Genus *Helepta* Raf. Neogen. 3 (1825).

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- Spilanthus arborea* (Forst. et Forst. f.) Forst. f. in Comm. Soc. Goett. (Phys.) ix, 67 (1787); DC. Prod. v, 626 (1836), sub. spp. exclus. = *Laxmannia arborea* Forst. et Forst. f. Char. Gen. 94, t. 47 (1776).
Spilanthus atriplicifolia L. Syst. Nat. ed. XII, iii, 236 (1768).
Spilantus atriplifolius R. W. Darw. Fam. Pl. ed. II, ii, 544 (1787) = *Isocarpha atriplicifolia* (L.) R. Br. *Bidens atriplicifolia* L. Amoen. Acad. iv, cent. pl. 2, 329 (Jun. 11, 1756).
Spilanthus atriplicifolia Houtt. ex Miq. Fl. Ind. Bat. ii, 37 (1856) = *Dichrocephala latifolia* (Pers.) DC.
Spilanthus bicolor (DC.) Benth. et Hook. f. ex Hemsl. Biol. Centr.-Am. Bot. ii, 192 (Jun. 1881), non Gen. Pl.
Ceratocephalus bicolor (DC.) Ktze. Rev. Gen. Pl. i, 326 (1891) = *Zinnia bicolor* (DC.) Hemsl. *Mendezia bicolor* DC. Prod. v, 533 (1836).
Pyrethrum Bidens Med. in Act. Acad. vel Hist. et Comment. . . . Theod.-Palat. (Phys.) iii, 241, t. 18 (1775) = *Cotula Pyrethra* L.

- Acmella biflora* (L.) Spreng. L. – Spreng. Syst. Veg. iii, 591 (1826) = *Wedelia biflora* (L.) DC. *Verbesina biflora* L. Sp. Pl. ed. II, ii, 1272 (1763).
- Acmella buphthalmoides* (Jacq.) Rich. in Pers. Syn. Pl. ii, 473 (1807) = *Heliopsis buphthalmoides* (Jacq.) Dun. *Anthemis buphthalmoides* Jacq. Pl. Rar. Hort. Caes. Schoenbr. ii, 13, t. 151 (1797).
- Spilanthus cascata* Steud. Nom. Bot. ed. I, 108 (1821) = *Verbesina crocata* (Cav.) Less.
- Spilanthus cernua* (L.) Koehn. in Just Bot. Jahresber. xxii, 2, 595 (1897) = *Spiranthes cernua* (L.) Rich. *Ophrys cernua* L. Sp. Pl. 946 (1753).
- Spilanthus crocata* (Cav.) Sims in Curt. Bot. Mag. xl, 1627, t. 1627 (1814); DC. Prod. v, 626 (1836), sub spp. exclus. *Verbesina crocata* (Cav.) Less. *Bidens crocata* Cav. Ic. Descr. Pl. i, 66, t. 99 (1791).
- Spilanthus ecliptoides* Gardn. in Hook. Lond. Jour. Bot. vii, 407 (1848).
- Ceratocephalus ecliptodes* (Gardn.) Ktze. Rev. Gen. Pl. i, 326 (1891) = *Jaegeria hirta* (Lag.) Less.
- Acmella flavicaulis* Raf. New Fl. N. Am. i, 52 (1836) = *Heliopsis helianthoides* (L.) Sweet.
- Acmella Garcini* (Burm. f.) Spreng. L. – Spreng. Syst. Veg. iii, 591 (1826) = *Anvillea Garcini* (Burm. f.) DC. *Buphthalmum Garcini* Burm. f. Fl. Ind. t. 60, f. 1 (1768), descr. sub nomine *Anthemidis Garcini* Burm. f. l. c. 183.
- Acmella globosa* (Ort.) Spreng. L. – Spreng. Syst. Veg. iii, 592 (1826) = *Zaluzania globosa* (Ort.) Sch. Bip. *Anthemis globosa* Ort. Nov. Rar. Pl. Hort. Bot. Matrit. Descr. Dec. iv, 47 (1797).
- Spilanthus gracilis* (Big.) Koehn. in Just Bot. Jahresber. xxii, 2, 595 (1897) = *Spiranthes gracilis* (Big.) Beck. *Neottia gracilis* Big. Fl. Bost. ed. II, 322 (1824).
- Spilanthus guatemalensis* Vatk. ex J. D. Sm. Enum. Pl. Guat., etc., i, 23 (1889), nom. nud. = *Melampodium paludosum* HBK.
- Spilanthus hirta* (Lag.) Steud. Nom. Bot. ed. II, ii, 622 (1841).
- Acmella hirta* Lag. Gen. et Sp. Nov. 31 (1816) = *Jaegeria hirta* (Lag.) Less.
- Spilanthus Karvinskiana* DC. Prod. v, 623 (1836).
- Ceratocephalus Karvinskianus* (DC.) Ktze. Rev. Gen. Pl. i, 326 (1891) = *Jaegeria hirta* (Lag.) Less.
- Acmella lanceolata* Raf. New Fl. N. Am. i, 52 (1836) = *Heliopsis scabra* Dun.

- Spilanthes nitidus* Llav. in Llav. et Lex. Nov. Veg. Descr. i, 28 (1824);
sp. dub. DC. Prod. v, 626 (1836).
Ceratocephalus nitidus (Llav.) Ktze. Rev. Gen. Pl. i, 326 (1891)
= *Salmea scandens* (L.) DC.
- Acmella nudicaulis* Raf. New Fl. N. Am. i, 52 (1836) = *Heliopsis*
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- Acmella parvifolia* Raf. New Fl. N. Am. i, 52 (1836) = *Heliopsis*
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- Spilanthus Pseudo-Acmella* (L.) Murr. L. — Murr. Syst. Veg. ed. XIII,
610 (1774); DC. Prod. v, 625 (1836).
Verbesina Pseudo-Acmella L. Sp. Pl. ed. I, ii, 901 (1753); Trim.
Hand Bk. Fl. Ceyl. iii, 40 (1895). *Chrysanthemum Maderas-*
patanum, latifolium, Scabiosae capitulis parvis, Pluk. Alm. Bot.
99, t. 159, f. 4 (1720).
- Ceratocephalus Acmella* (L.) Ktze. var. *Pseudacmella* (L.) Ktze.
Rev. Gen. Pl. i, 326 (1891). (Species mixta e generibus
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- Spilanthes pseudo-gummifera* Forst. ex DC. Prod. v, 626 (1836) =
Laxmannia arborea Forst. et Forst. f.
- Spilanthes Romanzoffiana* (C. et S.) Koehn. in Just Bot. Jahresber. xxii,
2, 595 (1897) = *Spiranthes Romanzoffiana* C. et S. in Linnaea.
iii, 32 (1828).
- Spilanthes sessilifolia* Hemsl. Biol. Centr. — Am. Bot. ii, 193 (Oct.
1881).
Ceratocephalus sessilifolius (Hemsl.) Ktze. Rev. Gen. Pl. i, 326
(1891) = *Jaegeria hirta* (Lag.) Less.
- Spilanthes sessilis* Poepp. Nov. Gen. et Sp. Pl. iii, 50 (1844).
Ceratocephalus sessilis (Poepp.) Ktze. Rev. Gen. Pl. i, 326 (1891) =
Jaegeria hirta (Lag.) Less.
- Acmella spilanthoides* Cass. in Dict. Sc. Nat. xxiv, 330 (1882) =
Wedelia carnosae Pers.
- Spilanthes tetrandra* Roxb. in Beats. Tracts Relat. St. Helena, App. i,
325 (1816); DC. Prod. v, 626 (1836), sub. spp. exclus. = *Lax-*
mannia arborea Forst. et Forst. f.
- Spilanthes tinctoria* Lour. Fl. Cochinch. ii, 484 (1790); DC. Prod. v,
626 (1836), sub spp. exclus. = *Adenostemma tinctorium* (Lour.)
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- Acmella trilobata* Spreng. L.—Spreng. Syst. Veg. 591 (1826) = *Zalu-*
zania triloba (Ort.) Pers.
- Spilanthes wedelioides* H. et A. in Hook. Jour. Bot. iii, 318 (1841).
Ceratocephalus wedelioides (H. et A.) Ktze. Rev. Gen. Pl. i, 326
(1891) = *Eclipta elliptica* DC.

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BY J. M. GREENMAN.

Schoenocaulon calcicola Greenman, n. sp., bulbis ovoideis 1.5–2 cm. diametro; caudice erecto cylindrato 5–10 cm. longo a reliquis atrobrunneis vel nigrescentibus fibrosis squamarum foliorumque exteriorum circumdato; foliis lineari-attenuatis 3–10 dm. longis 2–5 mm. latis 7–13-nerviis utrinque laevibus margine paulo hirtellis; scapo nudo 5.5–7.5 dm. alto aliquanto flexuoso subancipiti glabro basin versus purpureo; inflorescentia laxiflora 1–2 dm. longa 8–10 mm. anthesi diametro; bracteis parvis late ovatis tenuibus brunnescentibus; floribus sessilibus vel breviter pedicellatis; perianthio 6-partito, segmentis linearibus 2.5–3 mm. longis acutiusculis saepissime basi bidentatis; staminibus perianthio longioribus; capsulis maturis oblongo-lanceolatis ca. 1 cm. longis glabris reflexis. — Hillsides, Las Sedas, Oaxaca, Mexico, alt. 1830 m., 1 August, 1894, *C. G. Pringle*, no. 5754 (type, in hb. Gray); calcareous banks, Las Sedas, alt. 1830 m., 19 July, 1897, *C. G. Pringle*, no. 6740 (hb. Gray, hb. Field Mus.). The latter number was distributed as *S. intermedium* Baker, a species from which *S. calcicola* is readily separated by its reflexed fruit.

Schoenocaulon caricifolium Greenman, n. comb. *Veratrum caricifolium* Schlecht. Ind. Sem. Hort. Hal. 8 (1838). *Asagraea caricifolia* Kunth, Enum. Pl. iv. 666 (1843). Although this species has been treated by several authors as conspecific with *Schoenocaulon officinale* Gray, yet an examination of some of the original material, collected by Ehrenberg, of which there is now a specimen in the Gray Herbarium, shows very clearly that it can scarcely be regarded as identical with Dr. Gray's species. *S. caricifolium* differs from *S. officinale* in having narrower leaves, shorter scapes and inflorescence, and relatively shorter and distinctly inflated capsules. — Mexico, without defi-

nite locality, *Ehrenberg* (hb. Gray). Specimens secured by C. Conzatti and V. González at Etna, Cañada de San Gabriel, State of Oaxaca, alt. 3000 m., 8 August, 1897, no. 323 (hb. Gray), are apparently referable to this species.

Schoenocaulon Ghiesbreghtii Greenman, n. sp., caudice erecto 10–12 cm. alto reliquis brunneis aut nigrescentibus fibrosis squamarum et foliorum primorum obtecto; foliis linearibus attenuatis 4–8 dm. longis 2–6 mm. latis 7–13-nerviis utrinque glabris; inflorescentia 1–1.2 dm. vel ultra longa 1.5–2 cm. diametro densiflora; bracteis late ovatis 2.5 mm. longis obtusis 5-nerviis; floribus sessilibus vel breviter pedicellatis; perianthio profunde 6-partito, lobis anguste oblongis 4–4.5 mm. longis obtusis integris vel subintegris 3–5-nerviis; filamentis perianthio duplo vel ultra longioribus uniforme recurvatis; fructu ignoto. — State of Chiapas, Mexico, without more precise locality, *Dr. Ghiesbreght*, no. 672 (type, in hb. Gray); without definite locality, alt. 2130 m., *Berendt* (hb. Gray). This species is rather striking on account of the recurved filaments. In this respect it resembles *S. tenuifolium* Robinson & Greenman, but in other and more essential characters it is amply distinct.

Schoenocaulon jaliscense Greenman, n. sp., bulbis oblongo-ovoideis 2.5–3.5 cm. diametro; caudice erecto cylindrato 1–1.5 dm. alto a reliquis atrobrunneis vel nigrescentibus fibrosis squamarum foliorumque exteriorum obtecto; foliis gramineis 6–10 dm. longis 2–7 mm. latis 9–13-nerviis utrinque glabris margine inconspicue hirtellis; scapo erecto 8 dm. vel ultra alto nudo subancipiti aliquid glauco; inflorescentia elongata 1 usque ad fere 5 dm. longitudine 1–1.5 cm. diametro simplici vel raro ramum lateralem gerenti; bracteis parvis scariosis suberoso-marginatis; floribus breviter pedicellatis; perianthio alte 6-partito, segmentis lineari-oblongis ca. 2.5 mm. longis integris vel basi bidentatis apicem obtusum versus paulo ampliatis incrassatisque; staminibus perianthio longioribus; filamentis persistentibus; capsulis immaturis nec non pedicellis et segmentis perianthii plus minusve glaucis et purpurascensibus; fructu erecto oblongo-ovato quam 1 cm. brevior. — Cool grassy sides of cañons, near Guadalajara, Jalisco, Mexico, 11 November, 1889, *C. G. Pringle*, no. 2938 (type, in hb. Gray); Rio Blanco, Guadalajara, 1903, *C. G. Pringle*, no. 11,853 (hb. Gray); Cerro de San Felipe, Oaxaca, Mexico, alt. 2000 m., 29 August, 1897, *C. Conzatti & V. González*, no. 449 (hb. Gray).

Senecio (§ *Eremophili*) *ctenophyllus* Greenman, n. sp., herbaceus annuus vel perennis basi saepe lignosus; caulibus erectis 3–4 dm. altis simplicibus vel ramosis arachnoideo-tomentosis; foliis lanceolatis 2–9 cm. longis 1–2.5 cm. latis plus minusve pectinato-divisis arachnoideo-

tomentulosis ; foliis inferioribus petiolatis, summis sessilibus ; inflorescentiis terminalibus corymboso-cymosis tomentosis ; capitulis numerosis 8–9 mm. altis heterogamis calyculatis ; involucri campanulati squamis ca. 13 lineari-lanceolatis 5 mm. longis acutis nigro-penicillatis ceterum glabratis vel sparsissime tomentulosis ; floribus femineis liguliferis 5–8, corollis glabris, ligulis flavis ; floribus disci ca. 25 ; achaeniis cano-hirtellis. — Barranca below Sandia Station, Durango, Mexico, alt. 2135 m., 15 October, 1905, *C. G. Pringle*, no. 10,105 (type, in hb. Gray). This species has the general aspect of *S. eremophilus* Richards., *S. chihuahuensis* Wats. and *S. MacDougalii* Heller, but differs from all of them in being tomentulose throughout and in having narrower leaves with mostly simple slender and entire lateral teeth or divisions.

Senecio (§ *Tomentosi*) *loratifolius* Greenman, n. sp., herbaceus perennis ; caulibus erectis 3 dm. altis lanato-tomentosis ; foliis alternis elongato-lanceolatis vel subloratis 0.5–1.7 dm. longis 4–12 mm. latis acutis vel obtusis integris membranaceis juventate supra arachnoideo-tomentosis denique glabratis subtus persistenter albo-tomentosis ; foliis inferioribus basi sensim angustatis et subpetiolatis, superioribus sessilibus et amplexicaulibus ; inflorescentiis cymosis terminalibus ; capitulis paucis 8–9 mm. altis heterogamis calyculatis ; involucri campanulatis tomentosis, squamis ca. 13 lineari-lanceolatis 6–7 mm. longis ; floribus femineis ligulatis 8–12, corollis glabris flavis ; floribus disci ca. 35 quam squamis involucri vix longioribus ; achaeniis hispidulis. — Mountains near Saltillo, Coahuila, Mexico, alt. 2133 m., 5 October, 1905, *C. G. Pringle*, no. 13,676 (type, in hb. Gray). This species is related to *S. umbraculiferus* Watson, but differs amply in foliar characters, especially in having thinner leaf-texture, glabrate upper leaf-surface, and more distinctly amplexicaul upper leaves.

II. NEW OR OTHERWISE NOTEWORTHY SPERMATOPHYTES, CHIEFLY FROM MEXICO.

BY B. L. ROBINSON.

Tigridia morelosana Robinson, n. sp., bulbo ovoideo acuminato 4–6 cm. longo 2–3.2 cm. diametro atrobrunneo, radicibus fibrosis ; caule gracillimo flexuoso 3 dm. alto saepissime 1–2-foliato glabro modice compresso ; foliis basilaribus anguste lanceolato-linearibus attenuatis plicato-nervosis ca. 3 dm. longis ca. 8 mm. latis utrinque viridibus glabris laevibus ; foliis caulinis linearibus vel anguste spathiformibus ;

spathis saepissime 2 longipedunculatis 3-6-floris, foliolis oblongo-lanceolatis acutissimis 2-4 cm. longis margine tenuibus subscariosis; pedicellis gracillimis 2-3 cm. longis glabris; sepalis purpureis 14 mm. longis 6 mm. latis anguste obovatis obtusis basi angustatis in media parte atromaculatis; petalis ovatis 12 mm. longis acutiusculis cordatis brevissime stipitatis supra mediam partem purpurascens tenuibus infra mediam partem flavescentibus firmissimis 6 mm. latis; columna 4 mm. alta; antheris oblongis apiculatis in summa columna sessilibus; ramis styli 6 filiformibus antheras subaequantibus. — Sierra de Tepoxtlan, Morelos, Mexico, alt. 2350 m., 5 September, 1905, *C. G. Pringle*, no. 13,657 (type, in hb. Gray).

Amaranthus squamulatus Robinson, n. comb. *Scleropus squamulatus* Anderss. Om Galapagos-öarnes Veg., Stockh. Akad. Handl. 1853, 162 (1854), & Om Galapagos-öarnes Veg. 60 (1859). *Scleropus squarrulosus* Anderss. ex Gray, Proc. Am. Acad. v. 169 (1861), by clerical error. *Amblogyne squarrulosa* Gray, l. c. (1861). *Amaranthus squarrulosus* Ulile & Bray, Bot. Gaz. xix. 170 (1894); Rob. & Greenm, Am. Jour. Sci. l. 147 (1895); Rob. Proc. Am. Acad. xxxviii. 136 (1902).

Schoepfia Pringlei Robinson, n. sp., fruticosa vel arborescens 5 m. alta ramosa; ramis teretibus leviter flexuosis a cortice griseo rugoso tectis; ramulis plus minusve angulatis fuscescenti-puberulis; foliis alternis coriaceis ovato-lanceolatis obtusis vel acutiusculis vel etiam falcato-acuminatis integerrimis opacis utrinque viridibus glaberrimis subtus vix pallidioribus obscure pinnatinerviis 4-5.5 cm. longis 1.5-2.3 cm. latis; basi cuneatis brevissime petiolatis; pedunculis axillaribus 4 mm. longis puberulis cupulas 2-4 plus minusve racemosas gerentibus, pedicellis vix ullis; cupulis puberulis saepissime 2-partitis, lobo majore obscure 2-3-dentato floram solitariam subtendente; calyce carnosissimo rugoso turbinato; corolla extus glaberrima 6 mm. longa 5-6 mm. diametro viridescens-flava, tubo 4 mm. longo subgloboso, lobis 5 ovato-deltaideis acutiusculis 3 mm. longis recurvis; staminibus 5; filamentis omnino corollae adnatis; antheris breviter oblongis albidis; eorum insertionibus pubentibus; ovario fere supero, parte libera ovoidea subcarnosa ruguloso-papillosa; stylo 3.3 mm. longo; stigmate disciformi obscure 3-lobato; fructu ignoto. — Uruapan, Michoacan, Mexico, alt. 1525 m., 1 November, 1905, *C. G. Pringle*, no. 10,123 (type, in hb. Gray). This species differs in its much larger corolla and more lanceolate leaves from the plant of the West Indies and Florida, which has generally passed as *S. Schreberi* Lam. or *S. arborescens* R. & S. From *S. mexicana* DC. (known to the writer only from description) it appears to differ in its leaves, which are often fully twice as long as those described

by DeCandolle and in its decidedly urceolate almost globose rather than cylindric corolla; also in the fact that the corolla-lobes are more than half as long as the tube. *S. parvifolia* Planch., to judge from Nelson's n. 1836, so identified at the Royal Gardens at Kew, has a much more slender corolla. *S. angulata* Planch. is described by Hemsley, Biol. Cent.-Am. Bot. i. 185, as having flowers only one and one-half lines long and branches angled, while in the present species the branches are terete and even the branchlets are scarcely angled, the flowers being furthermore fully 3 lines long. The genus, however, is much in need of a thorough revision.

Mimosa (§ *Habbasia*) **buceragenia** Robinson, n. sp., valde armata 3-5 m. alta; ramulis viridibus albido-costatis puberulis in costis aculeatis; aculeis sparsis recurvatis 4 mm. longis basi albidis compressis 4-5 mm. latis apice brunnescentibus induratis; foliis 10-12 cm. longis 5-6 cm. latis; petiolo et rhachibus et rhachillis breviter molliterque pubescentibus; petiolo 2 cm. longo supra cum glandulo conspicuo oblongo sessili ca. 2 mm. longo instructo subtus cum aculeo saepius uno armato; rhachi aculeis 2-3 parvis instructa; stipulis binis subulato-filiformibus ca. 3 mm. longis erectis; pinnis ca. 11-jugis; foliolis ca. 25-jugis linearibus utrinque viridibus glabris acutiusculis 4-5 mm. longis ca. 0.8 mm. latis saepe leviter falcatis basi valde obliquis; floribus virescentibus spicatis; spicis densis saepissime in axillis binis pedunculatis ca. 4.5 cm. longis 8 mm. diametro; calyce cupulato brevissime 5-dentato; petalis 5 anguste lanceolatis; staminibus 10; ovario stipitato; fructu ignoto. — Valley near Treinte Station, in the vicinity of Cuernavaca, Morelos, Mexico, alt. 1220 m., 26 September, 1905, *C. G. Pringle*, no. 10,073. A species which, to judge from its inflorescence, belongs in the series *Leptostachyae*, but well marked in this series by its conspicuous petiolar glands.

Pedilanthus spectabilis Robinson, n. sp., caulibus teretibus crassis foliosis griseis minute granuloso-pulverulis vix 1 m. altitudine; foliis ovato-oblongis brevissime crassiusculeque petiolatis 8-9 cm. longis 4-6 cm. latis integris supra glabriusculis subtus breviter molliterque pubescentibus apice rotundatis saepissime retusis distincte mucronulatis basi breviter cordatis; inflorescentia terminali dichotoma bracteosisima densiuscula ca. 1.6 dm. lata; bracteis late ovatis cordatis sessilibus oppositis integris 4-5 cm. longis et latis internodia valde superantibus acute acuminatis caudato-attenuatis utrinque puberulis rubro-purpureis margine tomentellis; pedicellis griseo-tomentosis; involuero albido 18 mm. longo basi leviter invaginato, labio superiore profunde bipartito, lobis linearibus acutiusculis 6-7 mm. longis quali labio inferiore multo brevioribus margine tomentellis; stipite ovarii

glabro nutanti; filamentis glabris; stylo 1 cm. longo; capsula ca. 1 cm. diametro obtuse 3-lobata subsphaerica; seminibus viridescenti-griseis angulatis 6 mm. longis. — Cañon walls of limerock, Iguala Cañon, near Iguala, Guerrero, Mexico, alt. 760 m., 28 December, 1906, *C. G. Pringle*, no. 13,914 (type, in hb. Gray). This noteworthy species is probably the most showy of the genus. It differs from *P. bracteatus* (Jacq.) Boiss. in having pubescent leaves, denser inflorescence, and larger much more caudate-acuminate and strongly colored bracts.

Bonplandia linearis Robinson, n. sp., herbacea ramosa dense caespitosa gracilis 4 dm. vel ultra alta ubique glanduloso-pubescentis; ramis erectis vel ascendentibus; foliis alternis anguste linearibus 3–4.5 cm. longis vix 2 mm. latis sessilibus attenuatis cum lobis lateralibus 2 angustis late patentibus instructis; racemis erectis laxifloris 1–1.5 dm. longis; floribus saepissime geminis in pedicellis erectis ca. 1 cm. longis nutantibus; calyce tubuloso 15-striato et venoso-reticulato anthesi 8 fructifero 11 mm. longo leviter curvato paulo nigrescenti, dentibus lanceolato-deltaideis acutis; corolla cyanea ca. 2 cm. longa; tubo gracili ad orem calycis leviter deflexis; lobis anguste obovatis retusis late patentibus ca. 12 mm. longis; filamentis subaequalibus glabris longe exsertis; stylo filiformi glabro, ramis stigmatiferis 3 linearibus papillosis 1.2 mm. longis; ovario ovoideo glabro. — Lava fields, near Coru Station, above Uruapan, Michoacan, Mexico, 26 January, 1907, *C. G. Pringle*, no. 10,364 (type, in hb. Gray). This species obviously belongs to the hitherto monotypic genus *Bonplandia*. It differs strikingly from the common *B. geminiflora* Cav. in its narrowly linear leaves.

Brittonastrum Barberi Robinson, n. sp., herbaceum 4–6 dm. vel ultra altum; caulibus gracilibus suberectis simplicibus basi rubescentibus alibi pallide viridibus ubique crispe griseo-puberulis; foliis ovato-lanceolatis crenatis obtusis vel superioribus acutis vel etiam subattenuatis 2–3.5 cm. longis 1–2 cm. latis subtus pallidioribus utrinque crispe griseo-puberulis superioribus distantibus; petiolis 2–5 mm. longis; inflorescentia anguste paniculata 8–22 cm. longa 5 cm. diametro superne densiuscula; bracteis inferioribus lanceolatis subsessilibus 1–1.5 cm. longis superioribus valde reductis; inflorescentiis secundariis ascendentibus multifloris griseo-puberulis vel -pulverulis inferioribus plus minusve distantibus; bracteolis subulatis minimis et pedicellis purpurascensibus; calyce anguste tubulato anthesi deorsum attenuato fructifero deinde turgido 10–12 mm. longo pulcherrime purpureo griseo-puberulo et atomifero, dentibus lanceolatis parvis acutis erectis 1.5–2 mm. longis; corolla molliter puberula anguste tubulata leviter curvata 2.6 cm. longa, limbo valde ringenti, labio superiore erecto subcucullato inferiore deflexo ca. 2 mm. longo; staminibus juxta labium

superius exsertis. — Near Colonia Garcia in Sierra Madres, Chihuahua, Mexico, alt. 2290 m., 17 July, 1899, *C. H. T. Townsend & C. M. Barber*, no. 79 (type, in hb. Gray). Previously collected in imperfect specimens at Los Pinitos, Sonora, Mexico, alt. 2000 m., 11 October, 1890, *C. V. Hartman*, no. 122 (hb. Gray), and in southwestern Chihuahua, August to November, 1885, *Dr. E. Palmer*, no. FF in part. This species differs from the nearly related *B. neo-mexicanum* Briq. in its much longer corolla, more pedicellate flowers, shorter petioles, etc., from *B. canum* (Gray) Briq. in its shorter pedicels, longer less acutely toothed calyx, etc., from *B. pallidum* (Lindl.) Briq. by its ovate-lanceolate relatively narrower leaves, longer deep crimson calyx, and longer corolla.

Brittonastrum ionocalyx Robinson, n. sp., herbaceum; caulibus quadrangularibus breviter molliterque canescenti-puberulis; foliis deltoideo-ovatis sinu patulo cordatis grosse crenatis obtusis 3–5.5 cm. longis 2.5–4 cm. latis ubique molliter puberulis supra pallide viridibus subtus vix pallidioribus albo-nervosis, petiolo 6–10 mm. longo; inflorescentia 11–17 cm. longa terminali 5–6 cm. diametro densiuscula; bracteis infimis ovatis serrato-dentatis ca. 1 cm. longis, ceteris gradatim minoribus; cymis furcatis compositis minute granuliferis vel glanduloso-puberulis; floribus erectis vel paulo nutantibus; calyce cylindrato pulcherrime purpureo griseo-puberulo et atomifero anthesi 1 cm. longo fructifero vix accrescenti dentibus lanceolatis acutis 2 mm. longis erectis nec patulis nec induratis; corolla purpureo-coccinea 2.5 cm. longa leviter curvata externe molliter puberula, faucibus vix dilatatis, limbo ringenti, labio superiore erecto, inferiore pendulo; staminibus sub labio superiore modice exsertis. — Sandia Station, Durango, Mexico, alt. 2288 m., 15 October, 1905, *C. G. Pringle*, no. 10,146 (type, in hb. Gray). This species differs from *B. pallidum* (Lindl.) Briq. in its deep purple calyx and much more exserted corolla, as well as in its more compound inflorescence; from *B. coccineum* (Greene) Briq. in its much shorter calyx-teeth; from *B. betonicoides* (Lindl.) Briq. in its much shorter petioles; and from the real *B. mexicanum* (HBK.) Briq. in its very different foliage. To *B. ionocalyx* should be referred with scarcely a doubt Wright's no. 1532 from mountains east of Santa Cruz, Sonora, which appears to differ only in the fact that the leaves are a trifle less cordate at base.

Brittonastrum Palmeri Robinson, n. sp., herbaceum a basi horizontali radicante erectum 6–9 dm. altum; caule unico simplici acute quadrangulati saepius flexuoso vel torto ubique breviter crispeque griseo-puberulo; foliis deltoideo-ovatis grosse crenatis acutiusculis vel subacuminatis utrinque griseo-tomentellis vel glabriusculis subtus paulo

pallidioribus 3-6 cm. longis 2.4-3.6 cm. latis basi cordatis; petiolis 4-10 mm. longis; inflorescentia terminali ca. 1.5 dm. longa interrupte spiciformi, verticellastris inferne subremotis superne approximatis densis multifloris, cymulis brevibus densissimis, bracteis inferioribus foliaceis ovatis vel ovato-lanceolatis 2-2.5 cm. longis petiolatis superioribus lanceolatis vel linearibus; pedicellis brevissimis purpureis griseo-puberulis, calyce subcylindrato anthesi 1 cm. longo puberulo inferne viridi superne laete purpureo vel violaceo, dentibus argutissimis lineari-lanceolatis ca. 3 mm. longis maturitate subinduratis saepe curvatis plus minusve patentibus; corolla purpurea gracili griseo-puberula apicem versus deorsum curvata 2 cm. longa, labiis brevibus superiore subgaleato; staminibus breviter exsertis. — Alvarez, San Luis Potosi, Mexico, 5-10 September, 1902, *Dr. Edward Palmer*, no. 53 (type, in hb. Gray), distributed as *Cedronella mexicana* Benth. Previous collections of what appears to be the same species have been made as follows: Mexico, without precise locality, *Sumichrast* (hb. Gray), *Coulter*, no. 1078 (hb. Gray); in mountains near Morales in valley of San Luis Potosi, 1876, *Schaffner*, no. 682 (hb. Gray); region of San Luis Potosi, 1878, *Parry & Palmer*, no. 762 (hb. Gray). This species differs clearly from *B. mexicanum* (HBK.) Briq. in its deltoid-ovate leaves, shorter corolla, etc. It appears to differ in the same respects from *B. coccineum* (Greene) Briq., known to the writer from description, — a characterization which fails to convince the reader that *B. coccineum* is distinct from the real *B. mexicanum*. *B. Palmeri* differs from *B. betonicoides* (Lindl.) Briq. in its much shorter petioles, longer calyx-teeth, etc.

Brittonastrum Wrightii (Greenman) Robinson, n. comb. *Cedronella Wrightii* Greenman, Proc. Am. Acad. xli. 244 (1905). The separation of the American simple-leaved species of *Cedronella* as a new genus *Brittonastrum* now generally accepted necessitates the transfer of Dr. Greenman's excellent species *C. Wrightii*.

Russelia Pringlei Robinson, n. sp., caulibus subsimplicibus 1 m. vel ultra longitudine teretibus ca. 8-costatis niveo-tomentosis; internodiis 5-6 cm. longis; ramis elongatis gracilibus 4-6-angulatis griseo-tomentosis; foliis oppositis vel ternis inaequalibus lanceolato-ovatis 1.5-2 cm. longis 6-10 mm. latis acutatis basi subcuneatis serrato-dentatis supra viridibus crispe puberulis et squamiferis rugosis subtus pallidioribus densius squamiferis et praesertim in venis nervisque griseo-tomentellis; inflorescentia 3-4 dm. longa 3-4 cm. lata; cymulis oppositis vel ternis; verticellis 3-5 cm. distantibus; pedicellis filiformibus griseo-pubescentibus 3-4 mm. longis; calycis 5 mm. longi lobis ovato-lanceolatis caudato-acuminatis dorso squamiferis; corolla

coccinea tubiformi 16 mm. longa glaberrima, lobis rotundatis 1.5 mm. longis; capsula ovoidea acuminata 6 mm. longa glabra. — On vertical walls of limerock, Iguala Cañon, near Iguala, Guerrero, Mexico, 28 December, 1906, *C. G. Pringle*, no. 10,367 (type, in hb. Gray). A species peculiar in its terete canescent-tomentose stem.

Stemodia macrantha Robinson, n. sp., suffrutescens 1 m. vel ultra alta; caulibus decumbentibus gracilibus teretibus pubescentibus; ramis saepius simplicibus erectis vel ascendentibus viridibus patenter pilosis 3–6 dm. longis, internodiis 3–10 cm. longis; foliis lanceolato-ovatis utroque angustatis 5–6 cm. longis 2.5–3 cm. latis basi cuneata excepta crenato-serratis supra atroviridibus adpresse pilosis subtus paulo pallidioribus in costis et venis lateralibus pinnatis hirsutulis; petiolis 1 cm. longis hirsutulis superne alatis; inflorescentia terminali 1–4 dm. longa perlaxa folioso-bracteata, pedicellis filiformibus flexuosis glanduloso-pubescentibus unifloris 2–4 cm. longis ascendentibus ex axillis bractearum saepissime ternis vel quaternis orientibus; calycis laciniis glanduloso-pulverulis et hispidulis lanceolato-linearibus superioribus anthesi usque ad 7 mm. longis infimis paulo brevioribus omnibus a basi gradatim angustatis sed apice vero obtusiusculis; corolla 1.8–2 cm. longis, tubo viridi-flavescenti cylindrato ca. 13 mm. longo 4 mm. diametro purpureo-nervio intus externeque piloso ad fauces distincte sursum curvato, limbo laete purpureo, lobis suborbicularibus subaequalibus apice saepissime retusis; staminibus brevioribus mediae parti tubi affixis 3 mm. longis longioribus paulo supra basin tubi affixis 8 mm. longis omnibus inclusis antheriferis glabris; capsula ovoidea 5 mm. longa atrobrunnea a calyce persistenti circumdata. — Shaded bluffs of the deep barranca, near the foot of the Falls of Tzaráracua, below Uruapan, Michoacan, Mexico, 28 January, 1907, *C. G. Pringle*, no. 10,356 (type, in hb. Gray). This species is amply distinguished from its Mexican congeners by its much larger flowers, which in fact are decidedly showy for the genus.

LOBELIA NELSONII Fernald, var. **fragilis** Robinson & Fernald, n. var. a forma typica recedit foliis utrinque viridibus juventate sparse pilosis mox omnino glabratis lineari-lanceolatis multo brevioribus, maximis ca. 7 cm. longis 8–10 mm. tantum latis. — Mexico, *C. G. Pringle*, no. 10,360 (type, in hb. Gray). This variety shares with the typical form the soft woody stems and branches as well as all the more important characteristics of the inflorescence. The varietal name is suggested by the extreme brittleness of the branches, at least when dried. The variety, like the typical form, has numerous showy flowers with bright scarlet corolla. Both plants seem worthy of cultivation.

Piqueria (Subg. **Phalacraea**) **longipetiolata** Robinson, n. sp.,

repens subglabra; caule tenui flexuoso prostrato nodis radicante, internodiis saepius perlongis (ad 1 dm.) glabris angulato-costatis; foliis oppositis, limbo late ovato 1.8–3.5 cm. longo 1.2–2.7 cm. lato supra basin integram crenato-dentato supra viridi sparse hispidulo subtus paulo pallidiore glabro basi obtuso vel breviter acuminato apice obtuso, petiolo obcompressa (dorsoventraliter) limbum longitudine aequante; capitulis parvis ca. 9-floris cymosis, cymis ca. 7–13-capituliferis terminalibus; involucri campanulati squamis ca. 6 obovatis viridibus obtusis ciliatis 3 mm. longis; corollae tubo proprio brevi glanduloso-puberulo, faucibus campanulatis quam tubo longioribus subglabris, limbi dentibus 5 late ovatis obtusis; achaeniis immaturis sursum hispidulis basi rectiusculis. — Colombia, near R. Flautas, R. Paez Valley, Tierra Adentro, Central Cordillera, alt. 2900 m., 26 January, 1906, *H. Pittier*, no. 1208 (hb. U. S. Nat. Mus.; fragment in hb. Gray). This species stands nearest *P. callitricha* Robinson, Proc. Am. Acad. xlii. 15 (1906), but differs in having smaller more coarsely and simply toothed leaves with much longer petioles. It is also a smoother plant and has fewer-flowered heads.

➤ *Stevia alatipes* Robinson, n. sp., herbacea perennis ca. 1 cm. alta hirsuta; radice fibrosa; foliis radicalibus ovatis vel obovatis crenato-serratis ca. 8 cm. longis 4–5 cm. latis pinnatinerviis utrinque hirsutis haud vel vix punctatis apice rotundatis basi angustatis in petiolum alatum decurrentibus; foliis caulinis oppositis 2–4-jugis oblanceolatis vel fere spatulatis in petiolum alatum basi attenuatis; inflorescentia laxissime pauciramosa; ramis nudiusculis, capitula pauca parva saepe aggregata ferentibus; bracteis 7 mm. longis lanceolatis sessilibus herbaceis; pedicellis ad 1 cm. longis filiformibus glanduloso-puberulis; capitulis ca. 12 mm. longis 4-floris; involucri squamis 5 viridibus lanceolato-linearibus acutis inaequalibus ca. 7 mm. longis; corollis 7 mm. longis, tubo viridescenti puberulo, limbo albo; achaeniis nigrescentibus 3.2 mm. longis minute puberulis; pappo e squamis 3 brevibus albis et aristis 3 albidis 5–6 mm. longis barbellatis composito. — Pine forests, Uruapan, Michoacan, Mexico, alt. 1680 m., 14 November, 1905, *C. G. Pringle*, no. 10,124 (type, in hb. Gray). Near *S. elatior* HBK. but readily separable by its much larger basal leaves with long-attenuate base, its aggregated heads, etc.

➤ *Stevia Lozanoi* Robinson, n. sp., caule tereti purpureo pilis crispis griseis brevibus pubescenti supra laxo ramoso folioso; ramis divergenti-ascendentibus subsimplicibus gracilibus ca. 1 dm. longis foliosis in corymbos subdensos capitiformis terminantibus; foliis inferioribus ignotis, superioribus linearibus sessilibus alternis integris 4–5 cm. longis 3–7 mm. latis utrinque obscure viridibus punctatis 1–3-nerviis sparse

pubescentibus margine saepe purpurascenti-hispidulis apice obtusis basi attenuatis; corymbis 3-4 cm. diametro convexis 10-20-capitulatis; capitulis 1.5 cm. longis breviter pedicellatis vel etiam sessilibus, bracteis linearibus 3-6 mm. longis herbaceis; squamis involucri ca. 6 linearibus acutis purpureis 7 mm. longis pilis crispis atomisque resinosis tectis; flosculis 5; corollis 8 mm. longis, tubo purpureo pubescenti gradatim a basi sursum leviter ampliato, limbo albo patenti 5-lobo, lobis oblongis obtusiusculis; achaeniis gracilibus 5 mm. longis sursum praesertim in angulis hispidulis; pappo e squamulis 5 albidis brevissimis et aristis 5 purpureis divergentibus scabratis composito. — Sandia Station in mountains of northwest Durango, Mexico, alt. 2290 m., 12 October, 1905, *C. G. Pringle*, no. 10,092 (type, in hb. Gray). A species evidently related to *S. laxiflora* DC. and *S. serrata* DC., but readily distinguished by its numerous separate dense corymbs and entire leaves. Named for Sr. Filemon L. Lozano, faithful and efficient companion and assistant of Mr. Pringle in his recent journeys to Mexico.

STEVIA PLUMMERAE Gray, var. *durangensis* Robinson, n. var., foliis tenuibus lanceolato-oblongis 6-9 cm. longis 1.5-2 cm. latis supra mediam partem serratis nec dentatis supra pilis brevissimis crispis griseo-puberulis subtus molliter pubescentibus; corollis albis. — Barranca below Sandia Station, Durango, Mexico, alt. 2135 m., 13 October, 1905, *C. G. Pringle*, no. 10,106 (type, in hb. Gray). Nearer var. *alba* Gray, Syn. Fl. i. pt. 2, 92, than to the typical form, but differing in its thinner larger less strongly reticulated and much more pubescent leaves.

Eupatorium acutidentatum Robinson, n. sp., herbaceum erectum 6 dm. altum; caule gracili tereti striato viridi vel purpurascenti crispe puberulo subsimplici vel modice oppositirameo; foliis oppositis ovato-lanceolatis tenuibus argute serrato-dentatis basi cuneata et apice attenuato integris a basi 3-5-nerviis 3.6-5 cm. longis 1.8-2.2 cm. latis supra laete viridibus scabriusculis subtus vix pallidioribus in nerviis sparse pubescentibus, petiolo puberulo ca. 5 mm. longo; capitulis ca. 12-floris 1 cm. longis numerosis graciliter pedicellatis in corymbos valde convexos collectis, pedicellis 5-8 mm. longis griseo-puberulis; involucri squamis anguste oblongis vel lanceolatis attenuatis herbaceis griseo-puberulis inaequalibus laxè imbricatis interioribus quam flosculis dimidio brevioribus; corollis albis glabris, tubo proprio gracili quam faucibus gradatim sed valde ampliatis distincte brevioribus; achaeniis nigrescentibus 3 mm. longis prismaticis deorsum paululo angustatis sursum hispidulis; pappi setis minute barbellatis corolla fere aequilongis basin versus roseis. — Barranca below Sandia Station, Durango, Mexico, alt. 2135 m., 15 October, 1905, *C. G. Pringle*, no. 10,095 (type, in hb. Gray). This species is obviously close to *E. betulaeifolium*

(Greene) Robinson, n. comb. (*Kyrstenia betulæfolia* Greene, Leaf. i. 10, 1903.) It differs, however, in having decidedly narrower leaves, which are entire at the attenuate apex; the bracts are also of different form, being narrowly lanceolate, quite entire, and strongly attenuate; furthermore the involucreal scales are of a more herbaceous texture. Whether these distinctions will prove constant cannot be foretold; but on the whole they appear rather too significant to permit the placing of the present plant under *E. betulæfolium* as a variety.

Eupatorium campechense Robinson, n. sp., subglabrum; ramis teretibus striatulis glaberrimis lignescentibus modice medullosis; foliis oppositis petiolatis lanceolatis attenuatis saepe falcatis 3-nerviis crassiusculis nitidulis 8-10 cm. longis 2.4-3 cm. latis glabris vel in nerviis primariis obscure puberulis subremote serratis; petiolo ca. 1 cm. longo obcompressa supra canaliculato glabro vel papilloso; inflorescentiis amplis oppositirameis; capitulis numerosis ca. 5-floris graciliter pedicellatis subdense corymbosis; ramulis paniculae et pedicellis gracillimis puberulis; involucri squamis 5-stachyis imbricatis stramineis glaberrimis obtusis, extimis brevissimis ovatis ca. 1 mm. longis intermediis gradatim longioribus ovato-oblongis, intimis (numero ca. 5) anguste oblongis 7 mm. longis; corollis tubulosis sine faucibus distinctis 6 mm. longis, dentibus limbi ca. 1 mm. longis lanceolatis recurvatis; achaeniis prismaticis 5-angulatis fuscis in faciebus et in costis pubescentibus 3.3 mm. longis deorsum modice angustatis; pappi setis ca. 20 levibus albidis 4-5 mm. longis. — Apazoli near Yohaltun, Campeche, Mexico, 30 December, 1900, *E. A. Goldman*, no. 504 (type, in hb. U. S. Nat. Mus.; fragments in hb. Gray). A species well marked and apparently without close ally.

Eupatorium chrysostyloides Robinson, n. sp., herbaceum suberectum 1.3-4 dm. altum pilis crispis griseis brevibus hinc inde glanduliferis puberulum; caule solitario modice curvato vel flexuoso obtuse angulato pallide viridi folioso, in parte inferiore subsimplici; foliis oppositis longe petiolatis concoloribus viridibus nec lucidis late deltoideo-ovatis 3-6 cm. longis 2.4-5 cm. latis obtusis vel modice acutis grosse crenato-dentatis basi subtruncatis 3-nerviis in petiolum breviter decurrentibus; petiolo 1-4.5 cm. longo; corymbis rotundatis multicapitulatis densiusculis ramos terminantibus; pedicellis filiformibus griseo-pubescentibus; capitulis ca. 20-floris ca. 1 cm. longis 6 mm. diametro; involucri turbinato-cylindrati squamis numerosis anguste lanceolatis viridibus pallide nervatis hispidulis acutissimis valde inaequalibus multiseriatis; corollis viridi-albidis angustissimis brevissime 5-dentatis, faucibus nullo modo ampliatis; styli ramis longissimis aureis valde exsertis; achaeniis 5-angulatis prismaticis 2.5 mm. longis basi

angustatis albo-callosis sursum paulo hispidulis, pappi setis ca. 25 laete albis minute barbellatis. — On limerock, Sierra Madre, above Monterey, Mexico, alt. 915 m., 27 April, 1906, *C. G. Pringle*, no. 10,231 (type, in hb. Gray). This species belongs to a small but increasing group of very nearly related plants, including *E. Parryi* Gray, *E. chrysostylum* Robinson, and *E. sphenopodium* Robinson. From all these species, the present one differs in its exceedingly short crisped pubescence.

Eupatorium durangense Robinson, n. sp., herbaceum 6–9 dm. altum; caule tereti oppositirameo folioso purpurascenti ubique minuteque crispo-puberulo; foliis oppositis ovatis deflexis breviter petiolatis firmissculis obtusis vel vix acutis paulo supra basin 3–5-nerviis supra viridibus pilosellis subtus vix pallidioribus leviter reticulato-venosis in nervis venisque sparse pubescentibus serratis 2–3 cm. longis 1.3–2.2 cm. latis scabrido-ciliolatis, petiolo puberulo supra concavo 2–3 mm. longo; capitulis ca. 12-floris numerosis in corymbis convexis terminalibus collectis, pedicellis 5–12 mm. longis filiformibus griseo-puberulis; involucri squamis pallide viridibus griseo-puberulis oblongo-linearibus acutis valde inaequalibus sed laxe imbricatis interioribus ca. 4–5 mm. longis; corollis albis 6–7 mm. longis, tubo proprio gracili fauces gradatim sed distincte ampliatos subcylindratos subaequantibus; achaeniis nigris gracilibus 5-angulatis in angulis sursum hispidulis; pappi setis simplicibus corollam aequantibus superne laete albis basin versus roseis. — Barranca below Sandia Station, Durango, Mexico, alt. 2135 m., 15 October, 1905, *C. G. Pringle*, no. 10,096 (type, in hb. Gray).

Var. *angustius* Robinson, n. var., foliis angustioribus ovato-lanceolatis attenuatis maximis 3.2 cm. longis 1.7 cm. latis supremis saepe alternantibus. — Mesa de Sandia, northwestern Durango, Mexico, alt. 2745 m., 14 October, 1905, *C. G. Pringle*, no. 10,097 (type, in hb. Gray). This variety has something the appearance of *E. Robinsonianum* Greene, but may be readily distinguished by its more herbaceous involucre, thickish more pubescent and regularly deflexed leaves, shorter stouter petioles, etc.

Eupatorium erythrocomum Robinson, n. sp., suffrutescens laxè procumbens; caulibus tenuibus teretibus arcuatis ramosis atropurpureis striatulis plerumque ca. 2 mm. diametro cum pilis moniliformibus adpresse villosulis; foliis oppositis ovatis vel ovato-lanceolatis breviter petiolatis, limbo 2–2.8 cm. longo 1–1.2 cm. lato supra basin subrotundatam integram argute serrato apice acuto 3-nervio supra viridi glabriusculo subtus saepissime purpurascenti praesertim in nervis venisque adpresse pilosis, petiolo tereti purpureo ca. 2 mm. longo, venis supra

impressis, dentibus limbi utroque ca. 5; capitulis ca. 30-floris paucis 4-11 in corymbo terminali, pedicellis ca. 1 cm. longis erectis vel ascendentibus subfiliformibus atropurpureis adpresse villosulis, bracteis linearibus; involucri campanulati squamis ca. 15 lanceolati-linearibus subaequalibus vix imbricatis obtusis vel acutiusculis pilosis ca. 5 mm. longis margine praesertim apicem versus pulcherrime ciliatis; corollis albis 4 mm. longis, tubo proprio gracili fauces ampliatus subcylindratos subaequant, dentibus limbi 5 acutiusculis hispidopilosis; achaeniis prismaticis praesertim in angulis breviter hispidulis; pappi setis pulcherrime roseis. — Steep rocks, Ixtaccihuatl, Mexico, alt. 2440 m., January, 1906, *C. A. Purpus*, no. 1578 (type, in hb. Gray). This attractive species of *Eupatorium* was submitted to the writer by Mr. T. S. Brandege. It approaches *E. prunellifolium* HBK., but differs in its slender flexuous procumbent stems, and more evenly and sharply serrate leaves, which are essentially glabrous above. *E. oligocephalum* DC., an imperfectly known species, may also be of this affinity; but it is described as having glabrous involueral scales.

Eupatorium hospitale Robinson, n. sp., arboreum; ramis 6-angulatis striatis molliter lignosis medullosis glabris; foliis oppositis lanceolato-oblongis serratis vel subintegris petiolatis penninerviis utrinque glabris crassis siccitate nigrescentibus pellucide punctatis lineolatisque caudato-acuminatis basi attenuatis 16-18 cm. longis 5-6 cm. latis; panicula terminali pyramidata oppositiramea patenter ramosa obsolete pilosiuscula vel glabra multicapitulata; capitulis in summis partibus ramulorum sessilibus parvis ca. 6-floris; squamis involucri valde inaequalibus, interioribus oblongis obtusis 5 mm. longis paucis caducissimis, exterioribus multo brevioribus imbricatis dorso margineque pilosiusculis apice rotundatis persistentibus aetate patentibus; flosculis vero similiter albidis vel viridescens; corollis 4 mm. longis, tubo proprio gracili, faucibus cylindratis saepius vix ampliatis; achaeniis ca. 3 mm. longis brunneis acute 5-angulatis basi attenuatis in faciebus concavis pilosis ad angulos etiam hispidulis; pappi setis sordidis ca. 35 corollam subaequantibus. — *E. vanillosmoides* Hemsl., *Biol. Cent.-Am. Bot.* ii. 102 (1881), not Sch. Bip. ex Bak. in *Mart. Fl. Bras.* vi. pt. 2, p. 346 (1876). — Mirador, Vera Cruz, Mexico, *Liebmann*, no. 43 (type, in hb. Gray), *Sartorius* (hb. Gray); Orizaba, Mexico, October, 1855, *Schaffner* (hb. Gray), *Botteri*, no. 613 (hb. Gray). This well marked species appears never to have been described. The plant in question has been repeatedly distributed as *Eupatorium vanillosmoides* Sch. Bip., but the species to which Schultz really gave this name was a Brazilian plant of entirely different affinity, referred by Mr. Baker (*Fl. Bras.* vi. pt. 2, p. 346) to the synonymy of *E. pyriforme* DC. It

is true Schultz well knew the Mexican plant, and ascribed to it the same specific name (*vanillosmoides*), but under another generic name. In describing this hitherto uncharacterized Mexican plant it seems unwise to take up the nomen nudum *E. vanillosmoides* Hemsl., a name inadvertently ascribed by Mr. Hemsley to Schultz, although, as we have seen, Schultz used this binominal combination for quite a different plant of Brazil. To avoid probable confusion the Mexican plant is herewith given a new and distinctive name. The designation chosen is suggested by the fact that some of the internodes below the inflorescence are often swollen, hollowed, and provided with a somewhat regular rounded ingress for small insects, probably ants. These enlargements are not always present, and are doubtless of the nature of galls developing through insect irritation, and later serving as nesting places for the insects.

Eupatorium hymenolepis Robinson, n. sp., gracile patente ramosum; caule tereti nigrescenti obsolete strigilloso; ramis gracillimis flexuosis; foliis oppositis longe petiolatis ovatis vel rhomboideis basi abrupte angustata acuta excepta grosse serratis apice caudato-attenuatis 6-7.5 cm. longis 2-3.5 cm. latis tenuibus utrinque viridibus in nervis adpresse pilosiusculis subtus haud pallidioribus supra sparse strigillosis; cymis parvis 6-10-capitulatis graciliter pedunculatis saepissime nutantibus; capitulis parvis 3.5 mm. longis ca. 18-floris; involucri companulati squamis valde inaequalibus albo-scareosis in media parte tantum viridi-striatis, interioribus lineari-oblongis obtusissimis, exterioribus brevioribus acutis vel acuminatis; corollis albis 2.5 mm. longis glabris basin versus modice angustatis; dentibus 5 ovato-deltaideis brevibus patentibus; styli ramis albis paulo clavellatis; achaeniis nigris 5-angulatis 1.3 mm. longis basi albo-callosis sursum minute hispidulis, costis albidis; pappi setis gracillimis ca. 20 corolla distincte brevioribus. — Falls of Tzararacua, near Uruapan, Mexico, 28 January, 1907, *C. G. Pringle*, no. 10,355 (type, in hb. Gray). This species somewhat resembles *E. hymenophyllum* Klatt, but has slightly firmer leaves 3-nerved from the very base instead of from a point somewhat above the base; it differs also in its involucre. From *E. Gonzalezii* Robinson, to which it also bears some resemblance, it may be readily distinguished by its more attenuate leaves and scarious involucre scales.

Eupatorium isolepis Robinson, n. sp., suffruticosum; caulibus teretibus flexuosis oppositirameis brunneo-purpureis pubescentibus, pilis moniliformibus transverse purpureo-striatis; foliis oppositis graciliter petiolatis ovatis acuminatis serratis tenuibus subpellucidis subconcoloribus supra glabris subtus in nervis sparse pilosis penninerviis basi

rotundatis paululo in petiolum saepe subdecurrentibus 3–6.5 cm. longis 1.6–4 cm. latis; petiolo 1–4 cm. longo subtus convexo subglabro supra canaliculato villosus; capitulis 9 mm. longis 6 mm. diametro 20-floris numerosis ad apices ramorum glomerato-aggregatis, corymbis rotundatis densiusculis ca. 4 cm. diametro; pedicellis filiformibus puberulis 2–6 mm. longis; involucri campanulati squamis ca. 10 elliptico-vel obovato-oblongis aequilongis apice rotundatis saepius pulcherrime ciliatis dorso pubescentibus 3.2 mm. longis 1.5 mm. latis pallide viridibus; corollis albis, tubo proprio gracili 2 mm. longo glabro, faucibus campanulatis glabris, dentibus limbi 5 deltoideis pilosiusculis; antheris vix connatis apice longe appendiculatis; achaeniis nigrescentibus 5-angulatis 1.5 mm. longis sursum praesertim in angulis hispidulis apice cupula albida coronatis; pappi setis capillaribus vix barbellatis laete albis vel saepissime pulcherrime roseis corollam fere aequantibus caducis. — Open moist places, rocks of barranca, Ixtaccihuatl, Mexico, alt. 2440 m., *C. A. Purpus*, no. 1496 (type, in hb. Gray); also in the Valley of Mexico, *Schaffner*, no. 201 (hb. Gray). This species differs from *E. pazcuarensis* HBK. in its very obtuse involucreal scales; from *E. photinum* Robinson, in its thin pubescent less attenuate leaves. It is perhaps most nearly related to *E. Schaffneri* Gray, but it differs from that species in its more attenuate-acuminate and more regularly serrate leaves which are pinnately veined, while in *E. Schaffneri* they are palmately nerved from the very base.

EUPATORIUM PHOENICOLEPIS Robinson, var. *guatemalensis* Robinson, n. var., foliis quam eis formae typicae multo majoribus 12–14 cm. longis 9–10 cm. latis tenuioribus cordatis supra scabriusculis subtus in nervis venisque laxiuscule pubescentibus nec tomentosus; involucri squamis et floribus necnon achaeniis formae typicae simillimis. — Vol. Atitlan, Department of Solalá, Guatemala, alt. 2500–2700 m., 16 February, 1906, *W. A. Kellerman*, no. 5199 (type, in hb. Field Museum of Natural History; fragment in hb. Gray); between Patahil and San Lucas, Department of Solalá, Guatemala, 15 February, 1906, *W. A. Kellerman*, no. 5194 (hb. Field Mus.).

Eupatorium saltillense Robinson, n. sp., fruticosum 9–15 dm. altum oppositirameum; ramis teretibus late patentibus arcuato-ascendentibus a cortice brunneo-griseo obtectis foliosis; foliis ovatis tenuibus translucens integris vel obsolete serratis vel plus minusve distincte serrato-dentatis vix discoloribus supra sparse pilosulis obscurissime punctatis vel omnino epunctatis subtus minute glanduloso-punctatis et praesertim in nervis venisque puberulis apice obtusis vel obtusiusculis numquam attenuatis basi angustatis in petiolo decurrentibus et margine saepissime revolutis, limbo 4–5.8 cm. longis 2.3–3.3 cm. latis, nervis

subtus albidis prominulis, venis lateralibus utrinque ca. 5 inaequidistantibus maximis supra basin orientibus; petiolis 5–8 mm. longis leviter marginatis basi linea transversa connexis; inflorescentiis corymbosis valde convexis oppositirameis multicapitulatis; bracteis inferioribus petiolatis ovatis foliis similibus sed multo minoribus superioribus anguste linearibus sessilibus; pedicellis rectis filiformibus patentiascendentibus pilis crispis obtectis; capitulis parvis numerosissimis saepissime 5-floris 8 mm. longis; squamis involucri ca. 8 linearibus vix imbricatis sordide puberulis acutiusculis interioribus 4–5 mm. longis extimis 1–3 multo brevioribus; corollis glabriusculis 4.6 mm. longis albidis vel roseis, tubo proprio gracili quam faucibus subcylindratis brevioribus, dentibus limbi ovato-deltaeideis; achaeniis nigris prismaticis griseo-puberulis 3 mm. longis; pappi setis praesertim basi pulcherrime roseis corollam vix aequantibus. — Mountains near Saltillo, Coahuila, Mexico, alt. 2135 m., 5 October, 1905, *C. G. Pringle*, no. 10,080 (type, in hb. Gray). This species is obviously related to *E. micranthum* Less. It differs, however, in many small characters. The leaves are thin and translucent while in *E. micranthum* they are thickish and quite opaque. In *E. saltillense* they are also much broader relatively to their length and not attenuate. The nervation is furthermore quite different, for in *E. micranthum* the lateral veins leave the midnerve in a pretty regular pinnate fashion, while in *E. saltillense* they are less numerous and less regular and give the leaves somewhat the appearance of being 3-nerved from a point above the base.

Eupatorium sexangulare (Klatt) Robinson, n. comb. *Piptocarpha sexangularis* Klatt, Botanisches Beiblatt zur Leopoldina, 1895, p. 1. Mr. H. A. Gleason, during a recent examination of the *Vernonieae* in the Gray Herbarium, called my attention to the type of Dr. Klatt's *Piptocarpha sexangularis*, which appeared wholly irreconcilable with the genus in which it had been placed and indeed with any other genus of the *Vernonieae*. Unfortunately the specimen, although showing well the stem, leaves, inflorescence, involucreal scales, etc., has but very few flowers, and these have been so damaged by decay or insects that it is impossible to state precisely the form of the anthers or style-tips; nevertheless there can be no doubt that the plant is a *Eupatorium*, and as it appears to be unlike any species previously referred to that genus, it may be simply transferred thither. In its sharply angled stem and large thickish lanceolate leaves it bears considerable resemblance to the plant here described as *E. hospitale*. It may be readily distinguished, however, by the different venation of the leaves, entirely glabrous achenes, etc.

Eupatorium sphenopodium Robinson, n. sp., herbaceum oppositi-

rameum molliter hirsutum, pilis longis patentibus plus minusve moniformibus albis viscidulis inaequalibus; foliis oppositis deltoideis vel ovato-deltoideis longe petiolatis late cordatis grosse duplicateque crenato-dentatis tenuibus utrinque praesertim subtus in nervis pubescentibus, limbo 11-12 cm. longo 8-10 cm. lato, petiolo sursum alato ca. 7 cm. longo hirsuto; panicula oppositiramea; capitulis ca. 11-floris 10-11 mm. longis 4-5 mm. diametro; pedicellis gracilibus rectis valde inaequalibus 2-12 mm. longis; involucri squamis lanceolatis attenuatis peracutis 3-4-seriatis valde imbricatis viridibus albo-nerviis hispidulis adpressis; corollis angustissime tubulosis 3.5 mm. longis viridiscenti-albidis, faucibus vix ullis; dentibus limbi brevissimis erectis; styli ramis valde exsertis aurantiacis vel maturitate brunnescentibus valde clavatis; achaeniis fuscis prismaticis 2.7 mm. longis deorsum modice angustatis basi callosis plus minusve curvatis in faciebus et in costis sursum hispidulis; pappi setis inaequalibus ca. 20 vix scabratis laete albis corollam fere aequantibus. — On shaded cliffs of limerock, Sierra Madre, above Monterey, Mexico, 1000 m. alt., 16 July, 1906, *C. G. Pringle*, no. 10,259 (type, in hb. Gray). This species is closely related on the one hand to *E. chrysostylum* Robinson and on the other to *E. Parryi* Gray. From the former it differs in its more slender freely branched less pubescent stems, large bluntly toothed leaves and much longer pedicels. From *E. Parryi* it differs in having much larger leaves (of which even the uppermost are opposite), winged petioles, and smaller fewer-flowered heads.

➤ *Eupatorium thyrsiflorum* (Greene) Robinson, n. comb. *Kyrstenia thyrsiflora* Greene, Leaflet i. 9 (1903). The genus *Kyrstenia* Neck. does not seem to the writer in any way satisfactorily separable from *Eupatorium*. When all species are duly considered the two groups appear to merge by imperceptible gradations. There seems, however, to be little doubt that Professor Greene's *K. thyrsiflora* is specifically distinct and may be appropriately transferred to the older genus. From the more typical material of the species, with leaves in varying degree toothed and somewhat narrowed at the base, the following plant may be varietally separated.

Var. *holoclerum* Robinson, n. var., foliis ovatis integris vel obsolete crenato-serratis basi fere rotundatis. — Near the city of Durango, Mexico, April to November, 1896, *Dr. E. Palmer*, no. 755 (type, in hb. Gray). Distributed as *E. occidentale*, var. *arizonicum* Gray.

Eupatorium triangulatum Alam. ex DC. Prod. v. 172 (1836). After a careful examination of the types of this species in the DeCandolleian herbarium at Geneva, and of *E. rubricaulis* HBK. at the Museum of Natural History at Paris, the writer can find no differences of moment.

DeCandolle does not appear to have seen the plant of Humboldt and Bonpland, and the distinctions on which he attempted to separate *E. triangulatum* were deduced from the description of Kunth, but on comparison of the plants themselves these distinctions do not appear to be definite or important. The species should certainly be united and stand under the older name *E. RUBRICAULE* HBK.

BRICKELLIA BETONICAEFOLIA Gray, Pl. Wright. ii. 72 (1853). In the typical form of this rather variable species the leaves are ovate-oblong and flat, the larger 6 cm. long, 3 cm. wide; petioles very short, scarcely over 2 mm. long; longer scales of the involucre rather attenuate.

Var. *HUMILIS* Gray, l. c. Leaves ovate-oblong, flat, essentially sessile, the largest 3.8 cm. long, 1.5 cm. wide; longer scales of the involucre linear, attenuate.

Var. *elliptica* Robinson, n. var., foliis late ellipticis planis 3–4 cm. longis 1.8–3 cm. latis subsessilibus; squamis involucri atropurpureis interioribus lanceolati-linearibus attenuatis. — Barranca below Sandia Station, Durango, Mexico, alt. 2135 m., 13 October, 1905, *C. G. Pringle*, no. 10,102 (type, in hb. Gray).

Var. *conduplicata* Robinson, n. var., caule 6–9 dm. alto; foliis 2–3 cm. longis 1.4–1.8 cm. latis saepissime conduplicatis; petiolo gracile 4–5 mm. longo; squamis involucri interioribus oblongi-linearibus atropurpureis vix attenuatis. — San Luis Potosi, Mexico, on rocky hills, San José Pass, 16 August, 1890, *C. G. Pringle*, no. 3171 (distributed as *B. betonicaefolia* Gray?). Mountains near General Cepeda, Coahuila, Mexico, alt. 1920 m., 7 October, 1905, *C. G. Pringle*, no. 10,081 (type, in hb. Gray).

Brickellia saltillensis Robinson, n. sp., caulibus teretibus 9–12 dm. altis gracilibus striatulis pallide viridibus vel leviter purpurascensibus molliter breviterque pubescentibus foliosis; foliis alternis petiolatis in axillis proliferis, laminis late ovatis obtusis vel subacutis serratis tenuibus utrinque viridibus brevissime pubescentibus basi rotundatis 4–5.5 cm. longis 2–4 cm. latis a basi 3-nerviis laxe reticulato-venosis; petiolo 1–1.4 cm. longo pilis crispis glanduloso-puberulo; foliis parvis ellipticis 2–4 in axillis; panicula angusta 7–30 cm. longa 4–7 cm. diametro folioso-bracteata; cymulis saepissime 3-capitulatis; pedicellis gracillimis filiformibus glanduloso-puberulis nutantibus; capitulis ca. 14-floris 1.8 cm. longis; involucri subturbinati squamis exterioribus viridibus striatis lanceolatis attenuatis dorso puberulis, interioribus lanceolati-linearibus attenuatis purpureo-tinctis 1–1.2 cm. longis; corollis albidis angustissime tubulosis 8–9 mm. longis glabris, faucibus nullis, limbi dentibus brevissimis erectis; styli ramis nigrescentibus vix clavatis longe exsertis; achaeniis columnaribus 4.5 mm. longis adpresse pubescentibus

fuscis basi callosis, pappi setis ca. 22 aequalibus tenuibus laete albis 5 mm. longis vix scabratis. — On mountains, Saltillo, Mexico, alt. 2135 m., 5 October, 1905, *C. G. Pringle*, no. 10,082 (type, in hb. Gray).

LAGASCEA HELIANTHIFOLIA HBK., var. *adenocaulis* Robinson, n. var., caule (3-4 m. alto) usque ad summam partem dense glanduloso-puberulo nec piloso; foliis longiuscule oblanceolato-oblongis attenuatis supra scabris subtus paulo pallidioribus molliter tomentellis. — Hedgerows, Uruapan, Michoacan, Mexico, 24 January, 1907, *C. G. Pringle*, no. 13,907 (type, in hb. Gray). A transition between this variety and the typical spreading-pilose form is shown by L. C. Smith's no. 964 from the mountains of San Juan del Estado, Oaxaca.

LAGASCEA HELIANTHIFOLIA HBK., var. *levior* Robinson, n. comb. *Nocca helianthifolia* Cass., var. *levior* Robinson, Proc. Am. Acad. xxxvi. 468 (1901).

LAGASCEA HELIANTHIFOLIA HBK., var. *suaveolens* Robinson, n. comb. *L. suaveolens* HBK. Nov. Gen. et Spec. iv. 25 (1820). *Nocca helianthifolia* Cass., var. *suaveolens* Robinson, l. c.

Lagascea Palmeri Robinson, n. comb. *Nocca Palmeri* Robinson, l. c. 471 (1901).

Lagascea Pringlei Robinson, n. comb. *Nocca Pringlei* Robinson, l. c. 469 (1901).

Guardiola Palmeri Robinson, n. sp., glaberrima atroviridis compacte ramosa foliosa 3.5 dm. alta basi lignescens; caulibus teretibus striatulis gracilibus, ramis oppositis ascendentibus; foliis oppositis petiolatis ovatis vel subreniformibus integerrimis vel plus minusve repandis nec angulatis nec dentatis 1.5-3 cm. longis 1.2-2.8 cm. latis utrinque leviter reticulato-venosis subtus vix pallidioribus apice rotundatis basi late cordatis, petiolo 5-7 mm. longo; inflorescentiis in apicibus ramorum folioso-bracteosis 1-3-capitulatis; pedicellis 3-7 mm. longis; capitulis 12-14 mm. longis 6-8 mm. diametro; involucri subcylindrati fusco-viridis 1 cm. longi 4-5 mm. crassi squamis oblongis obtusiusculis striatulis leviter convexis nullo modo carinatis; radiis ca. 3; corollae tubo gracili glaberrimo 5 mm. longo, ligula elliptica 4 mm. longa 2.2 mm. lata bidentata alba; achaeniis immaturis concavo-convexis obovato-oblongis 4.6 mm. longis glabris; floribus disci ca. 10 gracillimis, tubo corollae ca. 9 mm. longo, faucibus brevissimis campanulatis, lobis limbi 5 lineari-oblongis obtusis recurvatis albis; filamentis albis tomentosis quam antherae virides multo brevioribus. — Outer circle of mesas, Otinapa, Durango, Mexico, alt. about 2450 m., 25 July-5 August, 1906, *Dr. E. Palmer*, no. 377 (type, in hb. Gray). This species in its few scattered heads, broad clearly petiolate leaves, and unkeeled involucreal scales, closely approaches *G. Rosei* Robinson;

but it differs from that species in its decidedly smaller untoothed leaves, which are rounded at the apex.

Zinnia tenella Robinson, n. sp., erecta gracilis annua tenuiter pilis subappressis griseis in novellis copiose pubescens in parte inferiore simplex supra saepissime 3-5-ramea 1.5-2.7 dm. alta; foliis tenuibus lanceolatis integris utrinque viridibus appresso-puberulis et sparse atomiferis obtusiusculis 3-nerviis patentibus vel deflexis basi cuneatis brevissime petiolatis 1.5-3.5 cm. longis 4-10 mm. latis; capitulis saepissime 1-5 terminalibus graciliter pedunculatis erectis ca. 7 mm. diametro (ligulis exclusis) aequi-altis; involucri campanulati squamis paucis (ca. 8) late oblongis obtusissimis subaequalibus appressis tenuiter appresso-puberulis ca. 5 mm. longis; ligulis ca. 5 patentibus late oblongis aurantiacis extus prope apicem saepe viridi-striatulis vel reticulatis minutissime puberulis et granuliferis 7.5 mm. longis 5-6.5 mm. latis; achaeniis florum liguliferorum obovatis concavo-convexis margine ciliatis in summa parte bidentatis 4 mm. longis (immaturis); corollis florum (ca. 15) disci 3 mm. longis sursum leviter ampliatis infra limbum brevissimum aurantiacum plus minusve purpureo-lineatis; paleis tenuibus ovato-oblongis acutis carinatis ciliolatis apice saepissime aurantiacis; achaeniis obovatis. — Very common on grassy plains and hills, Tejamén, Durango, Mexico, alt. about 2135 m., 21-27 August, 1906, *Dr. E. Palmer*, no. 500 (type, in hb. Gray). This species resembles in many respects *Z. linearis* Benth. It differs, however, in having broader leaves and a more slender erect and simple habit. It is especially to be distinguished from the related species by its fewer subequal involucreal scales.

➤ *Cymophora* Robinson, n. gen., *Compositarum Helianthearum*. Capitula homogama parva cymosa; disco parvo leviter convexo; paleis lanceolato-oblongis acutis carinatis flosculos amplectentibus. Involucrum anguste campanulatum, squamis paucis ovato-oblongis obtusis saepe mucronulatis subherbaceis striatis subaequalibus. Corollae tubulosae, tubo proprio brevissimo, faucibus cylindratis, limbo vel aequaliter 5-dentato vel flosculorum exteriorum plus minusve irregulari sed vix radiatiformi. Antherae connatae basi obtusae vel obscure sagittato-auriculatae apice distincte appendiculatae. Styli rami breves recurvato-patentes filiformes graciliter et distincte appendiculati, appendicibus capillaribus rectis ca. 0.1 mm. longis. Achaeinia anguste obconica pilis curvatis longiusculis albis villosa, pappo nullo. — Herba annua pubescens et glandulifera; foliis oppositis late ovatis subintegris; corollis albis; antheris purpureis.

➤ *C. Pringlei* Robinson, n. sp., caulibus laxè oppositeque ramosis patente pilosis 3-4 dm. altis; ramis arcuato-curvatis vel flexuosis

teretibus; foliis tenuibus a basi 3-nerviis breviter petiolatis, limbo late ovato integerrimo vel obsolete repando obtusiusculo 2-6 cm. longo 1.6-4 cm. lato utrinque sparse adpresseque pilosis supra viridi subtus pallidiore basi obtuso saepissime obliquo; cymis compositis laxis glanduloso-pubescentibus; capitulis ca. 10-floris 7 mm. longis 3.5 mm. diametro; pedicellis filiformibus rectis glanduloso-puberulis 6-10 mm. longis; involucri squamis ca. 6 subaequalibus (una vel duabus extimis valde minoribus exceptis) pallide viridibus striatis convexis nec carinatis; achaeniis nigrescentibus 2.2 mm. longis 0.6 mm. diametro ubique villosis apice rotundatis plus minusve margine squamacea cupulata coronatis. — Iguala Cañon, Guerrero, Mexico, alt. 760 m., 22 September, 1905, *C. G. Pringle*, no. 10,068 (type, in hb. Gray).

This plant appears to stand near *Eleutheranthera*, with which it shares many characters. It differs, however, markedly in its anthers, which are appendiculate and connate, in its non-acrescent involucre, and densely puberulent achenes. Furthermore in *Eleutheranthera* the achenes have a nipple-shaped contracted summit which is here lacking.

Perymenium globosum Robinson, n. sp., caule quadrangulato griseo-brunneo angulis rotundatis faciebus sulcatis, internodiis 7-9 cm. longis; foliis oppositis petiolatis ovato-oblongis serratis rugosis acuminatis basi rotundatis vel abrupte breveque cuneatis supra scabris strigillosis subtus vix pallidioribus scabriusculis in nervis venisque hispidulo-pubescentibus 8-12 cm. longis 4-5 cm. latis, petiolo 1.8 cm. longo flexuoso supra canaliculato; capitulis corymbosis, corymbis compositis 8-18 cm. latis; bracteis inferioribus foliaceis, bracteolis lineari-subulatis 3-5 mm. longis, pedicellis filiformibus flexuosis 1-2 cm. longis adpresse griseo-pubescentibus; involucri squamis ovatis acutis viridibus ca. 3 mm. longis; disco valde convexo; flosculis liguliferis ca. 7, ligulis linearibus aureis patentibus 6-8 mm. longis; paleis oblongis conduplicatis apice vix acutiusculis flavidis; capitulis fructiferis depresso-globosis 8 mm. diametro; achaeniis disci obovatis crassiusculis atrobrunneis plus minusve bullatis 2 mm. longis 1 mm. latis glabris a basi styli conica indurata coronatis; pappi aristis ca. 15 flavidulis inaequalibus plerisque 1 mm. longis. — Uruapan, Michoacan, Mexico, *C. G. Pringle*, no. 10,354. This species is nearly related to *P. verbescinoides* DC., but differs in having broader and less attenuate pales, greener involucreal scales, and leaves 3-nerved not from the base but from a point nearly 1 cm. above the base.

VERBESINA MONTANOIFOLIA Rob. & Greenm., var. *leptopoda* Robinson, n. var., pedicellis subaequalibus quam eis formae typicae longioribus (ca. 1 cm. longis) et gracilioribus; capitulis paulo minoribus. — By

streams, Tarascon, Mexico, 28 October, 1905, *C. G. Pringle*, no. 10,118 (type, in hb. Gray). According to note of Mr. Pringle this variety grows to a height of 3–4.5 m.

Verbesina pedunculosa Robinson, n. comb. *Actinomeris pedunculosa* DC. Prod. v. 576 (1836). *Verbesina Capitaneja* Nees, *Linnaea*, xix. 729 (1847); Rob. & Greenm. Proc. Am. Acad. xxxiv. 540 (1899).

Verbesina pleistocephala Robinson, n. comb. *Encelia pleistocephala* J. D. Smith, Bot. Gaz. xiii. 189 (1888), & Enum. Pl. Guat. i. 22 (1889). *Verbesina Donnell-Smithii* Coult. Bot. Gaz. xx. 50 (1895); J. D. Smith, Enum. Pl. Guat. iv. 88 (1895); Rob. & Greenm. Proc. Am. Acad. xxxiv. 556 (1899).

Coreopsis Pringlei Robinson, n. sp., fruticosa ramosa; ramis teretibus a cortice ochraceo-griseo obtectis; ramulis striatis viridibus plus minusve 6-angulatis foliosis; foliis oppositis petiolatis bipinnatifidis pallide viridibus glaberrimis vel vix pilosiusculis 2–4 cm. longis 1–3 cm. latis, segmentis patentibus angustissime linearibus leviter acutatis integris vel cum lobis secundariis paucis similibus instructis 4–16 mm. longis 0.6–0.8 mm. latis; capitibus terminalibus solitariis vel ad 3–5 corymbosis pedunculatis erectis vel nutantibus 3 cm. latis (ligulis patentibus inclusis); pedunculis 1–4 cm. longis nudis vel in media parte cum bractea unica lineari instructis; involucri campanulati squamis exterioribus ca. 8 herbaceis lineari-oblongis 3–5 mm. longis 1 mm. latis apice rotundatis basi pilosiusculis, squamis interioribus ovato-oblongis subscariosis acutatis ca. 6 mm. longis striatis flavido-brunneis; ligulis ca. 8 juventate supra aureis subtus flavidis maturitate laete flavis oblongis ca. 1.2 cm. longis 4–6 mm. latis, nervis atrobunneis; paleis linearibus pallidis brunneo-lineolatis apice obtusis eroso-ciliatis; achaeniis disci linearibus valde obcompressis in facie interiore et in marginibus valde villosis in facie exteriori subglabris 5 mm. longis (vix maturis); pappi aristis 2 pallidis villosoplumis attenuatis 3–4 mm. longis. — Dry ledges, San Juan del Rio, Queretaro, Mexico, alt. 1920 m., 8 September, 1905, *C. G. Pringle*, no. 10,050 (type, in hb. Gray). This species is related to *C. rhyacophila* Greenman, but differs in its linear-oblong round-tipped outer involucreal scales and much narrower leaf-segments, as well as in its shorter petioles and more decidedly ligneous stem.

Tridax platyphylla Robinson, n. sp., herba perennis laxa ramosa pubescens; caulibus teretibus viridibus vel purpurascens striatulis pubescentibus; foliis membranaceis oppositis petiolatis supra basin 3-nerviis, lamina late ovata 6.3–11.5 cm. longa 4.5–10 cm. lata dentata vel leviter 3-lobata supra viridi sparse pubescenti cum pilis basi tuberculo-incrassatis subtus vix pallidiore in nervis appresso-pubescenti apice

acuta vel obtusiuscula vel brevissime acuminata basi cuneato-attenuata; capitibus laxe corymbosis longe pedicellatis radiatis, disco leviter convexo; involucri squamis paucis subaequalibus ovatis vel late oblongis acutis herbaceis hirsutulis ca. 7 mm. longis; flosculis disci numerosis, corollis anguste tubulosis aurantiacis 7 mm. longis externe glabris, tubo proprio brevi basi ampliato; faucibus multo longioribus paulo et gradatim amplioribus 5-nerviis, limbi dentibus 5 brevibus ovato-lanceolatis acutiusculis apice puberulis; achaeniis turbinato-cylindricis 2.8 mm. longis sericeis, pappi setis plumosis numerosis attenuatis plus minusve inaequalibus ca. 2.6 mm. longis; flosculis radiatis 5, ligulis albis late oblongis vel suborbicularibus patentibus apice 3-dentatis 6-10 mm. longis. — River ledges, Balsas Station, alt. 600 m., 27 September, 1905, Guerrero, Mexico, *C. G. Pringle*, no. 10,075 (type, in hb. Gray). This species is habitally similar to *T. tenuifolia* Rose, which, however, has smaller leaves and pappus decidedly longer than the achenes.

GALINSOGA FILIFORMIS Hemsl., var. *epapposa* Robinson, n. var., habitu foliis inflorescentia, etc., formae typicae simillima; achaeniis omnino epapposis apice annulo albido inconspicuo coronatis; foliis caulinis quam eis formae typicae paululo minoribus. — San Ramón, Durango, Mexico, 21 April-18 May, 1906, *Dr. E. Palmer*, no. 127 (type, in hb. Gray). This puzzling plant, which according to the notes of the collector was found in numbers, much dried, on stony ridges among trees and bushes, differs in its lack of pappus from any other *Galinsoga*. Its otherwise close correspondence with *G. filiformis*, however, would seem to show that it is merely a new instance of a calvous form of an ordinarily pappus-bearing species. Similar cases are familiar in several neighboring genera, e. g. *Calea*, *Jaegeria*, etc. The phenomenon seems to present an ecological problem of interest, and it is to be hoped that collectors who have an opportunity to study these plants in the field may bear the matter in mind and endeavor to learn the conditions which determine the presence and absence of pappus in these in other respects essentially identical forms.

Flaveria bidentis Robinson, n. comb. *Ethulia bidentis* L. Mant. i. 110 (1767). *Flaveria chilensis* Gmel. Syst. 1269 (1796); Johnston, Proc. Am. Acad. xxxix. 285 (1903). *Milleria Contrayerba* Cav. Ic. Pl. i. 2, t. 4 (1791). The author has examined the type of *Ethulia bidentis* in the Linnaean Herbarium and finds that, as given in the Index Kewensis, it is the plant which has long passed as *Flaveria Contrayerba*. The Vienna rules of nomenclature require the restoration of the earlier specific name.

Pericome macrocephala Robinson, n. sp., griseo-pulverula vel

puberula oppositiramea; caulibus fragilibus subteretibus leviter angulato-striatis glabriusculis brunneis paulo lignescentibus; foliis triangulari-hastatis 5–6 cm. longis 4–5 cm. latis caudato-attenuatis subintegris basi abrupte cuneatis, auriculis subacuminatis, petiolo gracili 2–2.7 cm. longo; inflorescentiis corymbosis terminalibus 6–8 cm. latis subplanis 9–15-capitulatis; pedicellis gracilibus rectis vel leviter arcuatis sursum modice incrassatis pubescentibus 1–2 cm. longis; capitulis 1.7 cm. longis 1.2 cm. diametro homogamis multiflosculis; involucri cupula ovoideo-subcylindrata 1.2–1.4 cm. longa griseo-puberula multistriata dentibus brevissimis caudiformibus plus minusve patentibus; corollis laete flavis 1 cm. longis, tubo proprio gracillimo 3 mm. longo glanduloso-puberulo, faucibus anguste tubulosis sursum paululum ampliatis, dentibus limbi 4 brevibus ovato-oblongis obtusis; achaeniis nigrescentibus anguste oblongis valde compressis margine et apice fimbriato-ciliatis. — A showy plant growing in large masses on talus in mountains near San Ramón, Durango, Mexico, 21 April–18 May, 1906, *Dr. E. Palmer*, no. 69 (type, in hb. Gray). In habit and floral structure this species closely approaches *P. caudata* Gray, but differs from it conspicuously in having heads nearly twice as large. The form of the involucre also is different, being ovoid-subcylindric in the species here described while it is considerably more campanulate in *P. caudata*.

Loxothysanus Robinson, n. gen., *Compositarum Heleniearum*. Capitula homogama. Involucrum campanulatum vel turbinatum, squamis paucis uniseriatis aequalibus plerumque obovatis vel oblanceolatis acutis vel saepissime obtusiusculis herbaceis puberulis. Receptaculum parvum planiusculum onustum. Flosculi modice numerosi tubulosi hermaphroditi fertiles. Corollae albidae, tubo proprio gracili puberulo vel glandulifero fauces campanulatas subaequante, limbo 5-lobato. Styli rami breves recurvati filiformes vix infra apicem incrassati brevissime et obtusiuscule appendiculati. Antherae basi breviter sagittato-auriculatae apice obtuse appendiculatae. Achaenia gracilia 5-angulata sursum hispidula deorsum longiuscule angustata. Pappi squamae 5–8 oblongae erosae eis in margine exteriori achaenii quam aliis valde brevioribus. — Frutices humiles vel suffrutices ramosi erecti vel procumbentes. Capitula pauca mediocra axillaria vel laxe corymbosa. Flosculi vel omnes regulariter 5-dentati vel exteriores obscure subbilabiati. Folia opposita petiolata, limbo ovato vel orbiculari paucilobato vel vix crenato. (Nomen a *λοξός*, *obliquus*, et *θύσανος*, *fimbriae*, pappum unilateraliter abbreviatum designat.)

L. sinuatus (Less.) Robinson, n. comb., foliis ovatis sinuatis plerumque 3-lobatis basi obtusis vel subtruncatis vel late cordatis; capitulis

corymbosis; involucri squamis ca. 12 oblanceolatis acutis vel acutiusculis. — *Bahia sinuata* Less. *Linnaea*, v. 160 (1830). *B. nepetaefolia* Gray, *Proc. Am. Acad.* v. 184 (1861). — On rocky soil in Central and Southern Mexico. The following specimens have been examined. On cliffs near Hacienda de la Laguna, *Schiede*, no. 358 (hb. Berlin, fragments in hb. Gray); between San Luis Potosi and Tampico, *Palmer*, no. 1090 (hb. Gray); bare mountain ledges, Tamasopo Cañon, San Luis Potosi, *Pringle*, no. 3096 (hb. Gray); Wartenburg near Tartoyuca, prov. Huasteca, *Ervenberg*, no. 65 (hb. Gray); steep banks of barrancas, Zacuapan, Vera Cruz, *Purpus*, no. 1862, in part (hb. Gray).

L. filipes Robinson, n. sp., fruticulus gracillimus procumbens ramosus; ramis curvato-ascendentibus foliatis breviter pubescentibus; foliis graciliter petiolatis, limbo suborbiculari 1–1.8 cm. diametro crenato supra viridi obscure tomentello subtus incano-tomentello; petiolo 1–1.5 cm. longo filiformi flexuoso puberulo; capitulis ca. 30-floris axillaribus; pedunculo 2–3.5 cm. longo filiformi; involucri subturbinato-campanulati squamis ca. 7 obovatis obtusiusculis anthesi ca. 3 mm. longis; corollis 2.8 mm. longis, tubo proprio gracili glanduloso-puberulo ca. 1 mm. longo, faucibus campanulatis limbum fere aequantibus; pappi squamis interioribus ca. 0.4 mm. longis exterioribus 0.2–0.3 mm. longis; achaeniis 2.8 mm. longis deorsum valde angustatis. — Steep banks of barrancas, Zacuapan, Vera Cruz, Mexico, May, 1906, *Purpus*, no. 1862, in part (type, in hb. Gray).

This plant, which was sent to the writer by Mr. T. S. Brandege, proves to be a near relative and evident congener of the problematic species originally described as *Bahia sinuata* by Lessing and later redescribed by Dr. Gray as *B. nepetaefolia*. Both plants differ from the more typical species of *Bahia* in general habit, in the broad leaf-blades, which are very shallowly if at all cleft or lobed, in the absence of rays, and in the strongly unsymmetrical pappus. To judge from Dr. Gray's description and notes relating to his *B. nepetaefolia*, he was much inclined to regard the plant as belonging to a separate genus and only referred it to *Bahia* from a reluctance to increase the number of monotypic genera. The discovery by Mr. Purpus of a second plant maintaining perfectly the generic distinctions of the first seems now to warrant fully the recognition of the two as an independent genus.

Tagetes stenophylla Robinson, n. sp., perennis erecta usque ad 1 m. altitudine ramosa glaberrima basi suffrutescens; caule tereti costato folioso glaucescenti; ramis ascendentibus gracilibus in pedunculos longos nudos apicem versus purpurascens et modice incrassatos terminantibus; foliis 2–4 cm. longis pinnatifidis, rhachi anguste lineari, segmentis etiam linearibus angustissimis utrinque ca. 3 acutis vel setu-

liferis simplicibus vel semel lobatis, lobis similibus angustis; pedunculis 5–10 cm. longis apice saepe nutantibus; involucri anguste ovoidei 1.5 cm. longi basi rotundati vel paulo turbinati pallidi vel purpureo-tincti squamis 5 alte connatis a lineis binis glandularum linearum notatis apice aureis obtusis tomentosis; flosculis liguliferis 5; ligulis aureis obovato-oblongis 10–12 mm. longis 6–8 mm. latis apice obcordatis saepe obliquis; achaeniis disci compressis lineari-oblongis nigrescentibus 3 mm. longis sursum strigillosis; pappi aristis 5 connatis quarum 2 multo longioribus apice liberis attenuatis sursum barbellatis. — Dry soil of fields near Uruapan, Michoacan, Mexico, 25 January, 1907, *C. G. Pringle*, no. 10,361 (type, in hb. Gray). This species has much in common with *P. linifolia* Seaton, but differs from it in having more deeply colored rays and obtusish not at all caudate-acuminate teeth of the involueral cup.

Cacalia Goldsmithii Robinson, n. sp., perennis herbacea erecta, caudice parvo ovoideo sursum fulvo-lanato; caule subrecto vel leviter flexuoso glabro simplici gracili 1–2-foliato 6–7 dm. alto; foliis radicalibus longe petiolatis ovatis repando-dentatis vix lobatis 1 dm. longis 6–9 cm. latis pinnatim nervatis firmissculis utrinque glabris laxe reticulatis apice rotundatis basi late cordatis, dentibus cuspidatis, nervis venisque utrinque prominulis, petiolo gracili nudo 14–16 cm. longo basi vix dilatato; folio caulino inferiore radicalibus simili sed minore basi obtuso nec cordato petiolo 12 cm. longo flexuoso nec appendiculato nec auriculato; folio caulino superiore multo minore oblongo dentato, petiolo 2 cm. longo basin versus modice ampliato caulem amplectente; corymbis compositis planis ca. 50-capitulatis; bracteis linearibus; capitulis ca. 13-floris contiguis; involucri simplicis haud calyculati campanulato-subcylindrici squamis ca. 8 oblongis 7 mm. longis 2–3 mm. latis dorso planiusculis apice obtusiusculis ciliatis; corollis albido-ochroleucis 8 mm. longis fere ad mediam partem quinquifidis, lobis oblongis obtusis; pappi setis sordidis tubum proprium vix superantibus; achaeniis compressis breviter oblongis glabris. — On level pastures, Hacienda San Marcos, Jalisco, Mexico, alt. about 350 m., 12 July, 1905, *Rev. P. Goldsmith*, no. 8 (type, in hb. Gray). This species is probably nearest *C. Palmeri* Gray, but differs in its thinner smooth ovate rather than suborbicular leaves as well as in its larger more numerous flowered heads.

Cacalia Holwayana Robinson, n. sp., herbacea erecta 1–2 m. alta; caule tereti medullosa striato atropurpureo glanduloso-puberulo; radicibus carnosis; foliis longipetiolatis orbicularibus subcentrali-peltatis 9–13-sinuato-lobatis supra laete viridibus subtus vix pallidioribus utrinque sparse pubescentibus laxe reticulato-venosis 1.5–2 dm. diametro, lobis acutis 2–4 cm. longis 1.5–5 cm. latis oblongis sinuato-

dentatis (nec lobatis) et cuspidato-denticulatis; petiolo 1.5–2 dm. longo atropurpureo griseo-piloso; inflorescentia ampla pyramidata, bracteis inferioribus saepe petiolatis foliis similibus sed multo minoribus, bracteis superioribus angustissime linearibus vel subfiliformibus atropurpureis glanduloso-pilosis; capitulis numerosis in summis ramis ramisque nutantibus ca. 10-floris 2 cm. longis; involucri subcylindrici calyculo bracteolarum subfiliformium suffulti squamis lineari-lanceolatis ca. 10 ca. 1.5 cm. longis in carina atropurpurea griseo-puberulis margine albido subscarioso levibus; corollis 13 mm. longis glabris, tubo proprio gracili 8 mm. longo, faucibus vix ullis, limbo in lobis linearibus profunde partito; achaeniis 5 mm. longis adpresse tomentulosis; pappi setis tenuibus laete albis corollam aequantibus. — Uruapan, Michoacan, Mexico, 11 October, 1899, *E. W. D. Holway*, no. 3617 (type, in hb. Gray); 12 November, 1905, *C. G. Pringle*, no. 13,672; in granitic soil on the Sierra Madre of Michoacan or Guerrero, alt. 1100 m., 6 September, 1898, *E. Langlassé*, no. 576. This species is near *C. peltata* HBK., but is readily distinguished by its leaves, which are less deeply lobed, the lobes not again sinuately lobed, and by the smaller exceedingly narrow bractlets, those of *C. peltata* being foliaceous.

CACALIA LAEVIGATA Sch. Bip. ex Klatt, *Leopoldina*, xxiv. 125 (1888). *Senecio heteroideus* Klatt, l. c. (1888). *Cacalia longipetiolata* Robinson & Greenman, *Am. Jour. Sci.* 1. 157 (1895). When in 1895 the authors of *C. longipetiolata* characterized that species they knew *C. laevigata* only from Klatt's description. A drawing and some fragments of the type of *C. laevigata*, subsequently received at the Gray Herbarium by the purchase of the Klatt Herbarium, prove beyond doubt the identity of *C. longipetiolata* with *C. laevigata*, a correspondence which could scarcely have been inferred from the brief and in some respects misleading characterization of *C. laevigata* given by Klatt.

Cacalia michoacana Robinson, n. sp., herbacea perennis pilis crispis griseis puberula ca. 9 dm. alta; caule simplici leviter flexuoso striato atropurpureo medio folioso basi et apice nudiusculo; caudice crasso lanato; foliis ca. 10 suborbicularibus palmato-lobatis 3–6 cm. longis 5–8 cm. latis crassiusculis utrinque reticulato-venulosis et in venis puberulis supra laete viridibus subtus pallidioribus basi subtruncatis vel latissime cordatis, lobis 5–7 brevibus triangularibus margine cuspidato-denticulatis; capitulis ca. 6 ramos ascendentes inflorescentiae terminantibus ca. 30-floris 1.5 cm. longis 2 cm. diametro longe pedicellatis; involucri atropurpurei campanulato-subcylindrici squamis principalibus ca. 15 lineari-lanceolatis dorso atropurpureis carinatis margine albis tenuibus subscariosis, involucrio basi squamis minimis calyculato; corollis 1 cm. longis, tubo proprio viridescenti gracillimo 5 mm. longo,

faucibus cylindricis et limbo 5-lobato flavescentibus, lobis linearibus recurvatis; pappi setis laete albis tenuibus aequalibus corollam fere aequantibus. — On pine-covered crater cone, Uruapan, Michoacan, Mexico, alt. 1680 m., 31 October, 1905, *C. G. Pringle*, no. 10,117 (type, in hb. Gray). Habitally near *C. laevigata* Sch. Bip., but differing conspicuously in its considerably smaller heads, narrower carinate dark purple involucre bracts, and less deeply lobed leaves.

Perezia arachnolepis Robinson, n. sp., herbacea erecta a basi plus minusve decumbenti 1.5 m. alta; caule tereti striato purpureo glabro usque ad inflorescentiam perlaxam simplici; caudice fulvo-lanato; radicibus fibriformibus duris atrobrunneis; foliis oblanceolato-oblongis vel oblongo-linearibus sessilibus sagittato-amplexicaulibus usque ad 1.6 dm. longis 1.7–5.8 cm. latis firmis utrinque viridibus reticulatis supra glabris subtus vix pallidioribus sparse puberulis vel glabris argute denticulatis apice acutis vel breviter acuminatis; inflorescentia perlaxa 8–16-capitata; capitibus ramos elongatos sursum valde squamosos terminantibus ca. 3 cm. diametro; involucre valde turbinato, bracteis pedunculi in squamas involucri gradatim transeuntibus anguste lanceolatis vel linearibus apice subulatis margine arachnoideo-lanatis; corollis purpureis 1.3 cm. longis glabris; antheris etiam purpureis; achaeniis atrobrunneis sursum hispidulis 3 mm. longis. — Cañons, Chapala Mountains near Guadalájará, Jalisco, Mexico, 13 December, 1889, *C. G. Pringle*, no. 2935 (type, in hb. Gray), and in barranca of Rio Blanco near Guadalájará, 29 November, 1905, *C. G. Pringle*, no. 13,668 (hb. Gray).

Perezia lepidopoda Robinson, n. sp., precedenti valde affinis herbacea erecta 7–8 dm. vel ultra alta glaberrima; caule purpureo recto tereti striato foliosissimo in parte superiore ramos simplices valde patentibus multi-bracteatos unicapitados gerente; foliis anguste oblongis vel oblongo-linearibus attenuatis acutissimis saepissime recurvatis vel reflexis conduplicatis subcartilagineis concoloribus sessilibus sagittato-vel hastato-amplexicaulibus argute et dupliciter sinuato-dentatis 6–13 cm. longis 8–22 mm. latis utrinque glabris viridibus reticulato-venosis, dentibus lanceolato-subulatis 2–4 mm. longis divaricatis acutissimis; ramis pedunculiformibus ca. 12 cm. longis a bracteis numerosissimis fere a basi sed praesertim apicem versus tectis, bracteis inferioribus 1–2 cm. longis anguste lanceolatis sagittatis denticulatis, superioribus anguste linearibus peracutis adpressis hinc inde contortis in squamas involucri gradatim transeuntibus; capitibus (omnibus valde immaturis) usque ad 3 cm. diametro multifloris; involucri turbinati squamis lineari-lanceolatis acutissimis viridibus vel purpurascens striatulis obsolete puberulis. — Valley near Cuernavaca, Morelos, Mexico, alt.

1220 m., 17 October, 1900, *C. G. Pringle*, no. 9253 (type, in hb. Gray). This species is clearly separated from the preceding by its much narrower leaves and merely puberulent more subulate involueral scales. It belongs to a group of several obviously diverse yet nearly related plants which have been provisionally referred to the merely inferential *P. turbinata* La Llav. & Lex. The latter, however, described as having ovate leaves and short-peduncled heads, must certainly have been a plant quite different from either here characterized.

III. NEW PLANTS FROM GUATEMALA AND MEXICO, COLLECTED CHIEFLY BY C. C. DEAM.

BY B. L. ROBINSON AND H. H. BARTLETT.

Polypodium (*Goniophlebium*) *hispidulum* Bartlett, n. sp., rhizomate crassitudine 3–5 mm. simplici vel furcato ad arborum truncos repenti longitudine usque ad 12 cm., aetate aperto foveolato-rugoso juventate paleis tecto, paleis deltoideo-linearibus secus lineam medianam ferrugineis margine straminellis; frondibus inter se propinquis 6–12 cm. longis 4–7.5 cm. latis; stipitibus gracilibus 0.5–3.5 cm. longis exigue pilosis supra canaliculatis subtus semiteretibus; laminis fere usque ad costam pinnatipartitis utrinque hispidulis atroviridibus circumscriptione valde variabilibus ovatis semiovatis vel aequilater-aliter triangulis prout segmenta duo inferiora reducta aut haud reducta sunt; segmentis integerrimis approximatis lanceolatis 3–9-jugis basi dilatatis confluentibus apice obtusis, maximis 6 mm. latis 3.5 cm. longis, terminale 1.5–6 cm. longo maxime variabili; nervo mediano flexuoso, nervis lateralibus alternis utrinque 10–11 haud procul a basi furcatis, ramis anticis liberis in segmentis superioribus soriferis, ramis posticis arcuatis marginem nec attingentibus, aut simplicibus aut furcatis aut anastomosantibus areolarum seriem unam formantibus; soris rotundis medio inter nervum medianum et marginem uniserialiter dispositis ca. 1 mm. diametro; sporangiis glabris ca. 20. — Los Amates, Department of Izabal, Guatemala, 11 February, 1905, *C. C. Deam*, no. 117 (type, in hb. Gray). The same fern, collected by *Tuerckheim* at Cubilquitz, Department of Alta Verapaz, December, 1900, was distributed as *Polypodium pubescens* Hook. et Grev., in John Donnell Smith's "Plants of Guatemala," no. 8053. *P. pubescens* is, without doubt, the nearest related species to *P. hispidulum*. It has, however, a much larger frond, with irregularly laciniate segments, which at the base of the frond are

widely separated and not at all confluent. The segments are also prevailingly opposite in *P. pubescens*, whereas in *P. hispidulum* they are alternate.

Paspalum guatemalense Bartlett, n. sp., perenne 6 dm. altum simplex vel ramosum; internodiis glabris lateraliter compressis, acie ad folii axillam versus canaliculatis; foliorum vaginis equitativis pilosis (praecipue juxta margines et ad ligulae basin) quam internodiis aut brevioribus aut longioribus margine brunneo-scareosis; ligula 2.5 mm. longa textura marginibus vaginarum simili; laminis lineari-lanceolatis 10–15 mm. latis 6–15 cm. longis apice acutis basi rotundatis vel subcordatis utrinque dense pilosis; spicis 1–3 sessilibus inter se 2.5–3.5 cm. distantibus 3–6 cm. longis; rhachi angusta glabra vel scabriuscula; pedicellis minute hispidulis; spiculis geminatis altera breviter altera longius pedicellata, geminis secus rhachin in seriebus duabus alternis; spiculis suborbicularibus 2.1 mm. longis 1.9 mm. latis glabris albican-tius viridibus antice planis postice valde convexis; gluma inferiore in spiculis geminorum superioribus suborbiculari apice rotundata quam spicula 6-plo brevior, in spiculis geminorum inferioribus longiore eccentrica late ovata obtusa vel acutiuscula; gluma secunda membranacea quam spicula paulo brevior 5-nervata, nervis juxta marginem anastomosantibus ad apicem in mucronem perbreve terminantibus; gluma tertia membranacea quam secunda longiore 3 (–5)-nervata; gluma quarta paleaque cartilagineis obscure nervatis; staminibus stylisque ut in speciebus generis reliquis. — A swamp at Gualan, Department of Zacapa, Guatemala, January 20, 1905, *C. C. Deam*, no. 427 (type, in hb. Gray). *P. guatemalense* is a member of Fournier's genus *Dimorphostachys*. Following his arrangement of the group, the affinity of the new species is with *Dimorphostachys Schaffneri* Fourn., *D. variabilis* Fourn., and *D. Ghiesbreghtii* Fourn. Of these, only *D. Schaffneri* is represented in the Gray Herbarium. It may be at once distinguished from *P. guatemalense* by its glabrous foliage and larger ovate spikelets, acute at the apex. *D. variabilis* and *D. Ghiesbreghtii* both have pubescent spikelets, whereas those of *P. guatemalense* are perfectly glabrous.

STREPTOCHAETA SODIROANA Hack. Noteworthy among the plants collected by Mr. C. C. Deam in Guatemala is a specimen of the anomalous South American genus *Streptochaeta*. The genus consists of two species, and in its spirally arranged (not distichous) flower-scales forms a unique exception among the genera of grasses. When the generic affinity of Mr. Deam's plant was discovered, it became evident that the species might be identical with the Ecuadorian *S. Sodiroana* Hack. A portion of the specimen was sent to Professor Hackel, who has kindly

confirmed the apparent identity. This is by no means an isolated case of the occurrence of identical species in Ecuador and Guatemala, but it has peculiar interest from the marked character and rarity of the plant concerned. Mr. Deam's specimens were collected at Los Amates, Guatemala, 10 February, 1905, and distributed as no. 97 of his set. He writes that only a few plants were found, and that these were growing in rather wet situations deep in the virgin forest. An interesting morphological as well as systematic account of the species is given in Professor Hackel's original characterization, Oest. Bot. Zeitschr. xl, 111 (1890).

Fuirena zacapana Bartlett, n. sp., rhizomate perpendiculari elongato modice incrassato; culmis 9 dm. longis gracilibus ascendentibus hispidis vel ad basin glabriusculis ca. 8-foliis; foliorum vaginis 1.5-3 cm. longis dense hispidis; foliis linearibus utrinque hispidis usque ad 5 mm. latis, in partibus culmi inferioribus 1 cm. longis superne 9 cm. longis; capitulis 3-4, infimo solitario in axilla folii supremi pedunculato, reliquis plus minusve approximatis; spiculis in capitulo quoque 3-6 ovatis 4 mm. latis 8 mm. longis; squamis brunneis pubescentibus in spiculae basi suborbiculatis in apice ovatis trinerviis, in dorso recti-aristatis; sepalis 3 brunneis glabris duriusculis ovatis basi subcordatis longe unguiculatis apice rotundatis infra apicem in dorso breviaristatis, aristis retrorsum scabris; setulis 3 cum sepalis alternantibus superne retrorsum scabris quam achaenio multo brevioribus; achaenio longe stipitato mucronato sepala paene aequante. — In swamps, Gualan, Department of Zacapa, Guatemala, 13 January, 1905, *C. C. Deam*, no. 423 (type, in hb. Gray). This very distinct species is nearest to *F. simplex* Vahl, from which it differs in its lax habit, in the extreme development of pubescence on the leaf-sheaths, in its short perianth-bristles, and long-stiped achene.

Myriocarpa malacophylla Robinson & Bartlett, n. sp., arborea 4 m. altitudine; ramis curvatis crassiusculis molliter lignosis siccitate corrugato-rugulosis pallide griseis juventate tomentosissimis aetate glabratissimis, lenticellis paucis sparsis; foliis membranaceis late ovatis cordatis breviter caudato-acuminatis serratis 17 cm. longis 11 cm. latis supra more generis sparse pilosis et cystolithis radiantibus instructis subtus molliter tomentosissimis griseis, apice caudiformi ca. 1 cm. longo, nervis lateralibus utrinque 4-5; petiolo 1.7-2 cm. vel ultra longo tomentoso; inflorescentiis omnino sessilibus ca. 1 cm. supra basin furcatis; ramis 1-2 dm. longis griseo-tomentosis unilateraliter floriferis; floribus ♀ arcte sessilibus; calyculo 2-phyllo brevissimo villosissimo; ovario lenticulari-ovoideo 0.7-0.9 mm. longo villosissimo-hispidulo; floribus ♂ etiam sessilibus, sepalis 4 ovatis obtusis villosissimis, staminibus 4. — Gualan,

Department of Zacapa, Guatemala, 12 January, 1905, *C. C. Deam*, no. 361 (type, in hb. Gray); Maria Madre Island, Tres Marias Islands, May, 1897, *E. W. Nelson*, no. 4275 (hb. Gray). This species appears to be either monoecious, as in Mr. Deam's specimen, which has staminate flowers at the base of some of the pistillate inflorescences, or it may be dioecious, as in Mr. Nelson's specimen, in which all the flowers are staminate. The species appears to stand nearest *M. cordifolia* Liebm., but differs in its ovate rather than suborbicular less rugose leaves and wholly sessile inflorescences.

Polygonum longiocreatum Bartlett, n. sp., caule simplici ca. 7 dm. alto, ad nodos inferiores radicanti; internodiis 1.5–2 cm. longis glabris; ocreis cylindricis eciliatis 1.5–1.7 cm. longis, in parte inferiore caulis quam internodiis brevioribus, plus minusve inflatis, in parte superiore imbricatis; foliis lanceolatis 1.5–3 cm. latis 9–13 cm. longis perbreviter petiolatis, apice basique acutis, utrinque glabris pellucido-punctatis, margine nervisque subtus scabris; spicis ca. 9, paniculatis erectis 4–5 cm. longis; pedunculis pedicellisque glabris; ocreolis rubris 2 mm. longis tri-vel quadrifloris; calyce rubro 5-partito; staminibus 7 styloque (solum in extremo bifido) inclusis; achenio lenticulari 2 mm. longo nigro, ad basin rotundato, ad apicem abrupte acuto, faciebus convexis. — In a swamp at Gualan, Department of Zacapa, Guatemala, January 14, 1905, *C. C. Deam*, no. 374 (type, in hb. Gray). The obvious affinity of *P. longiocreatum* is with *Polygonum spectabile* Mart., from which it differs in not having glandulose-scabrous peduncles. In his treatment of *P. spectabile* in De Candolle's Prodrumus, Meisner cites two earlier-published species of Weddell as possible synonyms. Dr. Small accepts, in his "Monograph of the N. A. Species of Polygonum," one of Weddell's names, *Polygonum ferrugineum*, as an available name for *P. spectabile* Mart. Whether he applies the name correctly or not, *P. longiocreatum* may be distinguished from the *P. ferrugineum* of Small's monograph by the style, which in the former is bifid only at the end, and by the long pedicellate flowers, small achenes, and short-petioled leaves.

Ruprechtia Deamii Robinson, n. sp., fruticosa (♀ solum visa); ramis flexuosis glabris in specimine exsiccato sulcato-rugosis brunneis, internodiis 7–30 mm. longis, ocreis membranaceis griseo-castaneis vix 0.6 mm. longis; foliis magnis oblongis coriaceis penninerviis 10–18 cm. longis 5.5–8 cm. latis integerrimis concoloribus utrinque prominenter reticulato-venulosis subtus in nervis patenter fulvo-pubescentibus et in venulis puberulis, basi rotundatis vel modice angustatis, apice obtusis vel rotundatis, petiolo brevissimo crassiusculo supra leviter canaliculato ca. 3 mm. longo; racemis numerosis fructiferis 2–6 cm. longis solitariis

vel usque ad 3 fasciculatim aggregatis patentibus vel deflexis subdensifloris, tomentosus; bracteis ovatis subacuminatis brunneis adpresse villosis; pedicello fructifero filiformi 2-3 mm. longo tomentoso; calyce fructifero ca. 3.5 cm. longo, tubo anguste ovoideo molliter subadpresse tomentoso ca. 6-7 mm. longo ca. 4 mm. diametro, alis 2.5 cm. longis 5 mm. latis spatulato-oblongis glabriusculis 3-nerviis reticulato-venosis apice rotundatis pallide viridibus subdiaphanis; sepalis interioribus subulatis glabris, parte libera ca. 4 mm. parte adnata ca. 1.5 mm. longa; achaenio attenuato-ovoideo obtusissime trigono, angulis tumidis leviter sulcatis in parte superiore sulci pubescentibus; stylis liberis, stigmatibus linearibus recurvatis. — Gualan, Department of Zacapa, Guatemala, alt. 128 m., January 11, 1905, *C. C. Deam*, no. 231 (type, in hb. Gray). This species belongs to the § *Hexasepalae* of Meisner, and § *Pseudoruprechtia* of Bentham and Hooker, these authors dividing the genus on different characters. It is nearly related to *R. Cumingii* Meisn., known to the author only from Meisner's description (DC. Prod. xiv, 179). If the characters there given are correct, the plant here characterized is certainly distinct, as is shown by its larger leaves, longer calyx, the presence of pubescence on the lower surface of the leaves, decidedly rugose branches, spreading or deflexed racemes, etc.

Aeschynomene Deamii Robinson & Bartlett, n. sp., fruticosa 2 m. alta laxe ramosa aspectu glabra; caulibus teretibus lignescentibus striatulis fusco-brunneis glabris; foliis petiolatis oblongis 5-7 cm. longis; foliolis ca. 18-jugis lineari-oblongis glabris utrinque viridibus supra minutissime nigro-punctatis subtus pinnatim venosis basi obliquis apice rotundatis mucronatis 9-10 mm. longis 2 mm. latis; rhachi supra sparse puberula subtus glabra; petiolo 1 cm. longo; stipulis 1.5 mm. longis subulatis brunneis acutissimis; racemis axillaribus 2-7-floris; pedunculis 10-17 mm. longis filiformibus glabris; bracteis ovatis herbaceis margine scariosis apice acutis supra basin affixis basi rotundatis liberis; pedicellis anthesi ca. 4 mm. longis fructiferis ca. 6 mm. longis; calyce glabro 2-partito, labio dorsali ovato ca. 7 mm. longo ca. 5.5 mm. lato obtusiusculo, labio ventrali angustiore ca. 9 mm. longo acuto; vexillo obovato 12 mm. longo 10 mm. lato apice rotundato basi modice angustato; alis semiobovatis basi a latere superiore obtuse auriculatis; carinae petalis ca. 11 mm. longis; staminibus quinis connatis; legumine ca. 13-seminato ca. 1 dm. longo 6.5 mm. lato fragili utrinque undulato, segmentis subquadratis margine crassiusculo faciebus glaberrimis levibus modice nervosis nec rugosis; seminibus atrobunneis lunatis levissimis subnitidis 5 mm. longis 3 mm. latis. — San Felipe, Department of Izabal, Guatemala, 15 February, 1905, *C. C. Deam*, no. 26 (type, in hb. Gray). In its numerous leaflets of oblong-linear shape

this species somewhat resembles *A. americana* L., *A. hispida* Willd., and *A. sensitiva* Sw. It has, however, flowers which are much larger than those of *A. sensitiva*, and somewhat larger than those of the other species mentioned. It differs furthermore from *A. hispida* in its entire not dentate bracts, and from both *A. americana* and *A. hispida* in its essentially glabrous foliage and fruit.

CASSIA EMARGINATA L., var. **subunijuga** Robinson & Bartlett, n. var., foliolis saepissime 2 late oblongo-ellipticis 6-7 cm. longis 4-5 cm. latis supra molliter pubescentibus subtus flavido-tomentosis. — Gualan, Department of Zacapa, Guatemala, 15 January, 1905, *C. C. Deam*, no. 220 (type, in hb. Gray). This variety appears to agree in flowers and fruit with the typical form, but it is noteworthy in habit by reason of the striking reduction in the number of leaflets to two. Occasionally, however, leaves with four leaflets occur on individuals on which most of the leaves have but two leaflets; so there is reason to suppose that the plant is merely a varietal development from a form with more numerous leaflets, rather than a separate species.

Mimosa (*Habbasia*) **gualanensis** Robinson & Bartlett, n. sp., ser. *Leptostachyarum*, caulibus gracilibus lignosis 4 m. longis aculeatis tomentellis, aculeis sparsis parvis valde recurvatis compressis inaequalibus maximis vix 2 mm. longis brunneis; foliis majusculis 27 cm. latis; pinnis 3-jugis 9-14 cm. longis; foliolis obovato-oblongis 2-4-jugis 4-5 cm. longis 2.4-3 cm. latis firmissimis supra reticulatis utrinque glabris, petiolo 7 cm. vel ultra longo rhachique valde armatis aculeis sparsis numerosis recurvatis 0.7-2 mm. longis; rhacheolis etiam basin versus aculeolatis; spicis gracilibus 5 cm. longis densifloris breviter pedunculatis, pedunculis tomentellis; floribus 2 mm. longis; calyce 1.2 mm. longo campanulato brevissime 5-dentato extus tomentello; petalis 5 calyce subduplo longioribus oblanceolato-oblongis; staminibus 10 maturitate modice exsertis; legumine immaturo 10 cm. longo 1.3 cm. lato 15-seminato plano tenui glabriusculo leviter arcuato, stipite crassiusculo tomentello tereti 5-6 mm. longo. — Gualan, Department of Zacapa, Guatemala, 19 January, 1905, *C. C. Deam*, no. 224 (type, in hb. Gray). This species, although clearly of the *Leptostachyae*, does not appear to be very closely related to any other. It should probably be placed near *M. guatemalensis* Benth., and *M. spirocarpa* Rose.

Tetrapteris emarginata Bartlett, n. sp., fruticosa procumbens 3-5 m. longa; ramis oppositis glabris griseo-brunneis; ramulis viridibus nigro-punctatis; foliis oppositis, aetate utrinque glabris, juventate albo-sericeis pilis mox deciduis, forma valde variabilibus, in ramulo florifero sessilibus vel perbrevisiter petiolatis suborbiculatis 1-1.5 cm. diametro cordatis emarginatis saepe mucronulatis, in ramulo foliifero

breviter petiolatis ovatis 4 cm. longis basi obtusis apice acutis; ramulis floriferis in quasi-umbellas quadrifloras terminantibus; pedunculis 7-8 mm. longis cum pedicellis aequilongis articulatis; bracteis pedunculorum bracteolisque pedicellorum lanceolatis minutis; sepalis 5 albicantius viridibus 2 mm. longis, 4 basi biglandulosi glandulis magnis; staminibus glabris calycem valde superantibus, omnibus basi coalitis; ovariis in unum pyramidatum faciebus concavis coalitis; fructu albo-lanuginoso dorso medio cristato crista integra glabra; fructus alis glabris viridibus rubro-tinctis anguste oblongis, duobus exterioribus ca. 13 mm. longis, duobus interioribus ca. 9 mm. longis. Petala non visa. — Gualan, Department of Zacapa, Guatemala, January 19, 1905, C. C. Deam, no. 150 (type, in hb. Gray). *Tetrapteris emarginata* belongs among the glabrous-leaved species of Jussieu's § *Tetrapteris* * *Anisopterae*. It may be easily distinguished from any of the Mexican species by the leaves of the flowering branches.

Euphorbia ephedromorpha Bartlett, n. sp., basi lignescenti; ramis prostratis modice crassis longitudine usque ad 10 dm. saepe simplicibus viridibus flexuosis aphyllis juventate valde compressis, aciebus ambabus bialatis; internodiis 2-4 cm. longis minute granulatis glabris vel perexiguae pilosis, in marginibus alarum minutissime scabratis; nodis haud incrassatis corpore papillato (nonne cum folio aequivalenti?) praeditis; stipula una glanduliformi crateriformi pilosa recte super papillam (de qua vide supra) et quam eandem parviore; cymis axillaribus et terminalibus dichotomis 2-12-cyathiis valde glanduloso-pilosis bracteatis; bracteis ad dichotomias oppositis 1.8 mm. longis linearispatulatis dense glanduloso-pilosis; cyathiis anguste conicis 3 mm. longis glanduloso-pilosis; pedicellis gracilibus cyathiis aequilongis; involucri segmentis propriis perbreuibibus flabelliformibus ad mediam digitatim 7-8-laciniatis; glandulis 5 planis transverse ovatis marginatis appendiculatis; appendicibus rectis quam glandulo 8-plo quam involucri segmentis triplo longioribus anguste spatulatis glabris; stylo brevi usque ad basin bifido; ovario 2 mm. longo glabriusculo stipitato, stipite cyathio paulo longiore; seminibus lilacinis ovoideis foveolatis. — Gualan, Department of Zacapa, Guatemala, 11 January, 1905, C. C. Deam, no. 232 (type, in hb. Gray). In regard to this species Mr. Deam writes: "I recall the place where it grew very vividly. There is a road leading from Gualan to the Motagua River, and as is the case with all travelled ways in Guatemala, it is washed into deep gullies. This plant (no. 232) was found in the nude, rocky, dry soil at the side of the road, on an angle of about 75°. It grew prostrate in patches extending over an area perhaps six feet square. The soil was of a red type, similar to that around Chattanooga and Atlanta. I did not see it in any other

place." *Euphorbia ephedromorpha*, a unique plant in both habital and technical characters, belongs to the § *Alectorocotonum*. The only *Euphorbia* of the same affinity which has been seen is in the Gray Herbarium from Cerro Quiengola, Oaxaca, Mexico, *Caec. et Ed. Seler*, no. 1611. It represents a clearly distinct new species of very similar habit, but it cannot be described on account of the scantiness of the material.

Acalypha euphrasiostachys Bartlett, n. sp., fruticosa ramosa 1 m. altitudine; ramulis junioribus molliter pubescentibus ochraceis aetate glabriusculis rubentibus; foliorum limbis ovatis 3-8 cm. longis 2-4.5 cm. latis dentatis utrinque molliter pubescentibus vel supra solum secus nervos pilosis, apice acutis vel caudato-acutis, basi maxime variabilibus acutis rotundatis vel subcordatis; petiolis limbo ca. quintuplo brevioribus; spicis masculis axillaribus sessilibus ca. 1 cm. longis nunquam ad basin bracteis femineis praeditis; spicis femineis axillaribus 2.5-7 cm. longis 4-7-bracteatis, dispositione formaque bractearum speciebus alpinis generis *Euphrasiae* persimilibus; bracteis femineis 8 mm. longis 10 mm. latis unifloris 13-dentatis, dentibus modice longis alternis brevioribus; calycis masculi segmentis 4 ovatis 0.5 mm. longis, feminei segmentis 3 ovatis ca. 1 mm. longis; ovario dense piloso; stylis viridibus bracteo exsertis 7 mm. longis multilacinuligeris. — Zacapa, Department of Zacapa, Guatemala, 24 January, 1905, *C. C. Deam*, no. 190 (type, in hb. Gray). A species near Watson's *Acalypha multispicata*, which has very similar fertile spikes.

Clusia quadrangula Bartlett, n. sp., arborea 5-6 m. alta ubique glabra; ramis modice crassis subteretibus; foliis coriaceis ovatis 3-4 cm. latis 7-11 cm. longis, apice basique acutis, petiolo quam limbo quintuplo brevioribus; nervis lateralibus numerosis parallelis utrinque prominulis inter se 1-2 mm. distantibus angulo ca. 45° a costa abeuntibus; inflorescentia terminali quam foliis superis duplo breviora ramosa, ramulis angulosis plerumque in florem unum brevipedicellatum terminantibus; bracteolis infimis semi-ovatis basi connatis, sequentibus (a sepalis non different) sepalisque 14-16 per paria decussatis coriaceis semi-ovatis cordatis dorso carinatis, collective obpyramidatis quadrangulis (ex quo nomen specificum); petalis 4 coriaceis late ovatis quam sepalis duplo longioribus; staminibus pernumeris in receptaculo elevato valde concavo pentagono dense aggregatis liberis, omnibus antheriferis, filamentis perbrevis paene nullis, antheris rimula longitudinali dehiscentibus, connectivis haud productis. Flores feminei ignoti. — Livingston, Department of Izabal, Guatemala, February 17, 1905, *C. C. Deam*, no. 56 (type, in hb. Gray). This *Clusia* has no obvious relationship with any heretofore described species. Until pistillate flowers are discovered it seems unwise to characterize a new section for its reception.

Following Engler's treatment of *Clusia* in Flora Brasiliensis, it is excluded from all the sections of the genus except § *Euclusia* by the character of the receptacle. From subsections *Oxystemon* and *Chlamydoclusia* of § *Euclusia* it is excluded by the muticous connective, and from *Cochlanthera*, the sole remaining subsection, by the four petals and very numerous stamens.

Rinorea deflexiflora Bartlett, n. sp., fruticosa 2.5 m. alta dichotome ramosa glabra novellis inflorescentiisque puberulis exceptis; ramis gracilibus juventate brunneolis aetate albobrunneolis glabris; lenticellis numerosis albis; internodiis superioribus ca. 11 cm. longis; nodis modice incrassatis in gemmam floriferam terminantibus; foliis oppositis cuneato-ovatis 4-12 cm. latis 8-24 cm. longis remote serratis caudato-acuminatis basi angustatis subcordatis supra atroviridibus subtus pallidioribus; petiolis 2-4 mm. longis; stipulis subulato-lanceolatis 7 mm. longis; inflorescentiis ubique puberulis inter ramos dichotomiarum terminalibus simplicibus 6 cm. longis; floribus ca. 15 longipedicellatis nutantibus bracteatis; pedicellis gracilibus 6 mm. longis deflexis; bracteis 3, una pedicellum subtendente, duabus infra pedicelli mediam suboppositis; sepalis 5 aequalibus acutis extus puberulis margine ciliatis 2 mm. longis; petalis 5 aequalibus oblongis 5 mm. longis haud unguiculatis apice valde revolutis; staminibus 5 glabris 3.5 mm. longis basi haud connatis; filamentis 1.3 mm. longis, anticis ad basin in dorso glandulae oblongae 0.8 mm. longae adnatis; connectivis in squamam ovatam lacero-ciliatam antherae loculis dimidio longiorem productis; stylo glabro stamina superante; ovario dense piloso. — Livingston, Department of Izabal, Guatemala, February 18, 1905, *C. C. Deam*, no. 61 (type, in hb. Gray). Four species of *Rinorea* or *Alsodeia* are now definitely known from north of Panama. One of them, the Mexican plant described by Watson as *Alsodeia parvifolia*, is of very doubtful generic affinity. The other old species are *Rinorea silvatica* (Seem.) O. K. and *Rinorea guatemalensis* (Wats.) Bartlett, n. comb. (*Alsodeia guatemalensis* Wats., Proc. Am. Acad. xxi. 458). Points which distinguish *R. deflexiflora* from the former are that in *R. silvatica* the spikes are nodding, the flowers are nearly sessile, and the sepals are almost as long as the petals. In *R. guatemalensis* the leaves are broadest at the middle and are acute at the base, as contrasted with the more cuneate, subcordate leaves of *R. deflexiflora*.

Hybanthus cymosus Bartlett, n. sp., fruticosus 3 m. altus; ramis gracilibus alato-angulatis glabratis supra straminellis subtus viridibus; internodiis foliis brevioribus; foliis alternis ovatis 2-4 cm. latis 4.5-8 cm. longis serrato-crenatis glabratis basi acutis subsessilibus, apice rotundato-obtusis; stipulis lineari-subulatis usque ad 2 mm. longis;

floribus in cymas racemosas 15–30-floras axillares terminalesve aggregatis; cymarum bracteis perparvis ovato-deltaideis albidis; pedunculis 3–8 mm. longis; pedicellis 5 mm. longis breviter supra basin articulatis; sepalis ca. 1.6 mm. longis puberulis subaequalibus; petalis glabris in fructu persistentibus, duobus posticis ovatis apice truncatis 2.4 mm. longis, duobus intermediis aequilongis subquadratis breviter apiculatis ad basin antrorsum brevi-auriculatis, antico 1.9 mm. longo trinervio inter mediam apicemque constricto, parte inferiore (ungue) ampulliformi, parte superiore (limbo) multo parviore suborbiculari apice bilobata; staminibus 2 mm. longis inter antheras connatis tubum formantibus, tribus posticis triangulo-appendiculatis, filamentis perbrevis liberis, duobus anticis appendicibus connatis, filamentis extus ad basin glandulae late scutiformi adnatis, glandula gibbositati petali antici conformali, loculis duobus contiguis antherarum anticarum abortivis; stylo corolla paululo longiore; capsula glabra viridi 6 mm. diametro 9 mm. longa. — Gualan, Department of Zacapa, Guatemala, 19 January, 1905, *C. C. Deam*, no. 385 (type, in hb. Gray). A species well marked by the combination of alternate leaves, numerous cymose axillary inflorescences, and short lower petal. In general structure it is most closely allied to such South American species as *Ionidium atropurpureum* St. Hil. and *I. Sprucei* Eichl.

Ipomoea anisomeres Robinson & Bartlett, n. sp., volubilis; caule gracili lignescenti glabro subtereti 3–6 m. longitudine a cortice brunnescenti-griseo obtecto aetate papilloso-scabrato; foliis ovatis integris profunde sinu patenti cordatis acutiusculis vel subattenuatis et in apice emarginato cum nervo excurrenti apiculatis penninerviis 6–11 cm. longis 4–7 cm. latis utrinque glabris subtus pallidioribus; petiolo gracili glabro 3–5 cm. longo; pedunculis axillaribus solitariis 3.5–6 cm. longis in summa parte composite cymoso-ramosis; pedicellis 1.5–2 cm. longis modice gracilibus sursum plus minusve incrassatis glabris; sepalis glabris margine albis 2 exterioribus 1–3 mm. longis suborbicularibus obtusis vix herbaceis 3 interioribus 1 cm. longis ellipticis apice rotundatis; corolla late infundibuliformi alba vel praesertim in faucibus purpurascenti 6.5–7 cm. longa, limbo 4–5 cm. lato subintegro, faucibus 1 cm. diametro 3.5 cm. longis cylindratis deorsum in tubum brevem (ca. 1 cm. longum) proprium angustatis; capsula ovoidea acuta 10–12 mm. longa glabra biloculari; seminibus 4 griseo-fuscis breviter pubescentibus. — Gualan, Department of Zacapa, Guatemala, 12–14 January, 1905, *C. C. Deam*, nos. 318 and 319 (types, in hb. Gray). This species appears to fall into § *Inaequisepalae*, as defined by Peter in Engl. & Prantl, Nat. Pflanzenf. iv. Ab. 3, 29. The specific name alludes to the strikingly unequal sepals.

Cordia truncatifolia Bartlett, n. sp., arborea 5-7 m. altitudine; ramulis 2-3 mm. crassis flexuosis juventate griseo-ferrugineis pubescentibus aetate griseis glabris ad nodos incrassatis; foliorum cicatricibus reniformibus vel in ramulis vetustioribus lunatis, interdum gemma accessoria inter cornua infra gemmam normalem praeditis; foliis late ovatis maximis infra mediam 5 cm. latis 7.5 cm. longis integerrimis vel apicem versus crenato-dentatis basi obtusis truncatis apice plerumque abrupte acutis supra scabris atroviridibus subtus velutino-pubescentibus griseo-viridibus, petiolis quam 8 mm. brevioribus; cyma dichotoma pauciflora foliis brevior omnino ferrugineo-pubescenti; pedicellis gracilibus 2-7 mm. longis; calyce campanulato ca. 1 cm. longo juventate 5 mm. diametro ad fructus maturitatem plus minusve inflato 5-nervato 5-laciniato, laciniis irregulariter angustodeltoideis; corolla alba (?) infundibuliformi 15 mm. longa extus intusque puberula usque ad mediam 5-lobata, tubo brevi, lobis rotundis 7 mm. latis; staminibus 5 baseis loborum vix attingentibus, filamentis 5 mm. longis; stylo stamina aequante apice bis bifido; drupa (immatura) ovoidea minute puberula mucronata calyce inclusa. — Zacapa, Department of Zacapa, Guatemala, January 23, 1905, *C. C. Deam*, no. 160 (type, in hb. Gray). In no. 160^a, collected at the same locality, the flowers and foliage are greatly reduced in size, a variation no doubt purely ecological. The shape of the leaves, which are remarkably like those of *Polygonum cuspidatum* Sieb. et Zucc., suffices to distinguish *Cordia truncatifolia* from all other species of *Sebestenoides*.

Russelia rugosa Robinson, n. sp., fruticosa; ramis ramulisque 6-angularibus tomentello-puberulis pallide griseis; internodiis 5-8 cm. longis; foliis oppositis vel ternis late ovatis obtusiusculis grosse crenato-serratis basi integerrimis cuneatis supra scabris valde rugosis atroviridibus subtus vix pallidioribus laxe reticulato-venosis breviter pubescentibus 5.5-8 cm. longis 2.6-4.8 cm. latis, petiolo crassiusculo 5 mm. longo supra canaliculato pubescenti; cymulis subsessilibus axillaribus verticellastros parvifloros formantibus; calycis lobis lanceolato-linearibus angustissimis caudato-attenuatis sordide pubescentibus nigrescentibus 5-6 mm. longis; corolla tubiformi verisimiliter coccinea 11-12 mm. longa pubescenti; capsula ovoidea nigrescenti levi nitida 4 mm. longa. — Gualan, Department of Zacapa, Guatemala, alt. 128 m., 18 January, 1905, *C. C. Deam*, no. 183 (type, in hb. Gray). A species pretty well marked in the genus by its large and very rugose leaves.

Tetramerium gualanense Robinson & Bartlett, n. sp., suffruticosum 1 m. altum ramosum, novellis viscoso-pubescentibus; caulibus subquadrangularibus lilacino-griseis minute albido-maculatis maturitate subglabris; foliis oppositis petiolatis membranaceis subconcoloribus

scabriusculis ovatis acute subcaudateque acuminatis integerrimis, limbo 6–8 cm. longo 3.5–6 cm. lato pinnatim nervatis basi acutis in nervis sparse puberulis aetate glabratis cystolithis conspicuis instructis, petiolo 1.5–2.5 cm. longo gracili supra canaliculato puberulo subtus rotundato glabro; spicis subdensis 2.5–4.5 cm. longis 1.3 cm. crassis ramulos oppositos terminantibus; bracteis obovatis cuneatis integerrimis acutis 5-nerviis utrinque glanduloso-pubescentibus 1 cm. longis 5 mm. latis, basi attenuatis; bracteolis binis oblanceolatis acutis cymbiformibus 9–10 mm. longis basi attenuatis in latere altero usque ad mediam in altero vix supra basin connatis; calyce 5-partito, lobis anguste lanceolatis acutissimis apice hispidulis; corolla subaequaliter 4-partita alba 1.5 cm. longa glabra, lobis anguste oblongis obtusis ca. 9 mm. longis; staminibus 2 lobos corollae subaequantibus in summo tubo insertis; antherarum loculis 2 summo subaequi-altis basi loculo uno plus minusve calcarato; stylo clavato; stigmate bifido; capsula obovata acuminata glabra valde compressa ca. 2 mm. longa ca. 2 mm. lata, stipite obcompressa 2 mm. longo; seminibus 2 lenticularibus fulvis 2.6 mm. longis in latere interiore glabriusculis in latere exteriori crispo-pubescentibus. — Gualan, Department of Zacapa, Guatemala, 18 January, 1905, *C. C. Deam*, no. 397 (type, in hb. Gray). In the form of its inflorescence and bracts this species approaches the members of the genus which have sometimes been separated as *Henrya*.

Isertia Deamii Bartlett, n. sp., arbor parva 5 m. alta; ramis ramulisque crassis inferne subteretibus superne obtuse quadrangulis sordide tomentosus; internodiis 4–5 cm. longis; foliis 20–30 cm. longis 8–11 cm. latis utrinque acutis supra glabris subtus griseo-tomentosis, petiolo limbis 10-plo brevioribus; stipulis 6–9 mm. longis triangulis persistentibus; inflorescentia foliis multo brevioribus paniculata ca. 10 cm. longa, ramulis tomentosus ascendentibus 7–20 mm. longis, pedicellis 2–5 mm. longis, bracteis bracteolisque triangulis parvis; calyce fuscato hemi-ellipsoidali truncato nec distincte dentato; corolla ca. 30 mm. longa coccinea extus, lobis limbi exceptis, tomentosa, lobis 7 mm. longis obtusatis extus glabris intus lanugine flavo tectis; staminibus 6 inclusis tubo adnatis, antheris circum stigmata connatis; stylo apice in ramulos sex ca. 6 mm. longos terminanti; bacca calyce coronata 6-pyrena. — Puerto Barrios, Department of Izabal, Guatemala, 24 February, 1905, *C. C. Deam*, no. 48 (type, in hb. Gray). *Isertia Deamii*, the third Middle-American species of the genus, is not similar enough to either of the old species to be confused with them.

➤ *Liabum caducifolium* Robinson & Bartlett, n. sp., fruticosum; caulibus teretibus striatulis griseo-fuscis glabris delapsu foliorum nudis, internodiis 6–8 cm. longis; inflorescentiis laxo corymboso-pan-

iculatis, ramis oppositis nudis patentibus vel arcuato-ascendentibus multicapitulatis, bracteis lanceolatis utrinque acutis integerrimis graciliter petiolatis supra glabris subtus arachnoideo-tomentosis, petiolo planiusculo glanduloso-hispidulo; pedicellis filiformibus 1-5 mm. longis; capitulis discoideis 6-floris; involucri squamis 13 acutis ciliolatis exterioribus ovato-lanceolatis 1 mm. longis interioribus gradatim longioribus angustioribusque intimis linearibus vel lineari-lanceolatis 5 mm. longis; flosculorum omnium corollis 6.5 mm. longis gracilibus sursum gradatim ampliatis sine faucibus distinctis, dentibus limbi linearibus ad apicem obtusiusculum attenuatis; pappi setis biseriatis exterioribus brevibus paucis planiusculis interioribus ca. 40 capillaribus fulvescentibus sursum scabriusculis. Achaenia immatura. — Near Acapulco, Guerrero, Mexico, between October, 1894, and March, 1895, *Dr. E. Palmer*, no. 245 (type, in hb. Gray). This species belongs to § *Andromachia*, and is closely related to *L. glabrum* Hemsl., but it differs in its much looser corymbose-paniculate inflorescence, its shorter involucre, and much more attenuate involucreal scales.

Liabum Deamii Robinson & Bartlett, n. sp., scandens 3-5 m. longum; caulibus anthesi delapsu foliorum ignotorum nudis subteretibus lanulosis albidis, internodiis 2-4 cm. longis, nodis crassiusculis; inflorescentiis ovoideis thyrsoideis multicapitulatis albido-lanuginosis 1-1.5 dm. longis 5-8 cm. diametro; bracteis petiolatis ovatis integris discoloribus supra leviter griseo-pubescentibus subtus albo-lanatis; ramulis 3-5-capituliferis; capitulis discoideis 6-floris subsessilibus vel brevissime pedicellatis; involucri squamis ca. 13 obtusis exterioribus ovatis ca. 2 mm. longis externe pubescentibus interioribus gradatim majoribus 3-4 mm. longis ovato-oblongis apicem versus pubescentibus; flosculis ♀ involucre longe exsertis, corollis glabris verisimiliter flavidulis 7 mm. longis, faucibus cylindratis tubum proprium graciliorem subaequantibus, dentibus limbi patentibus anguste lanceolatis acutissimis; achaeniis 2.5 mm. longis deorsum angustatis griseo-olivaceis modice compressis striatulis breviter pubescentibus; pappi setis 2-seriatis exterioribus paucis subpaleaceis 1-2 mm. longis interioribus ca. 50 capillaribus sursum minute scabratis ca. 6 mm. longis albidis. — Gualan, Department of Zacapa, Guatemala, *C. C. Deam*, no. 194 (type, in hb. Gray). This species clearly belongs to the § *Andromachia*, and appears to be nearest *L. glabrum* Hemsl., from which it may be distinguished, however, by its pubescence and much shorter involucre, the latter scarcely exceeding the achenes.

IV. DIAGNOSES OF NEW SPERMATOPHYTES FROM MEXICO.

BY M. L. FERNALD.

Carex ciliaris Fernald, n. sp., laxe caespitosa, caudice duro; culmis duriusculis 4–5 dm. altis acute triquetris superne ciliatis; foliis quam culmo brevioribus lineari-attenuatis 2.5–3.5 mm. latis, nervis marginibusque ciliatis marginibus revolutis; spicis 3–5, terminali clavellata subsessili 1–1.5 cm. longa vel omnino mascula vel apice foeminea; squamis masculis lanceolato-attenuatis pallide brunneis; spicis foemiinis breviter oblongis 0.6–2 cm. longis 0.5 cm. crassis, superioribus approximatis, inferioribus remotis et a bractea inflorescentiam aequanti vel superanti subtentis; squamis foemineis anguste ovatis acuminatis media parte viridibus 3-costatis levibus marginibus pallidis; perigygniis viridescentibus squamas aequantibus vel superantibus 4 mm. longis ellipsoideo-triquetris, faciebus planis 3–5-nerviis, rostro breviter conico-subulato hyalino bidentato. — Oak woods, Lena Station, Hidalgo, Mexico, alt. 2530 m., 26 August, 1905, *C. G. Pringle*, no. 10,039 (type, in hb. Gray). Nearest related, apparently, to *C. anistostachys* Liebm., which, according to the description, has scabrous culms, the staminate scales red-punctate, and the pistillate scales ciliolate.

Carex perlonga Fernald, n. sp., culmis 6 dm. altis laevissimis basi a vaginis ferrugineis tectis; foliis quam culmo plerumque brevioribus 4–5 mm. latis valde 1–3-nerviis serrulatis basi ferrugineis; bracteis inferioribus elongatis quam culmo longioribus, superioribus abbreviatis setaceis; spicis 7 solitariis inferioribus remotis superioribus approximatis laxe ascendentibus vel pendulis lineari-cylindricis 5–10 cm. longis 3–4 mm. latis apice masculis; squama mascula oblonga subacuminata fulva medio viridi, foeminea oblongo-lanceolata acuminata albo-fulva medio viridi; perigynio viridi trigono-fusiforimi striato 4 mm. longo, ore obliquo subintegro. — Barranca below Trinidad Iron Works, Hidalgo, Mexico, alt. 1585 m., 2 June, 1904, *C. G. Pringle*, no. 8863 (type, in hb. Gray). A species of the *Polystachyae*, unique in its solitary not clustered spikes, thus closely approaching the *Debiles*.

Alnus firmifolia Fernald, n. sp., arborea vel fruticosa 6–12 m. alta; ramis ramulisque atrobrunneis glabris cum lenticellis numerosis munitis; foliis elliptico-oblongis obtuse acuminatis vel apice rotundatis basi angustatis 5–17 cm. longis 2–5.5 cm. latis firmis duriusculisque supra glabris sublucidis subtus pallidis piloso-hispidis in nerviis prominentibus; petiolo crassiusculo glabro 0.7–1.2 cm. longo; inflorescentiis

fertilibus 6-9 cm. longis, amentis maturis 3-5 oblongo-cylindricis atrobrunneis pedunculatis 7-14 mm. longis 5-7 mm. diametro; nuculis cuneato-obovatis vel suborbicularibus rufobrunneis lucidis 1.5-2 mm. longis. — Mountains about Cima Station, Mexico, alt. about 3000 m., 30 August, 1905, *C. G. Pringle*, no. 10,040 (type, in hb. Gray). Resembling large-leaved *A. jorullensis* HBK., but quite lacking the close covering of waxy or granular atoms which characterizes the lower leaf-surface of that species.

Alnus Pringlei Fernald, n. sp., arbor parva; ramis ramulisque angulatis, juventissimis cinereo-puberulis mox glabratis; foliis late elliptico-ovatis 4.5-9 cm. longis 3-7 cm. latis apice breviter acuminatis basi rotundatis, marginibus regularibus vel paulo sinuatis crebre serrulatis, venis subtus prominentibus rufescentibus pilosis; petiolis 0.5-1 cm. longis piloso-ciliatis; ramis floriferis elongatis; amentis ♂ 4-7 terminalibus anthesi 5-6 cm. longis; pedunculis fructiferis 2 valde divergentibus crassis; amentis ♀ 3-4 sessilibus maturitate cylindricis 2.2-2.7 cm. longis 0.9-1.1 cm. diametro atrobrunneis; nuculis crassis late cuneatis et angulatis 2.5-3 mm. longis obscuris pallide brunneis. — By streams, near Uruapan, Michoacan, Mexico, alt. about 1525 m., 13 November, 1905, *C. G. Pringle*, no. 10,125 (type, in hb. Gray). Most nearly related to *A. acuminata* HBK., which has larger oblong-ovoid ashy-brown strobiles 1.5 cm. thick, and larger thick-winged lustrous nutlets.

EUPHORBIA ARIENSIS HBK., var. *villicaulis* Fernald, n. var. *Eumecanthus Benthamianus* Kl. & Garcke, in Kl. Tricocc. 42 (1860), not *Euphorbia Benthami* Hiern, Cat. Welw. Afr. Pl. i. 943 (1900). *Euphorbia ariensis* Benth., Pl. Hartw. 51, no. 387 (1840), not HBK. Nov. Gen. et Sp. ii. 57 (1817). Caulibus in parte inferiore valde villosis; foliis quam eis formae typicae aliquid latioribus; inflorescentia laxiore. — In pine forests at Coru Station, Michoacan, Mexico, alt. 1970 m., 29 October, 1905, *C. G. Pringle*, no. 10,116 (type, in hb. Gray). This locality is only about 48 km. to the west of Patzcuaro, which was Hartweg's original station.

Heliotropium calcicola Fernald, n. sp., frutex gracilis 6-15 dm. altus; cortice brunneo exfolianti; ramulis albido-strigoso-puberulis; foliis lanceolatis utroque attenuatis breviter petiolatis apice mucronatis cum pilis minutis et lucidis utrinque obtectis 2-4.5 cm. longis 3-10 mm. latis margine revolutis; spicis terminalibus et lateralibus geminis 0.5, maturitate usque ad 2, cm. longis; pedunculis gracilibus 1.3-2 cm. longis canescentibus; calyce 1.5-2.5 cm. longo cum pilis minutis adpressis canescenti, lobis lanceolatis; corolla anguste urceolata 3 mm. longa adpresse setulosa, lobis ovatis acuminatis; stylo nullo;

nuculis subglobosis 1.3 mm. altis albidis adpresse setulosis. — Limestone cliffs, Iguala Cañon, Guerrero, Mexico, alt. 760 m., 28 September, 1905, *C. G. Pringle*, no. 10,062 (type, in hb. Gray). Not closely related to other Mexican species, perhaps nearest *H. coriaceum* Lehm., which is much coarser, densely villous, with broader rugose villous leaves and larger flowers and fruits.

SALVIA HISPANICA L., var. *chionocalyx* Fernald, n. var., foliis bracteisque supra viridibus et minute pubescentibus subtus paulo pallidioribus et praesertim in nerviis breviter pilosis; spicis pertenuibus 5–10 cm. longis 1–1.5 cm. crassis; floribus adpresse ascendentibus; calycibus conspicue denseque albo-pubescentibus. — Fields, Uruapan, Michoacan, Mexico, 16 October, 1904, *C. G. Pringle*, no. 8837½ (type, in hb. Gray). A striking extreme of *S. hispanica*, the typical form of which differs in its ordinarily thicker spikes of less appressed cinereous calyces.

SALVIA HISPANICA L., var. *intonsa* Fernald, n. var., foliis et partibus superioribus caulis tomentosus; spicis brevibus crassis 1.5–5.5 cm. longis 1.5–2 cm. crassis; calycibus tomentosus patentibus. — Buena Vista, Department of Santa Rosa, Guatemala, alt. 1680 m., December, 1892, *Heyde & Lux*, no. 4401, in exsicc. J. D. Smith. Differing from *S. hispanica* in the dense tomentum of its leaves, stems, and calyces.

7 *Salvia* (*Vulgares*) *mucidiflora* Fernald, n. sp., herbacea (?) alta; caule cinereo-pulverulento obtuse angulato faciebus profunde sulcato; foliis rhomboideo-ovatis 3.5–10 cm. longis crenato-serratis subtus albidis et tomento brevi densoque obtectis supra griseo-viridibus cum pilis brevibus albis, basi cuneato integro in petiolum puberulum gradatim angustato; ramis brevibus patentibus; racemis laxis 3.5–10 cm. longis; rhachi et pedicellis et etiam calyce dense albovillosis paene lanatis; verticellis 3–6-floris subdistantibus; bracteis late ovatis mucronatis 4–7 mm. longis subpersistentibus laxe albo-villosis; pedicellis 1–3 mm. longis; calyce anguste campanulato anthesi 7 mm. fructifero 8–9 mm. longo, labio superiore acuminato ascendenti, inferiore rectiusculo cum lobis 2 deltoideis aristatis; corolla azurea et alba 13–14 mm. longa, labio superiore villosa oblongo 6 mm. longo, inferiore violaceo patenti paulo longiore; stylo villosa. — San Ramón, Durango, Mexico, 21 April–18 May, 1906, *Edw. Palmer*, no. 187 (type, in hb. Gray). Nearest related to *S. longispicata* Mart. & Gal. but differing in its crenate-serrate leaves and the long pubescence of the inflorescence.

Salvia (*Vulgares*) *arthrocoma* Fernald, n. sp., caulibus superne pilosis, pilis pallidis nodulosis; foliis rhomboideo-ovatis 4–8 cm. longis supra basin cuneatam crenato-serratis apice acuminatis supra pilis compressis adpresse setulosis et in venis pilis gracilibus nodulosis mu-

nitissimus subtus in venis venulisque pilis gracilibus nodulosis pubescentibus; petiolis gracilibus 1.5–4 cm. longis; racemo brevi, rhachi a pilis nodulosis peculiaribus tecta; verticellis 3–6-floris demum 1–1.5 cm. distantibus; bracteis late ovatis longe acuminatis et calycibus in nervis marginibusque pilis gracilibus nodulosis munitis; pedicellis 3 vel usque ad 5 mm. longis; calyce campanulato anthesi 5 fructifero 8 mm. longo tubo valde costato, labiis deltoideo-acuminatis valde patentibus superiore ascendenti 2–3 mm. longo quam lobo recto inferioris brevior; corolla 1 cm. longa, tubo faucibusque albidis, labiis obtusis ringentibus apicem versus purpureo-tinctis, galea pilosa 4 mm. longa labium inferius latius paulo superante. — Barranca below Trinidad Iron Works, Hidalgo, Mexico, alt. 1620 m., 16 July, 1904, *C. G. Pringle*, no. 8940 (type, in hb. Gray). Somewhat suggesting *S. fluviatilis* Fernald, but clearly characterized by its slender jointed hairs.

Salvia (*Vulgares*) *Lozani* Fernald, n. sp., caulibus herbaceis gracilibus decumbentibus basi saepissime radicanibus aliquid ascendentibus demum 5–6 cm. longis minute glanduloso-setulosis, pilis patentibus; foliis regulariter remotis, jugis 4–6 cm. distantibus, foliis infimis suborbicularibus 1.2–1.6 cm. longis superioribus ovatis vel oblongis 1.5–2.5 cm. longis integris margine paulo revolutis basi rotundatis vel subcordatis apice rotundatis supra viridibus glabris pallide nervatis subtus pallidioribus et glandulis atrorubris punctatis; pedunculo 4.5–7 cm. longo; verticellis 3 remotis 2-floris; bracteis ovatis obtuse acuminatis glanduloso-setulosis 2–3 mm. longis; pedicellis 1–2 mm. longis; calyce anthesi campanulato glanduloso-setuloso rubropunctato 4–5 mm. longo, labio superiore obtuso 2-dentato nigrescenti 2 mm. longo, inferiore pallidioris lato brevissimo; corolla 17–18 mm. longa, tubo infundibuliforme leviter ventricosa 8 mm. vel ultra longo, galea breviter pubescenti 3–4 mm. longa, labio inferiore cyaneo albo-maculato 1 cm. longo, lobo medio 12 mm. lato. — Wet grassy places in pine forests near Trinidad Iron Works, Hidalgo, Mexico, alt. 1770 m., July–August, 1904, *C. G. Pringle*, no. 8928 (type, in hb. Gray). Named for Filemon L. Lozano, for several seasons Mr. Pringle's able field companion. A unique species, nearest related perhaps to *S. villosa* Fernald.

Salvia (*Candicantes*) *chionophylla* Fernald, n. sp., fruticosa depressa; ramis laxis gracilibus prostratis 3–6 dm. longis; cortice pallide brunneo pilis brevissimis crebris stellatis canescenti; foliis elliptico-ovatis vel breviter oblongis integris vel obscure crenatis utroque angustatis 0.5–1.5 cm. longis cinereis dense stellato-puberulis juventate canescentibus; petiolis gracilibus 2–4 mm. longis; racemis 0.5–1 dm. longis; verticellis 3–6-floris demum 2–2.5 cm. distantibus; pedicellis

2–4 mm. longis; calyce tubuloso-campanulato anthesi 6–7 fructifero 8–9 mm. longo valde costato, tubo lobis latis obtusis breviter acuminatis duplo longiore; corolla 1.5 cm. longa, tubo paulo exserto; galea azurea et alba pilosa 6 mm. longa a labio inferiore cyaneo superata. — On shelving rocks and gravelly slopes of the cañon-wall, Chojo Grande, Coahuila, Mexico, 29 August, 1904, *Edw. Palmer*, no 368 (type, in hb. Gray). Nearest related to the upright narrow-leaved *S. thymoides* Benth., which has a glandular calyx.

Salvia (*Scorodoniae*) *chalarothyrsa* Fernald, n. sp., ramis gracilibus retrorse molliterque pilosis; foliis cordato-ovatis acuminatis dentatis superioribus 2.5–4.5 cm. longis 2–3.5 cm. latis vix rugosis utrinque adpresse pubescentibus, pilis planis; petiolis 0.5–1.5 cm. longis dense pilosis; inflorescentia cylindrica laxa thyrsoida 1.5–6 dm. longa; rhachi necnon pedunculis pedicellisque cum pilis mollibus patentibus glanduloso-capitulatis tectis; cymis 3–10-floris usque ad 3–4 cm. distantibus, pedunculis 0.5–2 cm. longis; bracteis lanceolatis vel linearibus tarde deciduis; calyce pedicellos aequante anguste campanulato anthesi 4 fructifero 5–6 mm. longo glanduloso-hirsuto, lobis alte deltoideis subaequalibus apice subulatis; corolla cyanea 12–13 mm. longa, tubo pallido glanduloso-punctato paulo exserto, galea brevissima breviter pilosa, labio inferiore multo longiore, lobo intermedio magno emarginato 7–9 mm. lato. — Hills about Tuxpan, Jalisco, Mexico, alt. 1220 m., 27 October, 1904, *C. G. Pringle*, no. 8856 (type, in hb. Gray). A remarkable species in its thyrsiform inflorescence, related only to *S. thyrsoflora* Benth., a species also from the Jalisco mountains, from Tepic to western Michoacan.

Salvia (*Inflatae*) *muralis* Fernald, n. sp., fruticosa 1–2 m. alta; ramis gracilibus firmis subteretibus cinereo-puberulis; foliis anguste ovatis 6–9.5 cm. longis 2–4.7 cm. latis remote crenato-dentatis obtuse acuminatis basi subcuneatis vel rotundatis supra pallide viridibus adpresse setulosis subtus pallidioribus et glanduloso-punctatis dense albo-pilosis in costa media et in nervis principalibus; petiolo gracili cinereo-puberulo 2–3 cm. longo; ramis floriferis gracilibus brevibus ex axillis superioribus inferne foliatis; floribus saepissime geminis; pedicellis gracilibus 3–5 cm. longis; calyce anthesi curvato tubiformi 1.5–2 cm. longo inferne constricto viridique superne patente expanso et rubro-tincto sparse piloso, lobis deltoideis 5 mm. longis; corolla cinabarina 4.5–6 cm. longa valde exserta pilosa tubulari-infundibuliformi, faucibus paulo gibbosis, galea pilosa 1.5–1.7 cm. longa labium inferius subaequante; staminibus styloque exsertis illo piloso. — Hanging from fissures in limestone-cliffs, Iguala Cañon, Guerrero, Mexico, alt. 762 m., 28 September, 1905, *C. G. Pringle*, no. 10,072 (type, in hb.

Gray). Nearly related to *S. pubescens* Benth., which has a shorter, broader, and more colored calyx, shorter corolla, and nearly or quite glabrous style.

Salvia (Cyaneae) atrocaulis Fernald, n. sp., caulibus nigrescentibus vel purpurascens 1.8–2.4 m. altis basi 2–3 cm. crassis in partibus inferioribus glabris inflorescentiam versus puberulis; foliis late cordato-ovatis utrinque viridibus supra sparse adpresso-setulosis et in nerviis puberulis subtus glabris sed glanduloso-punctatis regulariter dentato-serratis, limbo 7.5–15 cm. longo 5–12 cm. lato apice caudato-acuminato; petiolo 4–14 cm. longo; inflorescentia racemosa 1.5–3 cm. vel ultra longa, rhachi puberula, verticellis 5–12-floris inter se denique 2–2.5 cm. disjunctis; pedicellis puberulis anthesi 7 mm. fructiferis 12 mm. longis; calyce anthesi 14 mm. fructifero 22 mm. longo glanduloso-punctato, in nervis cum pilis caducis moniliformibus pubescenti, lobis subulato-mucronatis deltoideis tubo anguste campanulato triplo brevioribus; corolla 5 cm. longa violacea fere vel omnino glabra, tubo aliquid ventricosum labiis paulo longiore; stylo barbato. — Wet banks, barranca below Trinidad Iron Works, Hidalgo, Mexico, alt. 1650 m., 22 August, 1904, *C. G. Pringle*, no. 8887 (type, in hb. Gray). Nearest related to *S. recurva* Benth., but differing in its dark stems, broader firmer leaves, less pubescent calyx, and essentially glabrous corolla.

Salvia (Cyaneae) flaccidifolia Fernald, n. sp., verisimiliter fruticosa; ramis gracilibus superne decussatim bifariam pilosis; foliis graciliter petiolatis; petiolis supra pilosis inferioribus limbum superantibus; laminis ovatis cordatis caudato-attenuatis tenuissimis 3.5–9 cm. longis crenato-serratis supra atroviridibus adpresse setulosis subtus pallide viridibus fere glabris in venis adpresse setulosis; racemis 6–8 cm. longis, verticellis 6–8 remotis 3–6-floris; bracteis ovatis aristatis caducis; pedicellis 2–5 mm. longis puberulis; calyce anthesi 5–6 mm. longis, labio superiore ovato aristato inferiore bilobo biaristato; corolla 2–2.3 cm. longa cyaneo-purpurea, tubo valde ventricosum, labio superiore recto 1 cm. longo, inferiore longiore pendulo valde dilatato. — Barranca below Trinidad Iron Works, Hidalgo, Mexico, 1906, *C. G. Pringle*, no. 10,298 (type, in hb. Gray). Nearly related to *S. recurva* Benth., which it resembles in its very thin long-petioled leaves, but with much smaller calyx and corolla.

Salvia (Tubiflorae) simulans Fernald, n. sp., caulibus glabris; ramis erectis brevibus; foliis ovatis abrupte acuminatis basi rotundatis vel rotundato-cuneatis regulariter dentato-serratis 0.5–1 dm. longis 3.2–6.5 cm. latis supra adpresse setulosis et resinoso-punctatis subtus glabris; petiolis paulo pilosis 4–8 cm. longis gracilibus; racemo principali 1.5 dm. longo; rhachi glanduloso-pulverula; verticellis 5–15-floris

demum 2 cm. distantibus; pedicellis gracilibus glanduloso-pruinosis 1.5 usque ad 7 mm., longis; calyce purpureo-tincto tubiformi anthesi 7–8 mm. fructifero 1 cm. longo, tubo basi valde costato pruinoso, faucibus paulo dilatatis levius costatis glabratis, labiis aristato-acuminatis 3–4 mm. longis inferiore bifido recto superiore sursum curvato; corolla rubro-purpurea 2.2–2.6 cm. longa, tubo et faucibus anguste cylindricis sursum curvatis 1.5–1.7 cm. longis 2–3 mm. diametro, labiis approximatis, galea dense pilosa labium inferius aequanti; stylo barbato. — Wet barranca below Trinidad Iron Works, Hidalgo, Mexico, alt. 1680 m., 22 August, 1904, *C. G. Pringle*, no. 8927 (type, in hb. Gray). Strongly suggesting *S. Martensii* Gal., which, however, has the ventricose corolla-tube of the *Cyaneae*. From that species, *S. simulans*, which has the cylindric corolla-tube of the *Tubiflorae*, is further distinguished by its rounded-cuneate leaf-bases, and especially by the elongate galea.

Castilleja Conzattii Fernald, n. sp., suffruticosa; caulibus simplicibus erectis glanduloso-puberulis; foliis linearibus vel lineari-lanceolatis 3–5-nerviis 2–7 cm. longis dense puberulis, inferioribus integris, superioribus pectinatis, laciniis linearibus patentibus; bracteis oblongis 1.5–2.5 cm. longis, summis coccineis trifidis, lobis lateralibus linearibus vel spatulatis, intermedio majore anguste obovato integro vel obsolete trilobo; pedicellis 1 mm. longis; calyce mediam tantum corollam paululo superante 1.5–1.8 cm. longo viridi et albo, antice et postice aequaliter fisso, lobis oblongis subtruncatis 5–6 mm. longis; corolla viridi et rubella 2.2–2.5 cm. longa, tubo 1.2–1.3 cm. longo, galea elongata, labii lobis obtusis 1 mm. longis. — Sta. Ines del Monte, Zimatlan, Oaxaca, Mexico, alt. 820 m., 8–9 December, 1905, *C. Conzatti*, no. 1360 (type, in hb. Gray). Nearest related, apparently, to the variable *C. angustifolia* (Nutt.) Don, of the northwestern United States, from which it differs chiefly in the broad middle lobe of the bracts.

Ruellia (*Ophthalmacanthus*) *Pringlei* Fernald, n. sp., fruticosa; ramis gracilibus flexuosis subteretibus glanduloso-villosis cinereis; foliis ovatis 3–10 cm. longis 1.5–4.3 cm. latis tenuibus utrinque mollioribus pubescentibus basi cuneatis apice longe attenuatis; petiolis gracilibus sublanatis 1.5–3.5 cm. longis; pedunculis 1.5–3 cm. longis cinereo-pubescentibus unifloris; bracteis lineari-spatulatis acutis 2.5–5 cm. longis; calyce 3–4 cm. longo, laciniis lineari-lanceolatis 2.3–3 cm. longis ciliatis; corolla alba 7–8 cm. longa anguste infundibuliformi valde exserta, limbi 5–6 cm. lati lobis breviter oblongis vel suborbicularibus retusis; capsula immatura angusta 2.5–3 cm. longa 7 mm. crassa glabra. — Hillsides, Balsas Station, Guerrero, Mexico, alt. 610 m., 27 September, 1905, *C. G. Pringle*, no. 10,071 (type, in hb. Gray).

Apparently nearest *B. rosea* (Nees) Hemsl., which is said, however, to have the obtuse leaves short-petioled, the stem angled, and the rose-colored corolla 2 inches long.

BIDENS ROSEA Sch. Bip., var. *aequisquama* Fernald, n. var., involucri squamis subaequalibus, eis seriei exterioris elongatis 5-8 mm. longis. — Thickets near Uruapan, Michoacan, Mexico, alt. 1525 m., 1 November, 1905, *C. G. Pringle*, no. 10,109 (type, in hb. Gray). Differing from *B. rosea* in the very elongate segments of the outer involucre, which in the original description of the species is said to be shorter than the inner, and which in herbarium specimens measures 2-4 mm. long.

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THE SOIL PREFERENCES OF CERTAIN ALPINE AND SUBALPINE PLANTS.

M. L. FERNALD.

THE floras of alpine and subalpine districts are especially attractive to the field-botanist. The flowers of such regions are as a rule more showy in proportion to the size of the plants than in the lowland forms; while on mountain summits and slopes are found many species quite unknown in the habitable districts. And, owing to the steepness and exposure of the slopes, the plants of alpine and subalpine situations are ordinarily found in picturesque and even inaccessible localities:— on the faces of cliffs, in rock-crevices, or on talus-slopes formed from the overhanging cliffs. In this characteristic, of growing primarily on soils derived from the rock in place, our alpine plants are strongly contrasted with the most familiar vegetation of the lower and more habitable regions of New England, New York, and eastern Canada, a vegetation which is found on more or less mixed or transported soils — in our region chiefly of alluvial or glacial origin.

Aside from the somewhat unique habitat of many plants of high mountains and cliffs and their interest as species unknown or rarely seen in the lowland, these alpine plants present to the student of geographic botany a problem of peculiar fascination. In most cases their known distribution is seemingly very erratic. The typical plants of these regions, instead of occurring over broad and continuous areas of eastern Canada and the United States, are found in only a few very isolated situations; and not until they reach the high-northern districts of polar America or other boreal regions do they occur extensively or in closely contiguous large areas. *Empetrum nigrum*, for instance, the Crow-berry or Curlew-berry, is a characteristic trailing

shrub at the very highest points of the Adirondack, Green, and White Mountains, on the naked-topped mountains of Maine, on Mt. Albert and Table-top Mt. in Gaspé, on the rocks of Mt. Desert Island and the adjacent coast of Maine, New Brunswick and Nova Scotia; thence along the coast of Nova Scotia and the outer coast of Newfoundland to Labrador. About the Gulf of St. Lawrence it is somewhat local and usually confined to cold bogs or occasional cliffs. In other words, south of the St. Lawrence *Empetrum nigrum* is isolated in its distribution, occurring only on the higher mountain-summits and on cold coastal rocks or bogs. North of the St. Lawrence, however, it becomes one of the commonest of plants, "abundant throughout the semi-barren and barren regions of the [Labrador] peninsula, growing freely on the coast and inland,"¹ and according to Delabarre it is "the most abundant phenogamous plant of Labrador."² West of the Labrador Peninsula and Baffin Land it grows, according to Macoun, "along the north shore of Lake Superior, and at Port Arthur, Thence it takes a northwesterly direction and is found in peat bogs, on exposed rocks along the shores, and on barren grounds to the Pacific Ocean and Arctic Sea."³ From the Arctic it extends southward along the Coast Range to the region of Sitka, and very locally on cliffs to the coast of northern California. It is also on the mountains of southern British Columbia, and locally in Washington; and it grows in arctic-alpine regions of Eurasia. *Rubus Chamaemorus*, the Baked-apple of the coastal region of eastern Maine, southern New Brunswick and Nova Scotia, is also on the higher White Mts. of New Hampshire and the adjacent high peaks of western Maine, but unknown on other New England mountains; locally on bogs of Temiscouata and Rimouski Counties, Quebec, and on Table-top Mt. in Gaspé. From these isolated areas south of the St. Lawrence it extends northward along the outer coast of Newfoundland, and from the north shore of the St. Lawrence "everywhere throughout Labrador to beyond the tree limit"⁴; through Arctic and subarctic regions to Alaska, coming south along the Coast Range to the region of Sitka. Many other characteristic plants of the isolated alpine or colder areas of

¹ Low, Report on Explorations in the Labrador Peninsula: Geol. Surv. Can., Ann. Rep., n. s. viii. 40 L. (1896).

² Delabarre, Bull. Geogr. Soc. Phila. lli. no. 4, 190 (1902).

³ Macoun, Cat. Can. Pl. i. 458 (1886).

⁴ Low, l. c. 38 L. (1896).

Maine and New Hampshire are, like *Empetrum nigrum* and *Rubus Chamaemorus*, the common plants of Labrador and other subarctic and arctic regions of America. Another large group of isolated species is well represented by *Dryas Drummondii*, one of the commonest and most showy plants of the ledgy shores and gravelly beaches of the Gaspé Peninsula and of Anticosti Island. This beautiful shrub, so common in Gaspé and Anticosti, is quite unknown elsewhere east of the Rocky Mts. There, however, it is found throughout the System from northwestern Montana northward, along alpine rivers to the shores of the Arctic Sea.¹

When, on the other hand, we examine the detailed distribution of the plants which characterize the low altitudes, or at least the everyday inhabited portions of New England and eastern Canada, a very different situation is found. The most familiar plants of these regions, instead of occurring only at few and remote highly specialized stations, are of general or continuous distribution over broad and easily defined areas. Thus, to cite a few typical illustrations, *Clematis virginiana* occurs along streams from the Baie des Chaleurs to Georgia, and west to Lake Winnipeg and the Mississippi valley. *Anemonella thalictroides* is common in dry woods from southern New Hampshire westward to southern Ontario and Minnesota, south to Maryland, and in the upland country to western Florida. *Viola conspersa*² occurs very generally in alluvial woods and thickets or in wild meadows from southern Gaspé and eastern New Brunswick west to the Great Lake region, south to Maryland, West Virginia and southern Indiana, and locally along the mountains southward. *Ilex monticola* grows in rich woods of the Alleghanies from northern Alabama northward across Pennsylvania, and locally to the Taconic Mountains of southwestern Massachusetts and the hill-country of western New York. *Aster subulatus* in its general distribution follows the coastal marshes from New Hampshire to Florida. These five species of *Clematis*, *Anemonella*, *Viola*, *Ilex*, and *Aster*, illustrate very fairly the general and continuous distribution of a large proportion of our plants of the north-temperate regions.

The isolation above indicated of the alpine and subalpine plants in New England, Nova Scotia, New Brunswick, and Quebec (as well as on the Adirondack Mts. and in other cold areas of New York, on the

¹ See Macoun, Cat. Can. Pl. i. 132 (1883).

² *Viola conspersa* Reichenb. (*V. canina* L., var. *Muhlenbergii* Trautv.).

north shore of Lake Superior, and at other similar points) is of course due in part to the fact that we have in this large district only a limited number of regions in which the climatic conditions are comparable with those of the Arctic. And the occurrence in exposed or frigid situations of Mt. Washington or along the Gaspé rivers of such isolated species as *Empetrum nigrum*, *Rubus Chamaemorus* and *Dryas Drummondii* is one of the strong links of evidence which has convinced botanists of the inevitableness of the conclusions long ago reached by Hooker, Gray, and others, that it is "difficult to account for these facts, unless we admit Mr. Darwin's hypotheses, first, that the existing Scandinavian flora is of great antiquity, and that previous to the glacial epoch it was more uniformly distributed over the polar zone than it is now; secondly, that during the advent of the glacial period this Scandinavian vegetation was driven southward in every longitude, and even across the tropics into the south temperate zone; and that on the succeeding warmth of the present epoch, those species that survived both ascended the mountains of the warmer zones, and also returned northward accompanied by aborigines of the countries they had invaded during their southern migration. Mr. Darwin shows how aptly such an explanation meets the difficulty of accounting for the restriction of so many American and Asiatic arctic types to their own peculiar longitudinal zones, and for what is a far greater difficulty, the representation of the same arctic genera by most closely allied species in different longitudes."¹

Practically every newly explored alpine district or cliff-region of New England and eastern Canada furnishes its addition to the already extensive list of polar and high-northern species which are isolated south of the St. Lawrence; and to-day we know in this area, between Long Island Sound and the mouth of the River St. Lawrence, more than four hundred such *Pteridophyta* and *Spermatophyta*, a list which would be significantly increased by the addition of the lower groups of plants. But the discovery of a few additions to this very long list of arctic-alpine and high-northern plants south of the St. Lawrence, however interesting it always proves, is, in view of the extensive data already amassed, only of minor importance compared with the greater problem of determining the reasons for this isolated distribution.

¹ J. D. Hooker, *Outlines of the Distribution of Arctic Plants*: Trans. Linn. Soc. xxiii. pt. 2, 253 (1861). See also Darwin, *Origin of Species*, Chap. XI; Gray, *Am. Journ. Sci. Ser. 2*, xxxiv. 144 (1862).

For several years the writer has realized that, in the available information on the occurrence of these plants, a most important factor is missing; and since 1893 much of his field-observation has been directed toward a possible solution of the problem. During the past fourteen summers he has examined over thirty of the mountains of New England and eastern Canada which support more or less pronounced arctic-alpine floras; the cold cliffs of the Maine coast at various points from York to Cutler; the shores of the Bay of Fundy and the southern and eastern coasts of Nova Scotia at remote points; the coast of northeastern New Brunswick and of the Gaspé Peninsula; and the sea-cliffs of the south shore of the St. Lawrence westward to Temiscouata County, Quebec. The studies of these areas and of many river cliffs of northern Maine and eastern Quebec, supplemented by the detailed collections of other botanists and their publications upon the floras of various cliffs and alpine summits, especially of the White and Green Mountains, have furnished the basis for the conclusions here to be presented. In the explorations of the past few summers the writer has had the enthusiastic coöperation of Professor J. Franklin Collins, without whose ever ready ingenuity at "roping" difficult cliffs, it would have been impossible to secure many of these observations.

One of the first impressions gained in botanizing on Willoughby Cliffs or in Smuggler's Notch or on the sea-cliffs of Bic or of Percé, for instance, then on Mt. Washington or Katahdin or Table-top Mt., and then on Mt. Albert, is that alpine floras are very dissimilar. This difference has often been remarked. Dr. A. J. Grout, for example, in describing an ascent of Mt. Washington through Tuckerman's Ravine, says:

"After a climb of about two hours we came into Tuckerman's Ravine proper where the alpine plants began to appear. This reminds one strongly of the Smuggler's Notch ravines, on a much larger scale and the path to the summit zigzags back and forth over towering cliffs similar but less abrupt. One of the most striking things to me was the difference in the flora here and elsewhere on Mt. Washington and that of Smuggler's Notch and Mt. Mansfield. Here in Tuckerman's Ravine were *Salix phylicifolia* both sexes, *Alnus alnobetula* [*A. crispa*] and a number of more common alpine plants, but no *Pinguicula*, neither of our alpine Saxifrages, nor did I see any of our

rare alpine ferns; no *Artemisia Canadensis*, *Arenaria hirta* [*A. verna*, var. *propinqua*], *Hedysarum* or *Astragalus*. However this deficiency was atoned for by the bright yellow *Arnica Chamissonis* [*A. mollis*], strongly resembling a dwarf sunflower; *Oxyria digyna*, whose very looks seemed to say: 'a near relative of our sorrel'; *Gnaphalium supinum*, which one could easily mistake for our common *G. uliginosum*; *Phleum alpinum* that looks just like dwarfed timothy; *Salix argyrocarpa* in fine fruit, and a form called a hybrid between this and *S. phylicifolia*. Besides these more striking forms, we also collected here *Veronica alpina*, *Sibbaldia procumbens*, *Loiseleuria procumbens*, *Epilobium alpinum*, and *Geum radiatum* [*G. Peckii*]."¹

Later, at a meeting of the Torrey Botanical Club, Dr. Grout contrasted the flora of the Smuggler's Notch region of Mt. Mansfield; where "are found *Dryopteris* [*Aspidium*] *fragrans*, *Woodsia glabella* and *W. alpina*, *Pellaea gracilis* [*Cryptogramma Stelleri*], *Polystichum Braunii*, *Asplenium viride*, *Blephariglottis grandiflora* [*Habenaria fimbriata*], *Saxifraga oppositifolia*, *S. Aizoön*, and *S. autumnalis* [*S. aizoides*], *Astragalus Jesupi* [*A. Blakei*], *Hedysarum Americanum* [*H. boreale*], *Draba incana* [*D. stylaris*], *Arenaria verna* [var. *propinqua*], *Pyrola minor*, *Gentiana acuta* [*G. Amarella*, var. *acuta*], *Castilleja acuminata* [*C. pallida*, var. *septentrionalis*], *Erigeron hyssopifolius*, *Solidago Virgaurea*, vars. and that choicest of beauties and wonders, the insect-eating *Pinguicula vulgaris*";² with that of the summit-ledges, where are found "*Polygonum viviparum*, *Comandra livida*, *Viburnum pauciflorum*, *Salix Uva-ursi*, *Vaccinium caespitosum*, *V. uliginosum*, *Vitis-Idaea*, *Nabalus* [*Prenanthes*] *Boottii* and *Diapensia*";² and in the abstract of this address, as published, the concluding paragraph reads: "A comparison of the flora of this region and that of Mt. Washington, brings out the fact that here are several northern plants not found at the loftier elevation of the Mt. Washington region, although the conditions there are more severely alpine and supposedly more favorable. None of the saxifrages mentioned above can be found in the White Mountain region, but another alpine species, *S. rivularis*, occurs there. This is only one of several cases hard to account for, on a theory of a residual flora, as the regions are so near to each other and the conditions are so similar."²

¹ A. J. Grout, *Plant World*, ii. 116 (1899).

² A. J. Grout, as reported by N. L. Britton, *Torreyana*, ii. 47 (1902).

Had the plants of Smuggler's Notch and of Mt. Washington been further compared with the flora of the great alpine tableland of Mt. Albert in Gaspé the contrast would have been quite as marked, for on that broad expanse of bare summit and cañon-walls the characteristic plants are unlike those either of Mt. Washington or of Smuggler's Notch, and in their stead we find extensive areas of *Adiantum pedatum*, var. *aleuticum*, *Festuca altaica*, *Salix desertorum*, *Arenaria arctica*, *Statice sibirica*, *Solidago decumbens*, *Artemisia borealis*, and many other plants which are unknown elsewhere south of the St. Lawrence.

If, however, comparison is made of the floras of Smuggler's Notch and of Willoughby Cliffs, many sea-cliffs of Bic and the north coast of Gaspé, the mountain- and sea-cliffs of Percé, the cliffs of certain spurs abutting on the northwestern edge of Table-top Mountain, and various river-cliffs in northern Maine, New Brunswick, and the interior of the Gaspé Peninsula; we shall find a remarkable similarity in their floras. In fact, of the 29 distinctively cliff or subalpine plants of Smuggler's Notch all but the local *Astragalus Blakei* are known from the sea-cliffs of Bic and the Gaspé coast, the river-cliffs of the Gaspé interior, or the northwestern abutments of Table-top Mountain; while on the neighboring cliffs of Willoughby only 18 of the 29 notable Smuggler's Notch species are found, though a few others are there present. Furthermore, on the more northern and ordinarily more exposed cliffs of the Gaspé mountains and coast many additional plants are associated with those of Smuggler's Notch and of Willoughby Cliffs; but on none of these areas (except Table-top Mt. discussed below) is there a noteworthy identity with the alpine flora of Mt. Washington.

When, on the other hand, we compare the characteristic alpine flora of Mt. Washington and the adjacent White Mountains with that of Mt. Katahdin or the great alpine tableland (15 miles long, by 3 or more miles wide) of Table-top Mountain, or the coastal cliffs of eastern Maine, we find a striking similarity in these floras. Some of these areas support one or more plants not known in either of the others,¹ but on these three great mountain areas the characteristic species are identical, while several of them occur on the coast of eastern

¹ *Carex capitata*, *Geum Peckii*, *Saxifraga rivularis*, and *Euphrasia Williamsii* on Mt. Washington; *Carex Grahmi*, *C. saxatilis*, *C. katahdinensis*, and *Saxifraga stellaris*, var. *comosa* on Katahdin; *Phegopteris alpestris*, *Asplenium cyclosorum*, *Cerastium cerastioides*, *Petasites vitifolia* and *P. trigonophylla* on Table-top Mountain.

Maine and adjacent New Brunswick, on the highest of the Adirondacks, and on several lesser mountains of New England and New Brunswick not here enumerated.

Furthermore, at the exposed summits of Mt. Mansfield and of Camel's Hump in Vermont, where the distinctive plants of Smuggler's Notch are mostly unknown, the following alpine and subalpine plants are found:

<i>Lycopodium Selago</i> L., var. <i>appressum</i> Desv.	<i>Betula alba</i> L., var. <i>minor</i> (Tuckerm.) Fernald.
<i>Agrostis borealis</i> Hartm.	<i>Comandra livida</i> Richardson.
<i>Calamagrostis Pickeringii</i> Gray.	<i>Polygonum viviparum</i> L.
<i>Deschampsia atropurpurea</i> (Wahl.) Scheele.	<i>Arenaria groenlandica</i> (Retz.) Spreng.
<i>Hierochloe alpina</i> (Sw.) R. & S.	<i>Amelanchier oligocarpa</i> (Michx.) Roem.
<i>Poa laxa</i> Haenke.	<i>Potentilla tridentata</i> Ait.
<i>Carex brunnescens</i> Poir.	<i>Empetrum nigrum</i> L.
“ <i>Michauxiana</i> Boeckl.	<i>Ledum groenlandicum</i> Oeder.
“ <i>rigida</i> Good., var. <i>Bigelowii</i> (Torr.) Boott.	<i>Vaccinium caespitosum</i> Michx.
<i>Scirpus caespitosus</i> L.	“ <i>uliginosum</i> L.
<i>Juncus filiformis</i> L.	“ <i>canadense</i> Kalm.
“ <i>trifidus</i> L.	“ <i>pennsylvanicum</i> Lam., var. <i>angustifolium</i> (Ait.) Gray.
<i>Luzula parviflora</i> Desf.	“ <i>Vitis-Idaea</i> L., var. <i>minus</i> Lodd.
<i>Salix balsamifera</i> Barratt.	<i>Solidago Virgaurea</i> L., var. <i>alpina</i> Bigel.
“ <i>phylicifolia</i> L.	<i>Prenanthes Boottii</i> (DC.) Gray.
“ <i>Uva-ursi</i> Pursh.	
<i>Alnus crispa</i> (Ait.) Pursh.	

Of these 32 alpine and subalpine plants of the high summit-areas of the Green Mountains, plants which are quite different from the distinctive species of the Smuggler's Notch cliffs, 29 are common species of Mt. Washington, Katahdin, and Table-top Mountain; and the remaining 3, although as yet unknown from Table-top, are familiar plants of Mt. Washington and others of the White Mountains, of Katahdin, and even of some of the minor mountains of Maine.

As already remarked, the characteristic plants of the great tableland of Mt. Albert are, so far as known, unique in our flora; and, judging from our very limited knowledge of certain botanically unexplored mountains it is possible that upon them still other alpine or subalpine floras exist. Nevertheless, admitting that there are still highly promising mountains and cliffs within our boundaries whose plants are quite unknown to us, we already have sufficient data to point out three very

clearly defined floras which are quite absent from certain alpine and subalpine areas, but as positively the distinctive plants of certain others.

In the accompanying table is shown the known distribution south of the St. Lawrence and east of the Great Lake region and western New York of 258 alpine and subalpine *Pteridophyta* and *Spermatophyta*. This list includes a large proportion of the New England species, but owing to the lack of sufficiently accurate knowledge of the distribution of certain alpine plants (especially in eastern Canada) they are for the present omitted. Many other species belonging to such perplexing genera as *Calamagrostis*, *Poa*, *Salix*, *Epilobium*, *Campanula*, *Solidago*, *Aster*, etc., must await more detailed study before they can be satisfactorily identified.

It should be borne in mind that, in the preparation of these tables of distribution, only the alpine and subalpine habitats have been included, i. e., the localities in which the plants occur upon soils in place, either upon summit-ledges and upper slopes or on exposed cliffs and talus. In a few cases plants may be present in the bogs or swamps of a given region, but unknown in the rock-habitats. Such species are *Rubus Chamaemorus* and *Menyanthes trifoliata*, for instance, abundant in certain bogs along the lower St. Lawrence, but apparently unknown from the adjacent sea-cliffs and consequently not included from them in the table.

In tabulating the distribution of plants of regions which are not known to the writer from personal observation, it has not always been possible to secure full data, and many plants which are probably present in these localities are necessarily left unchecked. Some of the members of the *Pinaceae*, for example, are undoubtedly upon the cliffs of Smuggler's Notch, but the published lists of plants of that region have naturally laid more emphasis upon the localized species than upon those which are common throughout the Green Mountains, and the presence of many of the latter may be only assumed.

Of the 258 plants whose alpine and subalpine distribution is here tabulated, many species, it will be noticed, are confined very definitely to certain alpine areas, and are quite unknown from certain others. These areas which are characterized by distinctive floras fall into three major groups, and a fourth or minor group (of a single area) supporting a flora which embraces to a striking degree a mixture of plants which are otherwise confined very exclusively to one or the other of two of the major groups of areas.

TABLE I, SHOWING THE DISTRIBUTION SOUTH OF THE RIVER
ST. LAWRENCE OF 258 ALPINE AND SUBALPINE PLANTS.

NAMES OF PLANTS	GROUP I							Ia	II							III	
	Adir. Mts. ¹	Green Mts. ²	White Mts. ³	Katahdin. ⁴	Lesser Mts., Me. ⁵	E. Coast, Me. ⁶	Tableland, Table-top. ⁷		N. Edge, Albert. ⁸	Smuggler's Notch. ⁹	Willoughby. ¹⁰	St. John R. ¹¹	Restigouche R. ¹²	Gaspé Rivers. ¹³	Bic. ¹⁴		Gaspé Coast. ¹⁵
<i>Lycopodium Selago</i> L., var. <i>appressum</i> Desv.	+	+	+	+	+	+	+	+									+
var. <i>patens</i> (Beauv.) Desv.									+				+	+	+		
<i>alpinum</i> L.							+	+									
<i>sitchense</i> Ruprecht			+	+	+		+	+									
<i>annotinum</i> L., var. <i>pungens</i> Desv.	+	+	+	+	+	+	+	+									
<i>Selaginella selaginoides</i> (L.) Link								+			+	+	+		+	+	+
<i>Adiantum pedatum</i> L., var. <i>aleuticum</i> Rupr.																	+
<i>Cryptogramma densa</i> (Brack.) Diels																	+
<i>Stelleri</i> (Gmel.) Prantl									+	+	+	+	+	+	+		
<i>Phegopteris alpestris</i> (Hoppe) Mett.							+										
<i>Robertiana</i> (Hoffm.) A. Br.											+	+					
<i>Cystopteris fragilis</i> (L.) Bernh.								+	+	+	+	+	+	+	+	+	+
<i>montana</i> (L.) Bernh.								+				+					+
<i>Asplenium viride</i> Huds.									+	+	+		+	+	+		
<i>cyclosorum</i> (Rupr.) Fernald*							+										
<i>Polystichum Lonchitis</i> (L.) Roth															+	+	
<i>scopulinum</i> (Eaton) Maxon																	+
<i>Aspidium fragrans</i> (L.) Sw.									+		+	+	+	+	+		
<i>Woodsia glabella</i> R. Br.									+	+	+	+	+	+	+		
<i>alpina</i> (Bolton) S. F. Gray									+	+	+	+	+	+	+		
<i>oregana</i> D. C. Eaton														+			
<i>scopulina</i> D. C. Eaton															+		
<i>Larix laricina</i> (DuRoi) Koch				+	+		+			+			+	+	+	+	+
<i>Picea mariana</i> (Mill.) BSP.	+	+	+	+	+	+	+	+		+			+	+	+	+	+
<i>canadensis</i> (Mill.) BSP.	+	+	+		+	+	+	+		+	+	+	+	+	+	+	+
<i>Abies balsamea</i> (L.) Mill.	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+
<i>Juniperus communis</i> L., var. <i>montana</i> Ait.															+	+	+
<i>Hierochloa alpina</i> (Sw.) R. & S.	+	+	+	+	+		+	+									
<i>Phleum alpinum</i> L.			+	+	+		+	+				+	+		+		
<i>Agrostis borealis</i> Hartm.	+	+	+	+	+		+	+					+	+	+	+	+
<i>Calamagrostis Pickeringii</i> Gray	+	+	+				+	+									
<i>Langsdorfii</i> (Link) Trin.	+	+	+	+	+		+	+									
<i>hyperborea</i> Lange									+	+			+		+		
<i>purpurascens</i> R. Br.														+			
<i>Deschampsia atropurpurea</i> (Wahl.) Scheele	+	+	+	+			+	+									
<i>caespitosa</i> (L.) Beauv., var. <i>alpina</i> Vasey																	+

**ASPLENIUM cyclosorum* (Rupr.) comb. nov. *Athyrium cyclosorum* Rupr. Beitr. Pflanzenk. Russ. Reich. iii. 41 (1845).

¹, ², ³, etc. For notes see page 165.

TABLE I—continued.

NAMES OF PLANTS	GROUP I						Ia	II						III			
	Adir. Mts.	Green Mts.	White Mts.	Katahdin.	Lesser Mts., Me.	E. Coast, Me.	Tableland, Table-top.	N. Edge, Albert.	Smuggler's Notch.	Willoughby.	St. John R.	Restigouche R.	Gaspé Rivers.	Bic.	Gaspé Coast.	N. W. Edge, Table-top.	Tableland, Albert.
<i>Saxifraga caespitosa</i> L.																	
<i>Parnassia parviflora</i> DC.																	
<i>Kotzebuei</i> C. & S.																	
<i>Rubus arcticus</i> L.																	
<i>Chamaemorus</i> L.																	
<i>castoris</i> Fries																	
<i>triflorus</i> Richards.																	
<i>Potentilla nivea</i> L.																	
<i>Robbinsiana</i> Oakes																	
<i>tridentata</i> Ait.																	
<i>palustris</i> (L.) Scop.																	
<i>Sibbaldia procumbens</i> L.																	
<i>Geum Peckii</i> Pursh																	
<i>Dryas integrifolia</i> Vahl																	
<i>Drummondii</i> Richardson																	
<i>Astragalus alpinus</i> L.																	
<i>elegans</i> (Hook.) Britton																	
<i>Blakei</i> Eggleston																	
<i>frigidus</i> (L.) Gray, var. <i>americanus</i>																	
(Hook.) Watson																	
<i>Oxytropis campestris</i> (L.) DC.,																	
var. <i>johannensis</i> Fernald																	
<i>Hedysarum boreale</i> Nutt.																	
<i>Empetrum nigrum</i> L.																	
var. <i>andinum</i> DC.																	
<i>Rhamnus alnifolia</i> L'Her.																	
<i>Viola nephrophylla</i> Greene																	
<i>palustris</i> L.																	
<i>labradorica</i> Schrank *																	
<i>Shepherdia canadensis</i> (L.) Nutt.																	
<i>Elaeagnus argentea</i> Pursh																	
<i>Epilobium alpinum</i> L.																	
<i>anagallidifolium</i> Lam.																	
<i>Pyrola grandiflora</i> Radius																	
<i>Ledum groenlandicum</i> Oeder																	
<i>Rhododendron canadense</i> (L.) BSP.																	
<i>lapponicum</i> (L.) Wahl.																	
<i>Loiseleuria procumbens</i> (L.) Desv.																	

**V. labradorica* Schrank, not *V. conspersa* Reichenb. (*V. canina*, var. *Muhlenbergii* Gray).

TABLE I—continued.

NAMES OF PLANTS	GROUP I						Ia	II						III			
	Adir. Mts.	Green Mts.	White Mts.	Katahdin.	Lesser Mts., Me.	E. Coast, Me.	Tableland, Table-top.	N. Edge, Albert.	Smuggler's Notch.	Willoughby.	St. John R.	Restigouche R.	Gaspé Rivers.	Bic.	Gaspé Coast.	N. W. Edge, Table-top.	Tableland, Albert.
<i>Kalmia angustifolia</i> L.	+	+	+	+	+	+											+
<i>polifolia</i> Wang.	+	+	+	+	+	+											+
<i>Phyllodoce caerulea</i> (L.) Gren. & Godr.			+	+			+	+									+
<i>Cassiope hypnoides</i> (L.) D. Don	+		+	+			+	+									+
<i>Andromeda glaucophylla</i> Link			+	+	+	+	+	+									+
<i>Chamaedaphne calyculata</i> (L.) Moench	+			+	+	+	+										+
<i>Arctostaphylos Uva-ursi</i> (L.) Spreng.													+				+
<i>alpina</i> (L.) Spreng.			+	+	+		+	+									+
<i>Vaccinium uliginosum</i> L.	+	+	+	+	+	+	+	+									+
<i>caespitosum</i> Michx.	+	+	+	+	+		+	+		+							+
<i>ovalifolium</i> J. E. Smith							+	+									+
<i>canadense</i> Richards.	+	+	+	+	+	+	+	+									+
<i>pennsylvanicum</i> Lam.,																	
var. <i>angustifolium</i> (Ait.) Gray	+	+	+	+	+	+	+	+									+
<i>Vitis-Idaea</i> L., var. <i>minus</i> Lodd.		+	+	+	+	+	+	+									+
<i>Oxycoccus</i> L.	+	+	+	+	+	+	+	+									+
<i>Diapensia lapponica</i> L.	+	+	+	+	+		+	+									+
<i>Primula mistassinica</i> Michx.									+	+	+	+	+		+	+	
<i>farinosa</i> L., var. <i>macropoda</i> Fernald											+			+	+		
<i>Statice sibirica</i> (Turcz.) Ledeb.																	+
<i>Gentiana Amarella</i> L.,																	
var. <i>acuta</i> (Michx.) Herder								+		+	+		+	+			
<i>Menyanthes trifoliata</i> L.						+	+										
<i>Lappula deflexa</i> (Wahlenb.) Garcke															+		
<i>Veronica alpina</i> L., var. <i>unalaschensis</i> C. & S.			+	+			+	+									
<i>Castilleja pallida</i> (L.) Benth., var. <i>septentrionalis</i> (Lindl.) Gray		+	+	+			+	+	+	+	+	+	+	+	+	+	+
<i>Euphrasia borealis</i> Towns.																	
<i>latifolia</i> Pursh.										+		+			+		
<i>Oakesii</i> Wettstein			+	+													
<i>Williamsii</i> Robinson			+														
<i>Pedicularis flammea</i> L.																+	
<i>Rhinanthus oblongifolius</i> Fernald	+	+	+				+										
<i>Pinguicula vulgaris</i> L.								+			+	+		+	+		
<i>Galium kamschaticum</i> Steller	+	+	+	+			+	+									
<i>Viburnum pauciflorum</i> Pylaie		+	+	+	+		+	+		+		+	+	+			+
<i>Lonicera caerulea</i> L., var. <i>villosa</i> (Michx.) T. & G.	+		+	+	+	+	+	+									+
<i>Valeriana sylvatica</i> Banks *												+			+		
<i>Campanula uniflora</i> L.															+		

* *V. sylvatica* Banks, not *V. uliginosa* (T. & G.) Rydberg, which is the plant of Arbor Vitae swamps of New England, New York, and the Great Lake region.

- ¹ Summits, and shores of high ponds, Adirondack Mts., New York.
- ² Summits, and shores of high ponds, higher Green Mts. (Mansfield, Camel's Hump, etc.), Vermont.
- ³ Summit areas and ravines of the higher White Mts. (Washington, altitude 6300 feet—1922 meters,— Lafayette, etc.), and shores of high ponds in the White Mts., New Hampshire.
- ⁴ Mt. Katahdin, altitude 5270 feet (1623 meters), the highest point in Maine. For detailed account of flora see RHODORA, iii, 147–184 (1901).
- ⁵ Lesser mountains (Baldpate, Saddleback, Abraham, Bigelow, etc.), of western and central Maine. For account of flora of Mt. Abraham see C. H. Knowlton, RHODORA, i, 191–193 (1899); of Mt. Saddleback see C. H. Knowlton, RHODORA, V, 35–38 (1903).
- ⁶ Mt. Desert Island and adjacent islands and mainland coast, eastern Maine. See Rand & Redfield, Flora of Mt. Desert I., Me. (1894).
- ⁷ Tableland area of Table-top Mt., a high tableland, extreme altitude 4250 feet (1296 meters), extending 15 miles or more north and south, in the western part of Gaspé Co., Quebec. Separated on the west from the Shickshock Mts. by the River Ste. Anne des Monts.
- ⁸ Northern slopes and crests of Mt. Albert, a high tableland, extreme altitude 3900 feet (1195 meters), west of the River Ste. Anne des Monts, and forming the eastern end of the Shickshock Mt. range, in Gaspé Co., Quebec. For list of plants see John Macoun, Trans. Roy. Soc. Can. i, sec. 4, 127–136 (1883).
- ⁹ Smuggler's Notch, a narrow pass shut in by cliff-walls of Mt. Mansfield and Sterling Mt., in northern Vermont. For detailed accounts see C. G. Pringle, Am. Nat. x, 741–743 (1876); H. W. Preston, Am. Nat. xvi, 901–905 (1882); W. W. Eggleston, Bot. Gaz. xx, 72–75 (1895); A. J. Grout, Plant World, ii, 116–118 (1899) and Torrey, ii, 46–48 (1902).
- ¹⁰ Cliffs and slides on the southwest side of Willoughby Mt., Orleans Co., Vermont. For detailed account see G. G. Kennedy, RHODORA, vi, 93–134 (1904).
- ¹¹ Cliffs and ledges of the St. John River and its tributaries, northern Maine and New Brunswick.
- ¹² Cliffs and ledges of the Restigouche River, New Brunswick and Quebec. For account see G. U. Hay, Bull. Nat. Hist. Soc. N. B. xiv, 12–35 (1896).
- ¹³ Cliffs and ledges of Little Cascapedia, Bonaventure, Grand, Ste. Anne des Monts, and other rivers of Gaspé and Bonaventure Counties, Quebec. For account of the flora of River Ste. Anne des Monts see John Macoun, l. c.
- ¹⁴ Many cliffs and headlands (conglomerate) of Bic and adjoining towns, Rimouski Co., Quebec.
- ¹⁵ Sea-cliffs and mountains from Matane River to Cape Marsouin, and at other points on the northern coast of Gaspé Co., Quebec; also Percé, Gaspé Co., Quebec. See Macoun, l. c.
- ¹⁶ Narrow east and west abutments, northwest of the great tableland of Table-top Mt., Gaspé Co., Quebec. (See 7).
- ¹⁷ Tableland and exposed cañon-walls, Mt. Albert, Gaspé Co., Quebec. (See 8).

In the areas of the first group — the alpine districts of the Adirondacks of New York; the exposed summits of Mt. Mansfield and Camel's Hump in Vermont; the alpine regions of the White Mts. of New Hampshire; of Baldpate, Saddleback, Abraham, Bigelow, Katahdin, and many lesser mountains of Maine; and of the tableland-area of Table-top in Gaspé; as well as the cliff-coast of eastern Maine — we find a flora many elements of which are common to all these areas, the remaining species being absent for the most part from only one or two. Of the 258 alpine and subalpine plants under consideration 70 (27.1 *per cent.*) are confined exclusively to the areas indicated as Group I (including Ia); i. e., they are characteristic of the White Mts., Katahdin, or the tableland of Table-top, but are quite unknown from the cliffs of Willoughby or of Percé, or from the tableland of Mt. Albert. These 70 plants include such familiar species and varieties as

Hierochloe alpina.	Salix herbacea.
Calamagrostis Langsdorffii.	Arenaria groenlandica.
Deschampsia atropurpurea.	Rubus Chamaemorus.
Poa laxa.	Cassiope hypnoides.
Carex rariflora.	Arctostaphylos alpina.
“ saxatilis, var. miliaris.	Veronica alpina, var. unalaschcensis.
Salix phylicifolia.	Rhinanthus oblongifolius.
“ argyrocarpa.	Solidago Virgaurea, var. alpina.
“ Uva-ursi.	Prenanthes Boottii.

Of the distinctive plants of the second large group of alpine and subalpine areas — Smuggler's Notch; Willoughby Cliffs; certain sea-cliffs of Bic and of the north and east coasts of Gaspé; the cliffs of certain northwestern spurs of Table-top Mt., and various river-cliffs of northern Maine, New Brunswick and the interior of the Gaspé Peninsula — there is likewise a very long list, 94 (36.4 *per cent.* of the 258 alpine plants here considered) of which are not, so far as known, ever found associated with the plants which characterize Groups I and III; while 11 others (4.3 *per cent.*) characteristic of Group II are known outside the areas comprising this group only on the north side of Mt. Albert which has already been noted as an anomalous area, Group Ia. Among the most familiar plants of this large flora (Group II) are

Cryptogramma Stelleri.	Anemone multifida.
Asplenium viride.	“ parviflora.
Woodsia alpina.	Draba stylaris.
“ glabella.	Saxifraga oppositifolia.
Carex eburnea.	“ Aizoön.

Saxifraga aizoides.
 Parnassia Kotzebuei.
 Dryas integrifolia.
 " Drummondii.
 Astragalus elegans.
 " Blakei.
 Hedysarum boreale.

Shepherdia canadensis.
 Primula farinosa, var. macropoda.
 " mistassinica.
 Gentiana Amarella, var. acuta.
 Pinguicula vulgaris.
 Erigeron hyssopifolius.
 Artemisia canadensis.

Although only 27 of these 105 (94 + 11) species characteristic of Group II occur on Willoughby Cliffs and 23 of them on the cliffs of Smuggler's Notch, 102 of the 105 are found on the cliffs of eastern Quebec where they are the characteristic vegetation.

The great tableland and cañon-walls of Mt. Albert, although exposing many square miles of alpine region, have a comparatively meagre flora; but the few species which there abound are of the greatest interest to the eastern botanist, for with but few exceptions they are quite unknown upon any other mountains or cliffs in eastern North America. The plants which are strictly localized in the rock-crevices and on the talus-slopes of Mt. Albert make up, so far as yet determined, a flora of only 21 species (8.15 per cent. of the 258 alpine and subalpine plants) but this flora includes the very distinctive

Adiantum pedatum, var. aleuticum.	Arenaria ciliata, var. humifusa.
Cryptogramma densa.	" sajanensis.
Polystichum scopulinum.	" arctica.
Deschampsia caespitosa, var. alpina.	Statice sibirica.
Danthonia intermedia.	Solidago decumbens.
Festuca altaica.	Artemisia borealis.
Salix desertorum.	" " var. Wormskioldii.
" chlorolepis.	
Lychnis alpina.	Cirsium muticum, var. monticola.

The area indicated as Group Ia, the northern slopes and crests of Mt. Albert, while supporting many plants (26) otherwise confined to areas of Group I and several (11) otherwise known only from areas of Group II, has by itself a scarcely noteworthy flora, only 5 plants (1.9 per cent. of our alpine species). These plants — *Carex lagopina*, *Luzula spicata*, var. *tenella*, *Sagina saginoides*, *Ranunculus pygmaeus* and *R. Allenii* — are all technical species and varieties and it is not improbable that further exploration will show them to belong primarily to either Group I or II.

The plants referred to in the preceding paragraphs represent a considerable proportion of our alpine and subalpine species and strongly marked varieties which, when they grow upon exposed summits and slopes and cold cliffs, are confined very definitely to certain

isolated localities but are quite absent from many closely adjacent alpine and subalpine areas in which the conditions of exposure, extremes of temperature, and amount of precipitation are seemingly the same. Besides the three primary groups of plants which, south of the St. Lawrence, are confined each to a single mountain or to certain very definite mountains and cliffs, there are several secondary groups of alpine species which are found associated with the members of each of two of the primary groups but not the third; and a rather smaller group of species which show no apparent selection of alpine areas. That is to say, a few plants grow in equal abundance on Mt. Washington, Katahdin, or Table-top (Group I) and on the tableland of Mt. Albert (Group III); others occur on the tableland of Mt. Albert (Group III) and also on the cliffs of Smuggler's Notch, or of the lower St. Lawrence, or on the northwestern abutments of Table-top Mt. (Group II); while only a few species thrive in all these areas (Groups I, II, and III). These facts will perhaps be more clearly brought out by the following summary.

TABLE II.

SUMMARY OF THE KNOWN DISTRIBUTION SOUTH OF THE ST. LAWRENCE OF 258 ALPINE AND SUBALPINE PLANTS ABOVE ENUMERATED, SHOWING THE NUMBER OCCURRING IN THE VARIOUS GROUPS OF AREAS.

	Group.	Species.	Per cent.
Confined to a single group	I	65	25.2
	Ia	5	1.9
	II	94	36.4
	III	21	8.15
Occurring on two or more groups	I & II	12	4.65
	Ia & II	11	4.3
	I & III	32	12.4
	Ia & III	0	0
	II & III	4	1.55
	Ia, II & III	2	0.8
	I, Ia, II & III	12	4.65
		258	100.00

Of the species which abound on Mt. Washington, Katahdin, or Table-top (Group I) and on the tableland of Mt. Albert (Group III) as well, but are unknown on the coastal cliffs of Gaspé and in other areas with an essentially identical flora (Group II) there are 32 (12.4 *per cent.*), of which the following are noteworthy.

Lycopodium Selago, var. appressum.	Loiseleuria procumbens.
Carex canescens.	Kalmia angustifolia.
“ rigida, var. Bigelowii.	“ polifolia.
Juncus trifidus.	Phyllodoce caerulea.
Betula glandulosa.	Andromeda glaucophylla.
Silene acaulis.	Vaccinium uliginosum.
Rubus arcticus.	“ canadense.
Empetrum nigrum.	“ Vitis-Idaea, var. minus.
Ledum groenlandicum.	Diapensia lapponica.
Rhododendron lapponicum.	Prenanthes trifoliolata, var. nana.

Twelve other plants (4.6 *per cent.*) unknown from the tableland of Mt. Albert (Group III) are common to districts included in Groups I and II; 11 species (4.3 *per cent.*) are common to Groups Ia and II, but are unknown from Groups I and III; 4 (1.5 *per cent.*) are common to Groups II and III; and 2 only (0.8 *per cent.*), absent from areas of Group I proper, are known from Groups Ia, II and III.

Twelve species (4.65 *per cent.*) are common to all the areas. These noteworthy plants are all familiar species:

Larix laricina.	Luzula parviflora.
Picea mariana.	Rubus triflorus.
“ canadensis.	Potentilla tridentata.
Abies balsamea.	Castilleja pallida, var. septentrionalis.
Agrostis borealis.	Viburnum pauciflorum.
Carex brunnescens.	
“ scirpoidea.	

It is apparent from this analysis of our alpine floras that, of the 258 plants here enumerated, 185 species and varieties (65 + 5 + 94 + 21) or 71.65 *per cent.* are closely restricted in their occurrence south of the St. Lawrence each to only one of the groups of mountains, cliffs, and alpine areas above tabulated; 61 (12 + 11 + 32 + 4 + 2) or 23.7 *per cent.* are known from two of the primary groups but not the third; and only 12 or 4.65 *per cent.* are found on all three groups of mountains and cliffs. Obviously, with less than 5 *per cent.* of our alpine and subalpine plants showing an inclination to grow upon all our mountain areas, but with more than 95 *per cent.* of the species showing a decided preference either for one group of alpine areas or for two of the groups

but not the third, there is to be found in the characteristics of these areas some influence or group of influences which is of fundamental importance in the distribution of plants.

If we seek in the precipitation and exposure of such districts as the tableland of Table-top Mt. (Group I), the northwestern escarpments of Table-top (Group II), and the tableland of Mt. Albert (Group III), an explanation of the very dissimilar floras of these areas we shall find that, as we should expect, these closely adjacent slopes and summits (the northwestern escarpments and the western edge of Table-top only about ten miles east of the tableland of Albert) have no apparent difference in the amount of precipitation. Nor is the exposure of these cloud-enshrouded districts a significant factor. The flat tableland of Mt. Albert, for instance, and its cañon-valleys with walls facing north, south, east, and west support an essentially uniform flora; similarly, upon Table-top a uniform flora is found upon north, south, east, and west exposures as well as upon the level portions of the tableland. Precipitation and exposure are, then, of only minor importance in determining the localized distribution of our alpine plants.

In attempting to account for the peculiarities of plant distribution much stress has been laid of late upon the degree of fineness or coarseness of soils, and their water-content. But to those intimate with the occurrence of our alpine plants these factors, again, seem of secondary importance. For instance, *Cystopteris montana* on Mt. Albert grows in equal abundance on the firm and steep amphibolite cliffs and in the deep, fine and saturated alluvium of mountain streams. *Selaginella selaginoides*, abundant in the wet mossy bogs of Bonaventure and Gaspé Counties, Quebec, is quite as much at home in the well-drained alpine meadows or in the crevices of either wet or dry rocks, in the latter situation merely becoming stiffer and more stocky than in deep shade or moisture. *Zygadenus chloranthus* is apparently indifferent whether it is in the crevices of sun-baked rock, on cold cliffs, in river-alluvium or in wet bogs. Similarly, many other members of the flora characteristic of the areas classed as Group II grow in wet or dry, fine or coarse soils.

The distinctive plants of Groups I and III, likewise, show a remarkable indifference to the coarseness or fineness, the dryness or saturation of their supporting soils. *Empetrum nigrum*, *Ledum groenlandicum*, *Vaccinium Vitis-Idaea*, var. *minus*, and *Prenanthes trifoliolata*,

var. *nana*, for example, seem equally at home in crevices of sun-baked or spray-showered rock, on sandy plains, in well-drained alpine meadows, and in saturated sphagnum bogs. With our alpine plants so ubiquitous, then, in their occurrence, upon saturated, well-drained, or dry soils, and with an apparent ability to thrive equally well in fine river alluvium or in the crevices of a scarcely altered ledge or cliff, we are hardly justified in depending upon these factors to explain the distribution indicated in the preceding tabulation.

When, on the other hand, we examine the lithological character of the regions in which these plants occur we find a very striking coincidence between the soil-forming rocks of these mountains and cliffs and the distribution of the plants which cover them.

In the first group of alpine areas specially indicated — the great mass of the White Mountains of New Hampshire; the Adirondack Mountains of New York; the highest summits of the Green Mountains of Vermont; Baldpate, Saddleback, Abraham, Bigelow, Katahdin, and nearly all the other naked-topped mountains of Maine; the great tableland of Table-top Mountain in Gaspé; and Mt. Desert Island and other parts of the exposed eastern coast of Maine — the predominant and often the exclusive rocks are granite or gneiss (both containing much orthoclase or potash-feldspar, and generally muscovite or potash-mica) or mica (muscovite)-schist,¹ often in close proximity, and all especially high in potassium. The distinctive soil element of the alpine areas constituting Group I is, then, potassium; and on these mountains and cliffs peculiarly rich in potassic constituents we find 122 of the plants here discussed, nearly two-thirds of which in their alpine distribution are quite unknown on the mountains of Groups II and III.

When, however, we examine the second large group of alpine and subalpine areas we shall find that their characteristic rocks differ from those of the first group — the mountains characterized by granite, gneiss, and mica-schist, rocks which furnished a strongly potassic soil — in one constant point. The cliffs of Percé,² of the

¹ For valuable assistance in the determination of several characteristic rock-specimens from eastern Quebec the writer is under special obligations to Professor J. E. Wolff and his student, Mr. H. N. Eaton. Upon these determinations and the detailed reports of members of the Geological Survey of Canada the writer has chiefly depended for the lithological data in this article. He is also indebted for suggestions upon the soil constituents of many rocks to Mr. H. H. Bartlett of the Gray Herbarium.

² For details of the mountains and cliffs of Percé see J. M. Clarke, N. Y. State Mus., Rep. lvii, 1. pt. 1 (Bull. 80), 133–171 (1905).

north coast of the Gaspé Peninsula,¹ and of Bic² are chiefly limestones, calcareous sandstones, limestone-conglomerates, and calcareous slates; the northwestern escarpments of Table-top Mt., where *Salix vestita* and *S. glauca*, *Saxifraga oppositifolia*, *S. Aizoon* and *S. aizoides*, and *Primula mistassinica* abound, are limestones;³ the river-cliffs and ledges of many streams of eastern Quebec, northern New Brunswick and Maine, characterized by *Cryptogramma Stelleri*, *Asplenium viride*, *Woodsia alpina* and *W. glabella*, *Carex eburnea*, *Tofieldia glutinosa*, *Astragalus elegans*, *Hedysarum boreale*, *Shepherdia canadensis*, *Primula mistassinica*, *Pinguicula vulgaris*, *Erigeron hyssoifolius*, etc., are chiefly limestones and limy slates (Silurian),⁴ or frequently some other rock penetrated by veins of calcite; the famous cliffs at Willoughby where the most notable plants occur are of impure limestone;⁵ and the great cliffs of Smuggler's Notch, unknown personally to the writer, are said by those who are familiar with them to show

¹ "On the south side of the St. Lawrence, in the counties of Gaspé and Rimouski, the rocks of the Quebec group are unconformably overlaid by a series of calcareous strata, which we have been accustomed to call the Gaspé limestones."—Logan, *Geology of Canada*, 390 (1863). For further details see Logan, l. c. 390–453; also Ells, *Geol. Surv. Can., Rep. of Progress for 1880–81 and –82, part D D* (1883).

² "In the vicinity of Bic Harbour there is a great display of the limestone conglomerates and the associated calcareous sandstones of groups B [Lower Silurian conglomerate limestones], and it is to the resistance which they have offered to the destroying agencies that have worn away the other rocks of the coast, that the formation of Bic Harbour is due. . . . In the limestone conglomerates the masses inclosed are sometimes very large; a boulder of dark gray limestone inclosed in one of the bands at Metis was measured and computed to weigh twelve tons; another in another part of probably the same band measured eleven feet long by six feet broad, and was supposed to weigh upward of twenty-five tons."—Richardson, *Geol. Surv. Can., Rep. of Progr. for 1858*, pp. 149, 150 (1859). Mr. H. N. Eaton's microscopical examination of rock-samples collected by the writer from two of the Bic headlands showed the limestone and other pebbles and boulders to be held together by a calcareous cement.

³ "Along the east and west flanks of Table-top Mountain, beds of dark-grey limestone are seen which upon careful examination showed no trace of fossils, but which, on account of their resemblance to the Levis limestones of the coast, described in former reports, and their position in relation to these rocks, are thought to be of the same age [Cambrian].

They appear to have been lifted up by the great granite mass which forms the main portion of Table-top Mountain, and for some distance from their contact with this mass, they show signs of alteration, being more or less changed to a dark-grey marble. The country occupied by these rocks is very mountainous. The ridges run east and west, seemingly along the general strike of the rocks, and are cut by numerous brooks on both sides of the water-shed, distant about six miles from the coast, and between it and the Ste. Anne River.

The mountains have rounded outlines, and are well wooded, although in the vicinity of Table-top they rise to a height of three thousand feet above the sea level, the general height being about fifteen hundred feet."—Low, *Geol. Surv. Can., Rep. for 1882–83–84, pt. F. 15* (1884).

⁴ See Logan, *Geol. of Canada* (1863); J. W. Dawson, *Acadian Geol.* (1878); etc.

⁵ See Kennedy, *RHODORA*, vi. 94, 95 (1904).

distinct incrustations of lime, especially in the sheltered pockets which are the hiding-places of *Cryptogramma Stelleri*. The soils of the second primary group of alpine areas are, then, distinctly calcareous; and on the calcareous mountains and cliffs we find 135 of the species here under consideration,¹ 94 of which are apparently unknown upon the little-calcareous but strongly potassic rocks (Group I) and upon the tableland area of Mt. Albert which constitutes Group III.

This third primary division of our alpine districts, the tableland of Mt. Albert, has long been distinguished among the mountains of Gaspé as an extensive area of serpentine, a soft rock which is essentially a hydrated magnesium silicate. The analysis of typical serpentine as given by Dana is "silica 43.48, magnesia 43.48, water 13.04 = 100,"² though extensive areas of massive serpentine do not reach this standard of purity. The distinctive soil-element, then, in the third primary division of our alpine areas is magnesium. Now, the presence in a soil of so large an amount of magnesian compounds and the absence of appreciable amounts of potassium and calcium produce conditions exceedingly unfavorable to the majority of plants; and the vast serpentine area of Mt. Albert appears to the unbotanical visitor essentially destitute of vegetation. This impression of the area was well described by Dr. A. P. Low, the discriminating Director of the Geological Survey of Canada, who in the summer of 1883 spent some weeks in a study of the geology of the Shickshock Mts. and of Table-top Mt. Mr. Low says: "The top of Mt. Albert is nearly flat, and is rent by a deep gorge on the east side, which, near its head, splits into several smaller ones. The sides of these gorges are quite destitute of vegetation and the bare serpentine rocks are weathered to a light buff color. On the top of the mountain blocks of serpentine are scattered around, and are partially covered by a thick growth of mosses [chiefly *Racomitrium lanuginosum*] and lichens. Sheltered places are occupied by a stunted growth of black spruce (*Abies nigra*), which rarely attains a height of ten feet. The branches interlace near the ground and form an impenetrable thicket. The whole surface has a dead appearance, and reminds one of the pictures of the moon."³

This vivid impression of the serpentine area of Mt. Albert is gained

¹ In Europe many species have been pointed out as confined primarily to calcareous soils. For a bibliography on this subject see Schimper, *Pflanzen-Geogr.* 129, 130 (1898).

² Dana, *Man. Geol.*, ed. 4, 68 (1895).

³ Low, *Geol. Surv. Can., Rep. for 1882-83-84*, pt. F. 7, 8 (1884).

by all who visit it, yet upon its seemingly naked slopes, in the crevices of the rock, and among the decomposing boulders, many plants are spread which in the first grand view of the region make little appeal to the eye. As already seen, 21 alpine plants are, so far as known, found south of the St. Lawrence only on the serpentine of Mt. Albert. Other species whose identity is still in doubt carry the number of these distinctive plants well toward forty. Several species also (32), unknown upon the strongly calcareous cliffs and mountains, but abounding on the slopes characterized by potassic rocks — *Betula glandulosa*, *Empetrum nigrum*, *Rhododendron lapponicum*, *Vaccinium uliginosum*, etc.— are equally abundant on the serpentine; 6 others,— *Selaginella selaginoides*, *Cerastium arvense*, *Arenaria verna*, var. *propinqua*, etc.,— are common to the limy rocks and the serpentine; and 12 species are found growing in many stations upon all three groups of mountains. It is, however, important to note that, while the coniferous trees occur as luxuriant forest upon the north slope of Mt. Albert nearly to the summit, reaching an altitude of 3300 feet (1000 meters), and form extensive forests on the high tableland at 3500 to 4000 feet (1050 to 1215 meters) of Table-top Mt.; they are on the serpentine of Mt. Albert only as scattered and uncharacteristic dwarf trees and shrubs, and no forest of appreciable character is seen in the area above the level of Ruisseau à la Neige at an altitude of about 1900 feet (570 meters), where the forest consists of meagre and valueless Bog Spruce (*Picea mariana*). In its meagre appearance the Bog Spruce on the serpentine of Mt. Albert is paralleled by *Rhododendron lapponicum*, *Vaccinium uliginosum*, *Ledum groenlandicum*, and other species, which, having their great development on potassic rocks, are on the serpentine of Mt. Albert very dwarfed and of a starved aspect. The more distinctive plants of the mountain, however,— *Adiantum pedatum*, var. *aleuticum*, *Polystichum scopulinum*, *Festuca altaica*, *Lychnis alpina*, *Arenaria arctica*, *Statice sibirica*, *Artemisia borealis*, etc.— are, especially in damp hollows or along water-courses, luxuriant to a surprising degree; the stipes of the *Adiantum* often exceeding a foot in length, the fronds of the *Polystichum* eighteen inches long, the handsome clumps of *Festuca* with culms two to three feet high, and *Artemisia borealis*, ordinarily only a few inches high, attaining in its var. *Wormskioldii* a height of twelve or fifteen inches, with wand-like inflorescences eight inches in length. From these observations it is concluded that, of the large group of plants which abound upon the

potassic rocks, a few are able to grow, under protest as it were, upon the strongly magnesian soil of Mt. Albert; but that another group of plants, unknown upon our granitic, gneissic, and schistose mountains or on the strongly calcareous mountains and cliffs, are not only restricted to the strongly magnesian rocks, but there attain a normal and often a luxuriant development.¹

It will be remembered that on the northern edge of Mt. Albert (Group Ia) two groups of plants are found; some species ordinarily confined to the potassic rocks (feldspathic or micaceous), others generally known only from the strongly calcareous soils. Different sections of the northern and eastern slopes of the mountain examined by Mr. Low showed the rock of the upper or subalpine and alpine district to be chiefly hornblende-schist and amphibolite, with occasional large areas of impure limestone, chloritic slates and schists; and gneiss, made up chiefly of orthoclase (potash-feldspar) and hornblende;² and as indicated by rock-specimens kindly examined microscopically

¹ It is interesting, in view of the great abundance on the serpentine of Mt. Albert of *Cerastium arvense*, to note that in 1887 Drs. Hollick and Britton called attention to the fact that on Staten Island *C. arvense*, var. *oblongifolium* "grows abundantly at many places on the serpentine hills, and in no other parts of the Island"; and that an analysis of the ash of the Staten Island plant showed it to contain

"Silica (SiO ₂)	39.85
Alumina and Oxide of Iron (Al ₂ O ₃ and Fe ₂ O ₃)	18.58
Lime (CaO)	9.35
Magnesia (MgO)	19.79"

See Hollick & Britton, Bull. Torr. Cl. xiv. 45-50 (1887).

This is a remarkable amount of magnesia to be present in a plant, the average plants of mixed soils deriving from the soil much less magnesia (See Dana, Man. ed. 4, 74).

As a rock plant, *Cerastium arvense* is rare in Maine, only one station, on the rocks between Cape Cottage and the light-house at Cape Elizabeth, being known personally to the writer; and, according to Hitchcock "Cape Elizabeth is largely composed of talcose schist [hydrous silicate of magnesium]"—C. H. Hitchcock, Agr. and Geol. Me., Ser. 2, 1861, p. 162 (1861). It will be noticed that in the tables of distribution *Cerastium arvense* is entered in Group I only from the eastern coast of Maine. The stations are few, the Duck Islands, etc., and it is not improbable that the plant is there on magnesian soil, for Hitchcock records talcose schist and serpentine as largely present along the coast of Penobscot Bay and on some of the neighboring islands. (Hitchcock, l. c., 162-163).

Several other plants of low altitudes have been recorded as occurring primarily on magnesian soils, but as yet such data in regard to North American plants is unfortunately rare.

In Europe, two much-discussed ferns, *Asplenium adulterinum* Milde and *A. Adiantum nigrum*, subsp. *serpentini* (Tausch) Heufler, are clearly demonstrated to grow only on serpentine, and on that rock to take the places respectively of *A. viride*, which prefers calcareous rocks, and *A. Adiantum nigrum* (typical), which is commonly on silicious soils.—For discussion see Luerssen, Farnpfl. 165-184, 275-281 (1889), also Schimper, Pflanzen-Geogr. 103, 104 (1898).

² Low, Geol. Surv. Can., Rep. for 1882-83-84, pt. F. 17, 18 (1884).

for the writer by Mr. H. N. Eaton, the amphibolite of the northern slope shows, besides hornblende and talc (a silicate of magnesium), calcite (carbonate of lime) and a lime-soda feldspar.¹ In the soil of this slope, then, potassium and calcium are found in such proportion, apparently, as to account for the presence of a few species each of the plants (24 of the potassic rocks, 11 of the calcareous) which ordinarily are found only on soils high in one or the other of these two elements.

But the chief interest of the north slope of Mt. Albert is in the fact that by far the most abundant mineral in the rocks is hornblende, which has as its principal constituents silica, magnesia, protoxide of iron, and lime.² Yet, so far as observed, none of the distinctive plants of the serpentine (magnesian) area of Mt. Albert extend across to the hornblende (also magnesian) area. This is obviously due to the hardness and slow decomposition of the hornblende as opposed to the softness and rapid decomposition of the serpentine, but detailed chemical analyses of the soils and plant-ashes, now under way, by Mr. H. H. Bartlett, will, when completed, furnish more satisfactory conclusions as to the exact conditions. Similarly, many questions somewhat outside the intended scope of the present preliminary paper have presented themselves for solution, but before they can be appropriately discussed they must await more detailed field-study and the completion of many chemical analyses.

The foregoing discussion, however, of the relation of our alpine plants to the chief soil-constituents of the rocks upon which they grow, establishes very conclusively the fact that the alpine plants are much more dependent upon the chemical constituents of the soil than has been generally supposed.

¹ Mr. Eaton's analysis of this rock from the north crest of Mt. Albert is as follows:

"A heavy, black schistose rock containing hornblende and feldspar.

In thin section — a holocrystalline rock, composed of hornblende, plagioclase, and talc.

The hornblende constitutes the great bulk of the rock. It is very pleochoric — light yellow, grass green, and greenish blue. Some crystals are idiomorphic, while others are eaten into and show intergrowths with feldspar and calcite.

Feldspar is relatively abundant in allotriomorphic prisms. It is wholly plagioclase. Twinning according to both the carlsbad and albite laws is common. The albite striations make angles of 9, 19, and 36 degrees respectively on three crystals which were tested; proving the species to have a range between a mixture of oligoclase and andesine, through andesine, to basic labradorite.

Talc occurs abundantly in irregular masses between the hornblende crystals, and seems to be a product of hornblende decomposition.

The rock is an amphibolite."

² Dana, *Man. Geol.* ed. 4, 67 (1894).

Unfortunately, the data accompanying herbarium-specimens rarely indicates anything of the soil-characters of the habitats of plants; and, besides, these facts are not easily gained from extensive geological maps. Yet, if we examine the sheets issued by the Geological Survey of Canada, we shall find that in their range outside the areas specially under consideration the plants which we have been discussing show a selection of soils similar to that already pointed out. A few illustrations will make this point more clear.

Empetrum nigrum, the Crow-berry or Curlew-berry, it will be remembered, is one of the commonest plants of the granitic, gneissic, and schistose mountains and coastal rocks of northern New England, New York, and eastern Canada. Outside of this area it abounds on the eastern coast of Newfoundland, throughout the Labrador Peninsula, in Baffin Land and Greenland, and more or less across the Arctic; "along the north shore of Lake Superior, and at Port Arthur. . . . Thence it takes a northwesterly direction and is found in peat bogs, on exposed rocks along lake shores, and on barren grounds to the Pacific Ocean and Arctic Sea."¹ From the Arctic it extends southward along the Coast Range to the region of Sitka; it is on the mountains of southern British Columbia, and very locally at isolated alpine or coastal stations southward. Many other characteristic plants of the eastern potassic rocks — *Loiseleuria procumbens*, *Vaccinium uliginosum*, *V. Vitis-Idaea*, var. *minus*, *Rubus Chamaemorus*, etc.— follow essentially this distribution and are unknown or of the greatest rarity along the Rocky Mountains. Others, however, such as *Sibbaldia procumbens*, are on the highest peaks of the Rocky Mountain system as well. Another group of these species is well represented by *Vaccinium ovalifolium* which, common on the potassic rocks of Gaspé, is unknown in the Arctic regions and the Rocky Mountains; but occurs from the Aleutian Islands to the mountains of Oregon, also in northern Michigan and in Newfoundland and southern Labrador. Still another group, represented by *Arenaria groenlandica*, is confined to Greenland, Labrador, the north shore of the St. Lawrence, the summit of Table-top, the coast of Nova Scotia near Halifax, the coast of Maine from the Mt. Desert region to the mouth of the Kennebec, the mountain-summits of northern New England and New York, a bleak granite slope below Middletown, Connecticut, and a few iso-

¹ Macoun, Cat. Can. Pl. i. 458 (1886)

lated summits to the highest peaks of the Carolinas. Various minor modifications of these ranges might be given, but these are sufficient to indicate the general distribution of these plants which in New England, New York, and eastern Canada are confined to granite, gneiss, and mica-schist.

Now, if we examine the lithological character of these areas in which *Empetrum nigrum*, *Sibbaldia procumbens*, *Vaccinium ovalifolium*, and *Arenaria groenlandica* abound, we shall find that these plants are commonly on potassic rocks. Thus, as shown by a geological map of Canada, the ancient Archaean area occupies nearly the whole district from Labrador to Lake Superior and the Lake of the Woods, its western boundary thence swinging northwestward to Lake Winnipeg, westward and northward to Lake Athabasca, Great Slave Lake, and then north to the Arctic.¹ This great area is primarily of gneiss, granites and mica-schist, rocks, it will be remembered, which are markedly potassic; and the area of its great development, it will be noted, is strikingly coincident with the general range assigned by Professor Macoun to *Empetrum nigrum*, a plant which in Labrador is reported by Low as "abundant throughout the semi-barren and barren regions of the peninsula, growing freely on the coast and inland,"² and by Delabarre as "the most abundant phenogamous plant of Labrador."³ *Empetrum*, it will be remembered, extends along the Coast Range from the Arctic to the region of Sitka, and locally southward. It is also on the mountains of southern British Columbia, but absent from the general Rocky Mountain area. When we again examine the geological map of Canada, we find that the entire Coast Range is designated as "Coast Granite," and that most of the southern part of British Columbia (immediately north of Washington) is granitic. Similarly, in the Rocky Mountains, where *Sibbaldia procumbens* and some other plants of these potassic rocks occur, the Archaean rocks form the "backbone" of the mountains; and in northern Michigan, where *Vaccinium ovalifolium* is found, and along the crests of the Alleghanies, where *Arenaria groenlandica* occurs, we have isolated southern extensions of the great Archaean axis which is best developed from Labrador to Lake Superior and northwestward.⁴

¹ The boundaries of this Archaean V-shaped mass are very distinctly shown in Dana's Manual, ed. 4, fig. 494. Note there also the isolated areas of Archaean.

² Low, Geol. Surv. Can., Ann. Rep. n. s., viii. pt. L. 40 (1896).

³ Delabarre, Bull. Geogr. Soc. Phil. iii. 190 (1902).

⁴ See Dana, l. c.

Furthermore, in the Maritime Provinces of Canada in which we know only a single station for *Arenaria groenlandica* (on rocks near Halifax), granite is of only occasional occurrence; in fact it is quite unknown on the coast between Nova Scotia and the north shore of the St. Lawrence. In Nova Scotia, however, there are some isolated granitic areas, one of the largest extending from Halifax Harbor to Margaret's Bay,¹ the only coastal station for *Arenaria groenlandica* in Canada south of the St. Lawrence. Likewise, at the only station in Connecticut for *Arenaria groenlandica*, the plant is said by its discoverer to grow "on bleak granite rocks below the city [Middletown]."²

When, however, we examine the broad range of plants which in New England and eastern Canada are confined to strongly calcareous rocks, we find that they have a distribution quite different in some details from those just examined. The range of *Dryas Drummondii*—on the limy rocks and gravels of the Gaspé Peninsula, on Anticosti, and generally along the rivers of the Canadian Rockies—has been noted. Many other plants show a similar range. Now, as indicated on the recent geological map of western Canada, the general area occupied by the Canadian Rocky Mountains is called Palaeozoic, a general classification to cover much of the area indicated on a previous map merely as "limestone"; and in his Journal of a Boat Voyage through Rupert's Land and the Arctic Sea, Sir John Richardson mentions *Dryas Drummondii*, *Hedysarum boreale*, *Elaeagnus argentea*, *Shepherdia canadensis*, and several other plants of our calcareous cliffs and gravels as abounding on the limestones of the Mackenzie River.³ Other plants of our limestone mountains and cliffs occur at somewhat scattered stations in Newfoundland, Labrador, and Arctic America; and a few of the plants, which south of the St. Lawrence are confined to the magnesian soils of Mt. Albert, are also known at isolated points from Newfoundland northward.

In order to test, so far as it is possible to do so without more accurate

¹ See Geological map of Nova Scotia, New Brunswick and Prince Edward Island, by J. W. Dawson, in *Acadian Geology* (1878).

² H. L. Osborn in letter to Asa Gray, May 17, 1878.

³ "The dogwood, silvery opulaster (*Elaeagnus argentea*), *Shepherdia*, and *Amelanchier* grow on banks that in Europe would be covered with gorse and broom, and the southern *Salix candida* is replaced by the more luxuriant and much handsomer *Salix speciosa*, which is the prince of the willow family. The *Hedysarum Mackenzii* and *boreale* flower freely among the boulders that cover the clayey beaches; while the showy yellow flowers and handsome foliage of the *Dryas Drummondii* cover the limestone debris."—Richardson, *Arct. Searching Exped.* 123 (1852).

data than exists upon herbarium-labels, the conclusions above reached, the writer has listed all the stations known to him, either from specimens or authentic reports, in arctic and subarctic British America, for fifteen of the more typical plants of the alpine districts of New England, New York and eastern Canada. In this work he has been greatly assisted by the map of Arctic British America and the accompanying notes published by Dr. G. M. Dawson.* In order to make the test more valuable the fifteen plants whose ranges were thus studied were selected equally from those of the three groups above tabulated. All together 55 stations or definite regions for these fifteen plants have been found. Of these, 7 are either not indicated on available maps or are too vaguely stated on the labels to be of service. The remaining 48 stations are listed in the following tabulation, and in each case the rock of the region, which could furnish the soil-elements for which the plants show distinct preferences in New York, New England, and eastern Canada, is noted.

TABLE III.

SHOWING THE KNOWN STATIONS OR REGIONS, FROM NEWFOUNDLAND TO ARCTIC BRITISH AMERICA, FOR 15 ALPINE PLANTS OF NEW YORK, NEW ENGLAND AND EASTERN CANADA.

GROUP I (Plants which, south of the St. Lawrence, are controlled in their Distribution by a Preponderance of Potassium in the Soil.)	Eriophorum callitrix	Carex rariflora	Arenaria groenlandica	Rubus Chamaemorus	Empetrum nigrum
Stations, and Rocks of the Region from which Potassic Soils could be derived.					
Cape Ray and Channel to White Bay, Newfoundland (Archaean ¹)				+	+
Despair Bay to Fogo Island, etc., Newfoundland (Archaean ¹)	+		+	+	+
Southeastern Newfoundland (Archaean ¹)	+			+	+
Baie Ste. Claire, Pointe-Ouest, etc., Anticosti (granite, gneiss ²)	+			+	+
North shore of St. Lawrence from Cap à l'Aigle to Bradore Bay, Quebec (granite, gneiss ³)	+	+	+	+	+
Red Bay, Labrador (gneiss ⁴)	+				+
Sandwich Bay, Labrador (syenite ⁵)			+		
St. Lewis Inlet, Labrador (syenite, gneiss ⁶)		+		+	

* Geol. and Nat. Hist. Surv. Can., Ann. Rep. n. s., ii. pt. R (1887).

TABLE III —continued.

GROUP I (Plants which, south of the St. Lawrence, are controlled in their Distribution by a Preponderance of Potassium in the Soil.)	Stations, and Rocks of the Region from which Potassic Soils could be derived.	Eriophorum callitrix	Carex rariflora	Arenaria groenlandica	Rubus Chamaemorus	Empetrum nigrum
	Seal Island, Labrador (gneiss ⁷)					+
	Webeck Harbor, Labrador (gneiss, syenite ⁸)		+			
	Hopedale, Labrador (gneiss, granite ⁹)	+	+	+	+	+
	Paul's Island, Labrador (gneiss ¹⁰)	+		+		+
	Nain, Labrador (gneiss ¹¹)	+	+		+	+
	Hebron, Labrador (gneiss ¹²)	+			+	
	Ungava Bay, Cape Chudleigh, Labrador (gneiss ¹³)	+	+		+	
	Cumberland Sound, Baffin Land (gneiss, granite ¹⁴)	+				
	Nottingham Island, Hudson Strait (gneiss, syenite ¹⁵)	+			+	+
	Cape Prince of Wales and Ashe's Inlet, or North Bluff, Hudson Strait (gneiss ¹⁶)					+
	Richmond Gulf, Ungava (feldspathic argillite, gneiss, etc. ¹⁷)	+				
	Great Whale River, Ungava (gneiss ¹⁸)	+				
	Lake Mistassini, North East Territory (gneiss ¹⁹)	+	+			
	Fort Churchill, Hudson Bay (feldspathic arkose, etc. ²⁰)				+	+
	Chesterfield Inlet, Hudson Bay (granite, gneiss ²¹)				+	+
	Great Bear Lake, Mackenzie (granite, gneiss ²²)		+			
	Fort Resolution, Great Slave Lake, Mackenzie (granite ²³)				+	
	Athabasca Plains, Athabasca (granite and gneiss ²⁴)				+	+

¹ Dana indicates a "central Newfoundland range" of Archaean, and "two other ranges farther east," the only one shown on his map running from Despair Bay north-eastward to Fogo Island region. On Logan's map in the Atlas accompanying the Geology of Canada (1863) the southeastern district of Newfoundland is also indicated as chiefly Archaean.

² "Cette soi-disant forêt sur laquelle on marche . . . se trouve en quelques endroits de la côte, comme à la Pointe-Ouest, par exemple. Là, la végétation se présente, en effet, sous l'aspect d'un tapis serré de plantes basses (*Arctostaphylos Uva-Ursi*, *Vaccinium Vitis-Idaea*, *Vaccinium pennsylvanicum*, *Ribes oxycanthoides*, *Empetrum nigrum*, etc.), formé en outre de tous petits sapins et d'épicéas tourmentés. . . Cette plateforme nous montre ici une succession de lits minces de calcaires argileux le plus souvent peu fossilifères. Notre promenade ayant lieu pendant la basse mer, nous rencontrons des blocs erratiques, parfois nombreux et groupés dans de petites anses, parfois isolés, çà et là, et sur lesquels nous reviendrons à propos de la période quaternaire. Presque tous ces blocs sont formé de roches cristallines (granit, gneiss, anorthosite, etc.)"—Schmitt, Monographie de l' Ile d' Anticosti, 11, 70 (1904).

³ "With the exception of a narrow border of Silurian strata on the Strait of Belle Isle, another at the mouth of the Mingan River, and a third near the Seven Islands, with the addition of two narrow Silurian strips running a few miles up the Murray River and the Gouffre, the north shore of the St. Lawrence is the southern boundary of this ancient series of deposits [Laurentian, chiefly granites and gneisses] from Labrador to Cape Tourmente"—Logan, Geol. Can. 47 (1863).

⁴ "Looking up through the bays and harbors we can see the low conical hills of Laurentian gneiss"—Packard, Lab. Coast, 281 (1891).

⁵ "The Laurentian rocks [at Sandwich Bay] rise into high, rugged, and broken syenitic hummocks."— Packard, l. c. 281 (1891).

⁶ "We pass St. Lewis Bay . . . with its north shore evidently syenitic . . . the headlands of syenite probably extend out from the gneiss mainland."— Packard, l. c. 137 (1891).

⁷ "At Seal Island the 'Domino gneiss' of Lieber appears, protected seaward by high islands intermixed with low gneiss 'skiers'."— Packard, l. c. 158 (1901).

⁸ "Cape Webuc or Harrison, which is a lofty gneiss headland, faced with syenite."— Packard, l. c. 181 (1901).

⁹ "The island on which Hopedale is situated is of the ordinary Laurentian gneiss which behind the mission house is curiously contorted; it is fine-grained, distinctly banded, with veins of quartz and of granite."— Packard, l. c. 206 (1901).

¹⁰ "On going ashore at Ford's Harbour [Paul's Island], I found the gneiss to consist of common reddish and greyish varieties."— Bell, Geol. and Nat. Hist. Surv. Can., Rep. of Progr. for 1882-83-84, p. 11 DD (1884).

¹¹ "The rock here [Nain] consists of a rather light grey gneiss."— Bell, l. c. 12 DD.

¹² "At this mission station [Hebron], the rocks were examined and found to be common biotite gneiss and amphibolites, intersected by trap dykes."— Daly, Bull. Mus. Comp. Zool., Harvard, Geol. Ser. V. no. 5, 216 (1902).

¹³ "The rock everywhere [Ungava Bay at Port Burwell] consists of ordinary varieties of gneiss."— Bell, l. c. 18 DD (1901).

¹⁴ "Dr. Boas describes the nucleus of the mountain masses [Baffin Land] as everywhere gneiss and granite."— G. M. Dawson, Geol. Surv. Can., Ann. Rep. n. s. ii. 40 R (1887).

¹⁵ "I explored the country [Nottingham Island] to a distance of about three miles in various directions from our anchorage, and found the rocks to consist of common varieties of gneiss, the only exception noticed being patches of a fine-grained red syenite on both sides of the inlet." — Bell, l. c. 28 DD (1901).

¹⁶ "The rocks on the west side of Ashe's Inlet consist of dark grey gneiss, composed principally of quartz and felspar in even beds . . . The rocks in the vicinity of the bay [Stupart's Bay, Prince of Wales Sound] were found to consist entirely of Laurentian gneiss."— Bell, l. c. 21, 25, DD (1901).

¹⁷ "It [Richmond Gulf] is surrounded by high hills. On the west, sharp cliffs, formed by the broken faces of the Manitonick rocks [felspathic argillites], which dip toward the sea, rise in places twelve hundred feet above the water. The south and east sides are bounded by lower rounded hills of Laurentian and Huronian rocks."— Low, Geol. Surv. Can., Ann. Rep. n. s., iii. 55 J (1888).

¹⁸ "At the fifteen foot chute [Great Whale River] the rock is similar to the last, and from here to the mouth of the river all the exposures examined were made up of red and grey hornblende orthoclase gneiss, the red predominating."— Low, l. c. 54 J (1888).

¹⁹ "The greater part of the shore-line here [west side of Lake Mistassini] being formed of gneiss, perpendicular faces are wanting."— Low, l. c. viii. 68 L (1896).

²⁰ "The rock [at Port Churchill] is a greenish-gray even-grained, false-bedded, felspathic arkose sandstone."— Tyrrell, Geol. Surv. Can., Ann. Rep. n. s. ix. 90 F (1897).

²¹ "Granites and gneisses occur along the north shore of Baker Lake, and down both shores of Chesterfield Inlet to its mouth."— Tyrrell, l. c. ix. 169 F (1897).

²² "The rocks of the southeast extremity of McTavish Bay [southeastern arm of Great Bear Lake] are described as red granites and gneisses."— G. M. Dawson, l. c. 19.

²³ "Near the easternmost [channel of Slave River], which is named John's River (*Rivière à Jean*), is Stony Island, a naked mass of granite, rising fifty or sixty feet above the water; and beyond that, to the eastward, the banks of the lake [Great Slave Lake] are wholly primitive."— Richardson, Arct. Searching Exped. 97 (1852).

²⁴ "They [Laurentian rocks] occupy most of the northern shores of Athabasca and Black Lakes. Throughout the greater portion of the area, the rock consists of light reddish-gray hornblende-granite, and biotite-granite or granitoid gneiss."— Tyrrell, l. c. viii. 16 D (1896).

"In the *second* or *barren ground* district, in places where the soil is formed of the coarse sandy debris of granite. . . *Rhododendron lapponicum*, *Kalmia glauca* [*polifolia*], *Vaccinium uliginosum*, *Empetrum nigrum*, *Ledum palustre*, *Arbutus* [*Arctostaphylos*] *Uva ursi*, *Andromeda* [*Cassiope*] *tetragona*, and several depressed or creeping willows, lie close to the soil."— Richardson, l. c. 416 (1852).

TABLE III—continued.

GROUP II (Plants which, south of the St. Lawrence, are controlled in their Distribution by a Preponderance of Calcium in the Soil.)	Anemone parviflora	Saxifraga caespitosa	Saxifraga oppositifolia	Dryas integrifolia	Pinguicula vulgaris
Stations, and Rocks of the Region from which Calcareous Soils could be derived.					
Bay of Islands to Cape Norman, Newfoundland (limestone ¹)	+			+	+
Anticosti (limestone ²)	+	+	+	+	+
Mingan Islands, Quebec (limestone ³)					+
Forteau Bay, Labrador (limestone ⁴)		+		+	+
Chateau Bay, Labrador (basalt, trap ⁵)		+			+
Battle Harbor, Labrador (trap, etc. ⁶)		+	+	+	+
Indian Harbor, Labrador (doleritic trap containing labradorite ⁷)					+
Hopedale, Labrador (doleritic trap, labradorite ⁸)	+	+		+	+
Paul's Island and Nain, Labrador (labradorite, gabbro, anorthosite ⁹)	+	+	+	+	+
Kaumajet Mts., Okkak to Cape Mugford, Labrador (diabase, limestone ¹⁰)			+	+	+
Torngat Mts., Hebron to Nachvak Bay, Labrador (diabase, limestone, calcspar ¹¹)	+	+	+	+	+
Ungava Bay, Cape Chudleigh, Labrador (dolomite, limestone ¹²)		+		+	+
Grinnell Land (limestone ¹³)		+		+	
Cape Sabine, Smith Sound (limestone ¹³)		+	+		
Jones Sound, Ellesmere Land (limestone ¹⁴)			+	+	
Cumberland Sound, Baffin Land (Middle Laurentian rocks? ¹⁵)			+	+	
Cape Prince of Wales and Ashe's Inlet, or North Bluff, Hudson Strait (dolomite, limestones, calcspar ¹⁶)		+	+	+	
Mansfield Island, Hudson Bay (limestone ¹⁷)		+	+		
Foot of James Bay, Moose Factory to Rupert House (limestone ¹⁸)	+			+	+
Fort Churchill, Hudson Bay (limestones ¹⁹)				+	+
Melville Island (limestone, calcareous sandstone ²⁰)		+	+	+	
Fort Good Hope, Mackenzie River (limestone ²¹)				+	+
Great Slave Lake, Mackenzie (limestone ²²)					+

¹ "On the opposite side [of the Strait of Belle Isle], the shore of Newfoundland is occupied by a series of limestones, apparently of Calciferous age. . . . they stretch along the coast for upwards of a hundred miles."— Logan, Geol. Can. 288 (1863).

These and other limestones are traced in succeeding pages and shown in the accompanying Atlas southward to Bay St. George.

² Anticosti Island is composed of Silurian rocks, chiefly limestones, which are discussed in detail in Logan's Geology of Canada, Chapters x and xii. See also Schmitt, Monographie de l' Ile d' Anticosti, 65-99 (1904). In view of a very general impression that *Sphagnum* does not occur in calcareous regions and of its abundance in certain marly bogs of Gaspé Co., Quebec (see RHODORA, vii, 8), it is interesting to note the statement of Sir William Logan that "the most extensive peat deposits in Canada are found on Anticosti. Along the low lands on the south coast of the island, from Heath Point to within eight or nine miles of Southwest Point, a continuous plain covered with peat

extends for upwards of eighty miles, with an average breadth of two miles; thus giving a superficies of more than one hundred and sixty square miles. The thickness of the peat, as observed on the coast, was from three to ten feet."— Logan, l. c. 783, 784 (1863).

³ "It is not until reaching the Mingan Islands, between 500 and 600 miles to the north-eastward, that we have any of its [Calciferous formation] characteristic fossils. . . . At the Mingan Islands and on the neighboring coast, there appears an interesting extension of this formation extending from Mingan River to Ste. Geneviève Island, a distance of about forty-five miles. It occupies the inner range of islands and most of the coast."— Logan, l. c. 119 (1863).

⁴ "Between this exposure [Mingan Islands] and Bradore Bay, the distance is about 300 miles. The shore, which is very much indented by bays and inlets, and fringed with a multitude of islands, presents an almost continuous line of bare rock; but in no part of it have there been observed any strata, but such as belong to the Laurentian series. On the east side of Bradore Bay, which is situated near to the entrance to the Straits of Belle Isle from the Gulf of St. Lawrence, the palaeozoic rocks again present themselves. Resting on the Laurentian gneiss, they run along the north coast for nearly eighty miles, with a breadth of probably ten or twelve miles. . . . On the strike, these yellow-weathering limestones pass in some parts into grey, compact, pure limestone. . . . In Forteau Bay, the whole mass appears to be more or less fossiliferous."— Logan, l. c. 287, 288 (1863).

⁵ "At Henley Harbor [Chateau Bay] is a system of trap-rocks. . . . These rocks consist of three masses of columnar basalt, capping the syenitic gneiss. It is a hard, fine, compact dolerite. . . . West of these basaltic rocks, on the opposite side of the harbor, is a large trap overflow forming a hill over three hundred feet high."— Packard, Lab. Coast, 285, 286 (1891).

⁶ I am unable to find any specific statement in regard to Battle Harbor, which is situated between Chateau Bay (5) and the great anorthosite area of St. Michael Bay.

⁷ "At Indian Harbor. . . . these same rocks ['Domino Gneisses'] appear. . . . Invariably accompanying these rocks is a doleritic trap of a peculiar mineralogical character. . . . It is composed of large crystalline masses of hypersthene and labradorite [a lime-soda feldspar]"— Packard, l. c. 288, 289 (1891).

⁸ "About an hour before we reached Hopedale, we passed a high sugar-loaf-shaped island 'The Beacon'. . . . The rock was evidently that variety of syenite containing labradorite [a lime-soda feldspar] and green hornblende."— Packard, l. c. 197. Trap dykes (doleritic) like those at Chateau Bay were seen at Hopedale, "in places like slightly winding stairs or steps descending to the water's edge, justifying the term *trap* applied to this rock, which is from the Swedish *trappa*, meaning a series of steps or stairs."— Packard, l. c., 206, 286 (1891).

⁹ "The Hopedale gneiss underlies the eastern end of Paul's Island, but a few miles west of Ford Harbor, it comes in contact with the famous anorthosite [a lime feldspar] and allied gabbro whence is derived the schillerizing labradorite. . . . The 'Brave' was headed for Nain, passing through a long tickle walled in on either side by high cliffs of massive gabbro for fifteen miles. . . . all the mainland visible thereabouts is composed of the gabbro."— Daly, Bull. Mus. Comp. Zool., Harvard, Geol. Ser. v. no. 5, 216-218 (1902).

¹⁰ At Mugford, "next above the light colored zone of the schists comes a series of black slates fifty to one hundred feet thick, indurated at the contact by a conformable three hundred-foot sheet of apparently intrusive diabase [containing labradorite]. . . . On Ogua'lik at the southwest end of the Tickle, the gneisses are overlain by an intrusive sheet of diabase, about fifty feet in thickness, upon which are piled slates, quartzites, limestones, and sandstones with interbedded traps."— Daly, l. c. 220, 221 (1902).

¹¹ Daly (l. c. 225, 226) discusses the sedimentary and intrusive rocks of this range, which are similar to those of the Kaumajet Mts. See also Bell, Geol. and Nat. Hist. Surv. Can., Rep. for 1882-83-84, 15 DD, etc. (1884).

"On the west shore of the first cove, from the entrance, on the south side of Nachvak inlet, the rocks consist of a coarse-grained slaty tufa or breccia. . . . to the south of it is a coarse grey mica schist. . . . In this rock, and near the slaty breccia, a vein of quartz was found, from a foot to two feet in thickness, and holding patches of brown-weathering calcspar."— Bell, l. c. 15, 16 (1884).

¹² "A short distance south of the station, a vein, varying from 8 to 13 inches in width, occurs in the gneiss. . . . It consists of light grey dolomite [calcium-magnesium carbonate] and white quartz. . . . Fragments of grey, drab and yellowish limestone, with obscure fossils, were common around the base of the hill."— Bell, l. c. 18, 19 (1884).

¹³ Dr. G. M. Dawson, quoting from a paper of Fielden and De Rance, says: "A limestone formation, resembling that elsewhere so widely spread in the Arctic regions, is described as characterizing considerable tracts on both the east and west sides of Kennedy Channel and Smith's Sound. . . . Carboniferous limestones were recognized in several places along the north coast of Grinnell Land. . . . 'There would also appear to be a strong likelihood that the limestone continues in a southeasterly direction by way of these mountains [the United States range] across the whole of Grinnell Land'."— G. M. Dawson, Ann. Rep. Geol. Surv. Can., n. s., ii. 51, 52 R (1887).

¹⁴ As indicated by Dawson little is known of the rocks of Ellesmere Land. The "Cape Rawson Beds" [containing limestones], however, are known there.

¹⁵ "The southern part of Baffin Land, including Frobisher Bay and Cumberland Sound together with Melville Peninsula, may be particularly referred to as evidently exhibiting a considerable development of Middle Laurentian rocks [including crystalline limestones]."— Dawson, l. c. 7.

¹⁶ "Among the prevailing gneiss boulders, scattered on the hills and plains, were found several of grey dolomite. . . . A small piece of greyish crystalline limestone was picked up near Ashe's Inlet. . . . Here [Eskimo Inlet, Prince of Wales Sound] I found a good many boulders of grey and yellowish limestone on the beach. . . . One of the veins of white quartz in this locality contains purplish red calcspar, . . . resembling some of the banded crystalline limestones of the Laurentian series."— Bell, l. c. 22–27.

¹⁷ "We arrived at the eastern part of Mansfield Island, about mid-way down, on the morning of the 30th of August. Its even outline presented a remarkable contrast to the shores of Hudson's Strait. It resembled a gigantic ridge of gravel; but stratified rocks, in low horizontal ledges, appeared here and there, through the *debris*, at different levels. . . . I landed at a point about the middle of the eastern shore of the island, and found the shore very flat, with shallow water for a considerable distance out. The rock proved to be a fossiliferous grey limestone, in rather thin horizontal beds."— Bell, l. c. 33.

¹⁸ "To the west and south it [shore at foot of James Bay] is almost flat, with its soil overlying nearly horizontal beds of Silurian and Devonian limestones for about one hundred and fifty miles inland to the Archaean country."— Low, Ann. Rep. Geol. Surv. Can., n. s. iii. 16 J (1888).

¹⁹ "In a fissure [at Port Churchill]. . . is, or was, a small outlier of an unaltered Cambro-Silurian limestone. . . . With the above are associated some fragments of white Silurian limestone. . . . In and around the old fort at the mouth of the river, are many boulders of heavier-bedded Trenton limestone."— Tyrrell, Ann. Rep. Geol. Surv. Can., n. s. ix. 91 F (1897)

²⁰ "The surface of it [Table-hill, Melville Island] consists generally of sand, on which are lying numerous masses of limestone. . . . We had passed, during our last march, a good deal of rich soil. . . . and the sorrel and saxifrage (*Saxifraga oppositifolia*) were more abundant than before. . . . On the north side of this ravine large masses of sandstone were lying on the surface of the ground, . . . and we remarked on this, and several other occasions, that the stones which were bruised by the wheels emitted a strong odor, like that of fetid limestone when broken."— Parry, First Voyage, Journal, 177, 184–85 (1821).

²¹ "At night we camped not far from the Old Fort [Good Hope]. The shale, sandstone, and limestone beds, continue throughout the space intervening between the former and present sites of Fort Good Hope."— Richardson, Arct. Searching Exped., 135 (1852).

²² "In the vicinity of the westernmost channel of the delta [of Slave River] and from thence to the efflux of the Mackenzie, the whole southern shore of the lake is limestone" — Richardson, l. c. 97.

TABLE III—continued.

GROUP III (Plants which, south of the St. Lawrence, are controlled in their Distribution by a Preponderance of Magnesium in the Soil.)	Lycnis alpina	Arenaria arctica	Arenaria sajanensis	Statice sibirica (and perhaps others)	
Stations, and Rocks of the Region from which Magnesian Soils could be derived.				Artemisia borealis	
Coal River, Newfoundland (serpentine ¹)	+	+		+	
Hopedale Islands, Labrador (trap ²)	+	+		+	+
Paul's Island, Labrador (gabbro, pyroxene ³)	+			+	+
Nain, Labrador (gabbro ³)	+	+		+	+
Kaumajet Mts., Okkak to Cape Mugford, Labrador (basalt, lavas ⁴)			+	+	+
Torngat Mts., Hebron to Nachvak Bay, Labrador (black diorite, soapstone ⁵)	+		+	+	+
Ungava Bay, Cape Chudleigh, Labrador (dolomite ⁶)	+			+	
Cape Prince of Wales and Ashe's Inlet, or North Bluff, Hudson Strait (dolomite, black mica, soapstone ⁷)		+		+	
Nottingham Island, Hudson Strait (dolomite ⁸)			+	+	

¹ On Bonne Bay, "there rises to a height of between 2000 and 3000 feet, a mountain of serpentine."— Logan, Geol. Can. 293 (1863). These serpentine mountains, as shown on the geological map of Canada, are greatly developed southward to Port au Port Bay. Coal River has its origin upon one of them, and its lower waters flow through another of the serpentine areas.

² "Trap dykes were always in the view [Islands off Hopedale]."— Daly, Bull. Mus. Comp. Zool., Harvard, Geol. Ser. v. no. 5, p. 216 (1902).

³ "The 'Brave' was headed for Nain, passing through a long tickle walled in on either side by high cliffs of massive gabbro."— Daly, l. c. 217. "When at Nain I obtained specimens of. . . paulite, a variety of pyroxene or hypersthene [a silicate of magnesium], which. . . was said to have been brought from Paul's Island."— Bell, Geol. & Nat. Hist. Surv. Can., Rep. for 1882-83-84, p. 12 DD (1884).

⁴ "The basalt [containing crysolite, a silicate of magnesium] agglomerate, which is also a significant part of the stratified series, is typical."— Daly, l. c. 221.

"Ogua'lik, Cape Mugford, the Bishop's Mitre are all part of an extensive area of slates, sandstones, conglomerates, limestones, and, much surpassing these in thickness, lava flows, volcanic tufts, and breccias."— Daly, Bull. Geogr. Soc. Phila. iii. 208 (1902).

⁵ "Some dykes of close-grained, almost black diorite [black diorite usually contains much augite, a silicate of magnesium], also cut the gneiss in the vicinity of Skynner's Cove. . . . I was informed that the Eskimo obtained a kind of soapstone [a hydrous silicate of magnesium] for making their pots in the vicinity of Skynner's Cove. . . . dykes [of black-looking rock] were seen all along, cutting the face of the mountain range."— Bell, l. c. 15 DD.

⁶ "A short distance south of the station [at Port Burwell, Cape Chudleigh], a vein. . . . occurs in the gneiss. . . . It consists of light grey dolomite [magnesian limestone] and white quartz" — Bell, l. c. 18 DD.

⁷ "Scattered on the hills and plains [near North Bluff, Hudson Strait], were several [boulders] of grey dolomite. . . . and of the soft buff grey dolomite."— Bell, l. c. 22 DD.

"On the west side of Ashe's Inlet. . . . some of them [veins] contain feldspar and black mica [magnesian]."— Bell, l. c. 29 DD. "At Ashe's Inlet a party of Eskimo from the eastward came on board." Among the rocks shown them "they recognized a rather hard and inferior variety of soapstone,"— Bell, l. c. 21, 24, 25 D D.

⁸ "At a projecting point. . . . I found some straggling veins of hard grey dolomite."— Bell, l. c. 29 D D.

It is not, of course, possible from the inadequate data at hand to say with certainty that in their arctic and subarctic distribution in British America the fifteen plants just discussed are confined to or even occur upon the soils which have respectively a preponderance of potassium, calcium, or magnesium; but it is clear that in the northern regions from which these plants are known soils are present similar to those upon which the plants have their best development south of the St. Lawrence. In their southern stations, however, it is apparent that the plants of alpine situations here considered show in most cases a pronounced selection of habitats dependent upon the relative abundance in the soil of the three important food-elements, potassium, calcium, and magnesium. A very similar selection of soils is shown by many plants of low altitudes; in fact, it is possible thus to analyze the distribution of the majority of *Pteridophyta* and *Spermatophyta* of New England and eastern Canada. It is very generally known, for instance, that many heaths (*Kalmia*, *Rhododendron*, *Vaccinium*, etc.) occur primarily on potassic soils; and that they are rare or quite unknown in extensive areas of limestone and can there be cultivated with success only if provided with an imported soil free from the abundant lime of the region.¹ Many other plants of low altitudes or of temperate regions, *Camptosorus rhizophyllus*, *Pellaea atropurpurea*, *Carex eburnea*, etc., are best developed on if not confined to calcareous rocks. These plants of low altitudes, *Kalmia latifolia*, *Rhododendron canadense* (*Rhodora*), *R. maximum*, *Vaccinium pennsylvanicum*, *Camptosorus*, *Pellaea atropurpurea*, *Carex eburnea*, etc., restricted in their best development to somewhat specialized soils and ordinarily absent

¹ "Any open, well-drained soil which does not contain limestone or heavy clay and has a moist and fresh subsoil will prove satisfactory [for *Rhododendrons*]. Where limestone or heavy clay prevails, beds must be specially prepared and filled with suitable soil."— A. Rehder, in Bailey, *Cycl. Am. Hort.* 1516, 1517 (1902).

"It is generally conceded that lime soils and manures containing lime. . . . are injurious to *Rhododendrons*; in limestone regions it is undoubtedly advisable to substitute, for the natural soil, others which are free from this objectionable element."— B. M. Watson in Bailey, l. c. 1519.

from certain others, occupy, in a general way, wide areas in eastern America; and, though absent from certain localities, they may be said to have a far more continuous range than the alpine species, and the intervals between their more isolated outlying colonies are not too great to be crossed by seeds and spores in the ordinary processes of dispersal.

The alpine plants, on the other hand, are, as already noted, present in our flora usually as small colonies isolated by hundreds or even thousands of miles from the other known members of their species. *Dryas Drummondii*, for example, one of the most abundant plants of the Canadian Rockies, has its nearest known colonies 2000 miles away, along the rivers of the Gaspé Peninsula and of Anticosti. *Polystichum scopulinum*, abundant on steep serpentine walls of Mt. Albert, Gaspé, is otherwise confined to mountains from Idaho to northern California, at least 2200 miles away. *Festuca altaica*, the commonest grass of Mt. Albert, is otherwise known only from Yukon, 2700 miles to the northwest, and from the mountains of Asia. Other species, though very isolated in their occurrence, are found at one or more points between our New England and Gaspé mountains and the northwestern portion of the continent. Among such is *Vaccinium ovalifolium* whose range has been already stated. These plants, typical of our alpine and subalpine species, often occur, then, in such isolated areas that it is highly improbable that they should have reached their known localities by ordinary dispersal of seeds and spores from one of these areas directly to another. And, in view of the fact above pointed out, of the restriction on adjacent alpine areas of most of our alpine plants to prevailing potassic, calcareous, or magnesian soils, it is at first difficult to see how these extremely fastidious plants could have grown in close association at the close of the glacial period, as implied by the long-accepted theory of Forbes, which was greatly extended by Darwin, Hooker, Gray, and others.

When, however, we take into account the character of some exceptional stations for these alpine plants at low altitudes or in less pronouncedly cliff- or rock-habitats, we get a clue to the conditions which they presumably found in their poleward march in the wake of the receding ice-sheet. Throughout New England and adjacent Canada and over much of the continent westward and northwestward there are many cold meadows and bogs or muskeags in which the conditions are such as to support many species which abound in alpine

or high-northern regions. In hundreds of bogs of New England and eastern Canada we find a few of the less markedly alpine plants such as *Carex pauciflora*, *Eriophorum callitrix*, *Habenaria dilatata*, *Andromeda glaucophylla*, *Ledum groenlandicum*, etc., plants which are typical of our sphagnous bogs and of the mountains composed of potassic rocks. Certain bogs and meadows maintain floras of greater variety and of very great interest, especially when we take into account the alpine distribution exhibited by them. Caribou bog, in Crystal, Maine, for instance, has, besides *Drosera linearis*, *Betula pumila*, *Lonicera oblongifolia*, and many other plants of unusual occurrence in New England, a few arctic-alpine species:

<i>Eriophorum callitrix</i> (Group I)	<i>Rhododendron canadense</i> (Group I)
<i>Carex vaginata</i> (Group II)	<i>Kalmia angustifolia</i> (Groups I & III)
“ <i>paupercula</i> , var. <i>irrigua</i> (Groups I & III)	“ <i>polifolia</i> (Groups I & III)
“ <i>limosa</i> (Groups I & III)	<i>Andromeda glaucophylla</i> (Groups I & III)
“ <i>pauciflora</i> (Group I)	<i>Menyanthes trifoliata</i> (Group I)
<i>Tofieldia glutinosa</i> (Group II)	<i>Lobelia Kalmii</i> (Group II)
<i>Rhamnus alnifolia</i> (Group II)	<i>Erigeron acris</i> (Group II)
<i>Ledum groenlandicum</i> (Groups I & III)	

Small bogs at the mouth of the Grand River, Gaspé Co., and similar but larger bogs at the mouth of the Bonaventure River, Bonaventure Co., Quebec, situated in strongly calcareous regions, have a notable series of arctic-alpine plants, of which the following are conspicuous:

<i>Selaginella selaginoides</i> (Groups II & III)	<i>Parnassia parviflora</i> (Group II)
<i>Scirpus pauciflorus</i> (Group II)	<i>Rubus arcticus</i> (Groups I & III)
“ <i>caespitosus</i> (Groups I & III, and rarely II)	<i>Potentilla palustris</i> (Group I)
<i>Rynchospora capillacea</i> (Group II)	<i>Empetrum nigrum</i> (Groups I & III)
<i>Carex vaginata</i> (Group II)	<i>Rhamnus alnifolia</i> (Group II)
“ <i>paupercula</i> , var. <i>irrigua</i> (Groups I & III)	<i>Viola nephrophylla</i> (Group II)
“ <i>limosa</i> (Groups I & III)	<i>Ledum groenlandicum</i> (Groups I & III)
<i>Juncus filiformis</i> (Group I)	<i>Andromeda glaucophylla</i> (Groups I & III)
<i>Tofieldia glutinosa</i> (Group II)	<i>Chamaedaphne calyculata</i> (Groups I & III)
<i>Salix pseudo-myrsinites</i> (Group II)	<i>Vaccinium canadense</i> (Groups I & III)
“ <i>balsamifera</i> (Group I)	“ <i>Vitis-Idaea</i> , var. <i>minus</i> (Groups I & III)
“ <i>pedicellaris</i> (Group I)	
<i>Comandra livida</i> (Groups I & III)	

- | | |
|--------------------------------------|--|
| Vaccinium Oxycoccus (Groups I & III) | Pinguicula vulgaris (Group II) |
| Menyanthes trifoliata (Group I) | Lonicera caerulea, var. villosa (Groups I & III) |
| Euphrasia latifolia (Group II) | Lobelia Kalmii (Group II) |

A certain boggy meadow in a sag near the western edge of Table-top Mt. is, perhaps, the most notable of these bog-areas. This particular meadow, which lies southeast of the crest of the limy northwestern escarpment upon whose cliffs are found many of the plants of Group II, is so situated as to receive the drainage from various directions. From the northwest the drainage is directly off the calcareous slope and in part from a granitic slope; from the southwest comes a general seepage from a small area of serpentine; and from the southward the drainage is off the edge of the great granitic tableland. On account of the strong contrast between the flora of this small meadow and the extensive meadows of the strictly granitic district, the area was designated by Professor Collins and the writer "the Calcareous Meadow," and it has been so indicated upon many herbarium labels. Yet the flora of this notable meadow contains many plants besides those of the calcareous alpine cliffs. The detailed list of alpine plants there recorded includes the following:

- | | |
|---|--|
| Selaginella selaginoides (Groups II & III) | Betula glandulosa (Groups I & III) |
| Polystichum Lonchitis (Group II) | Alnus crispa (Groups I & II) |
| Phleum alpinum (Groups I & II) | Comandra livida (Groups I & III) |
| Agrostis borealis (Groups I, II, & III) | Anemone parviflora (Group II) |
| Deschampsia atropurpurea (Group I) | Arabis alpina (Group II) |
| Danthonia intermedia (Group III) | Rubus arcticus (Groups I & III) |
| Scirpus caespitosus (Groups, I, II, & III) | " triflorus (Groups I, II, & III) |
| Carex stellulata (Group I) | Pyrola grandiflora (Group II) |
| " deflexa (Group I) | Phyllodoce caerulea (Groups I & III) |
| " capillaris, var. elongata (Group II) | Vaccinium uliginosum (Groups I & III) |
| " atrata, var. ovata (Groups I, II, & III) | " caespitosum (Group I and rarely II) |
| Juncus castaneus (Group II) | " ovalifolium (Group I) |
| Habenaria dilatata (Groups I & III) | Veronica alpina, var. unalaschcensis (Group I) |
| Salix vestita (Group II) | Castilleja pallida, var. septentrionalis (Groups I, II, & III) |
| " Barclayi (Group II) | Rhinanthus oblongifolius (Group I) |
| " pseudo-myrsinites (Group II) | Viburnum pauciflorum (Groups I, II, & III) |
| " argyrocarpa (Group I) | Lonicera caerulea, var. villosa (Groups I & III) |
| " glauca (Group II) | Valeriana sylvatica (Group II) |
| " phylicifolia (Group I) | |

Solidago multiradiata (Groups II & III)	Senecio pauciflorus (Group II)
Aster foliaceus (Group III)	Cirsium muticum, var. monticola (Group III)
Erigeron hyssopifolius (Group II)	Taraxacum ceratophorum (Group II)
Gnaphalium norvegicum (Group I)	Prenanthes trifoliolata, var. nana (Groups I & III)
Achillea borealis (Groups II & III)	
Petasites trigonophylla (Group I)	
Arnica mollis (Groups I & II)	

On these bogs and meadows, it will be noticed, there is a decided mingling of the plants which on alpine rocky slopes or on cliffs are rarely if ever found associated.

Similarly, in the valleys of rivers flowing from our higher mountain areas fragments or seeds of alpine plants are washed down to the bottom-lands where there results a mingling of the plants which are ordinarily confined to distinct areas and soils. Thus, along the River Ste. Anne des Monts, which receives much of the drainage from Mt. Albert, Table-top, and the adjacent mountains, we find, on the broad alluvial "flats" which are submerged during the freshet periods, such plants as *Vaccinium ovalifolium* (Group I), *V. Vitis-Idaea*, var. *minus* (Groups I & III), *Lychnis alpina* (Group III), *Epilobium alpinum* (Group I), and *Deschampsia caespitosa*, var. *alpina* (Group III) growing side by side and in equal luxuriance with *Arabis alpina*, *Dryas Drummondii*, *Erigeron hyssopifolius*, *Senecio discoideus*, *Taraxacum ceratophorum*, and other plants which in their rock-habitats are confined primarily to areas of Group II.

These series of habitats, the meadows, bogs, and alluvial plains, are alike, it will be seen, in having an extremely fine and mixed soil, often derived from rocks of very different kinds; and it is, apparently, the availability in these soils of the potassium, calcium, and often the magnesium, which makes it possible for plants, which in less favored soils are restricted to rocks high in one or another of these elements, to grow side by side on the bogs, meadows, and alluvial plains. Now, if we consider the condition of much of the northern hemisphere during the period when the great ice-sheet was receding and the arctic and subarctic plants were following in its wake, we shall see that there were, in America for instance, measureless stretches of country, from Long Island Sound northward, westward and north-westward and again on the western slopes of the continent, which were essentially identical in their character with the bogs and meadows above referred to, while there also abounded far greater deposits

of mixed and water-worn "till" than now cover large portions of our region. On these vast areas of fine and mixed soils nearly if not quite all the polar and boreal species could find the food-element or the combinations of elements upon which they most depended. For, even if the newly deposited soil in a given region were derived primarily from a single rock or from two rocks, a limestone and a serpentine for instance, it would require the presence in the region of only a very small quantity of another rock, a potassic feldspar for example, to support during their northward march the plants which require a potassic soil, as well as those which depend upon an abundance of calcium or magnesium. A very vivid illustration of this fact is contained in a recent paper by Mr. Allerton S. Cushman on "The Use of Feldspathic Rocks as Fertilizers."¹ Mr. Cushman says:

"Grinding is making surface, and it can be shown that the availability of potash in ground feldspar increases with the surface area. If feldspar is ground so that it will pass an 80-mesh sieve, it will of course contain a certain proportion of very fine particles, some of which approach the limits of visibility under a powerful microscope. If we carry on the grinding of the material from 80-mesh to 200-mesh, the proportion of the very small particles is enormously increased. The smallest particles which we need to consider here are those which can be measured by a micrometer device connected with the microscope. These smallest particles have a diameter of about 0.0001 millimeter. Now, in order to make a specific example, we will consider the surface areas presented by 1 pound of feldspar in different degrees of subdivision. First, in the form of a solid cube, then broken down to particles that could just pass an 80- and a 200-mesh sieve, respectively, and, finally, in the condition it would be if it were possible to grind all the material as fine as the finest particles which occur in an ordinary 200-mesh powder. The 1 pound of feldspar in a solid cube would have a surface area of 29.3 square inches; particles capable of passing an 80-mesh sieve would give 8,870 square inches; particles able to pass a 200-mesh sieve would give 24,905 square inches; and if it were possible to reduce the powder to particles 0.0001 millimeter in diameter, there would result a surface area of 16,460,000 square inches.

If it were practically possible to collect 1 ton of feldspar all in the

¹ U. S. Dept. Agric., Bur. Pl. Ind., Bull. no. 104 (1907).

state of the finest particles, as shown above, the surface-area presented by the ton would be enormous—in fact, it would be equal to 256,000,000 square feet, 5,877 acres, or more than 9 square miles.”¹

It is quite conceivable, then, that the polar plants, which had been forced to find temporary homes on the potassic, calcareous, or magnesian areas or the mixed soils of our more southern states and in Mexico, found in the extensive alluvial deposits, which, after the receding of the ice, covered much of the northern half of our continent, a mixed soil in which they were able to spread both eastward and westward as well as poleward; and then, as the particular soil-element upon which they most depended gradually became exhausted from the mixed soil and as the climate at low altitudes became increasingly warmer, these plants found upon bogs, cold meadows or sheltered alluvial shores, or upon cold cliffs and exposed mountain summits, the only habitats in which they have been able to persist within our temperate regions.

In areas of conglomerate rocks, it should be added, as for instance on some of the conglomerate cliffs along the lower St. Lawrence, where the component pebbles are of varied origin (limestones, serpentine, feldspathic rocks, etc.), there is sometimes a mixture of floras similar to that found on the bogs or meadows, and such plants as *Empetrum* and *Hedysarum* or *Zygadenus* will be found occasionally on the same cliffs. In such mixed areas it is, of course, difficult without actual examination of the soil and analyses of the ash of the plants, such as are now being made by Mr. H. H. Bartlett, to determine the controlling soil-elements.

Similarly, in the mixed soils which cover the ordinarily tillable districts of our northern states and Canada the problem is complicated, and in these temperate areas the preference of certain plants for one soil or another is best seen in rock- and cliff-habitats. There is need of close observations along these lines, and, although, in the alpine and subalpine areas here chiefly considered, the distribution of plants is largely controlled by the preponderance in the soil of potassium, calcium and magnesium, it will be found that in various areas, sodium, iron, and other elements are of equal importance in determining the ranges of our plants.

¹ Cushman, l. c. 27, 28.

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CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD
UNIVERSITY. — NEW SERIES, No. XXXVI.

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I. SYNOPSIS OF THE MEXICAN AND CENTRAL AMERICAN
SPECIES OF CASTILLEJA.

BY ALICE EASTWOOD.

THE genus *Castilleja* was published by Linnaeus fil. in 1771 (Suppl. 293). It was named by Mutis in honor of Domingo Castillejo of the botanical garden of Cadiz and rested upon the two species collected by Mutis in New Granada, *C. integrifolia* and *C. fissifolia*. At that time *C. pallida* and *C. coccinea* had been described by Linnaeus but under *Bartsia*, so that altogether four species were known. In 1818 Nuttall established the genus *Euchroma* (Gen. ii. 55) founded upon *Bartsia coccinea* and *B. sessiliflora* Pursh. The first satisfactory arrangement, however, came in 1846, when Bentham revised the genus *Castilleja* (DC. Prodr. x. 528-534), establishing four sections. At that time thirty-four species were known, fifteen of which belonged to Mexico and Central America. The subdivisions established by Bentham seem to mark off natural groups, which, however, show connecting characteristics that often render the true position of certain species doubtful. *Epichroma* is probably the most individual subdivision and has, perhaps, the best claim to generic rank; but some species placed in the present synopsis under *Euchroma* have floral characteristics that closely approach those of *Epichroma*, while other species under the same section are difficult to separate from *Hemichroma*. On account of this interrelationship any key must be more or less artificial. Perhaps when the knowledge gained from books and herbarium specimens is supplemented by that of the living plants in their natural environment, an entirely different system of classification may be arranged. Dried specimens often conceal the form of the flower, and when mounted frequently render dissection difficult, so that it is not always possible to obtain accurate knowledge of all of the parts; especially is this true of the lower lip of the corolla, which gives much of the characteristic

form. Great variation and closely related species indicate a recent genus still in process of evolution. The line separating *Orthocarpus* from *Castilleja* is not definitely fixed, and the species on the border may suffer changes in name frequently. At present the tendency is to remove all these doubtful species from *Orthocarpus* and include them in *Castilleja*, thus leaving the former genus represented only by annuals. The two genera are certainly very closely related, for there is scarcely a character of *Orthocarpus* which cannot be found in some species of *Castilleja*. Indeed, it is doubtful if the differences between the two genera are much more pronounced than are the differences between some of the sections of *Castilleja*. The last enumeration of the Mexican and Central-American species of *Castilleja* was in 1881-1882, when Hemsley enumerated 26 species (Biol. Cent.-Am. Bot. ii. 459-463). Since then great activity has prevailed in the biological exploration of Mexico and Central America, and specimens of *Castilleja* have been accumulating in all the large herbaria. The present paper is based upon the specimens in the Gray Herbarium and some from the herbarium of the U. S. National Museum. Besides the key a short diagnosis of each species has been added, sometimes modified from the original description and sometimes quoted.

SECTIO I. EPICHROMA Benth. in DC. Prodr. x. 528 (1846).

Calyx vix fissus, breviter et obtuse sinuato-lobatus. Folia pinnatisecta; rhachi et laciniis filiformibus vel anguste linearibus. Folia floralia caulinis minora et concolora. Flores laxe spicati vel racemosi. Annua.

Flores 2.5 cm. longi. Calyx coccineus infundibuliformis. Galea flava a basi exserta.	1. <i>C. tenuifolia.</i>
Flores 2 cm. longi. Calyx flavus. Galea flava exserta.	2. <i>C. aurea.</i>
Flores 1.5 cm. longi. Calyx viridi-purpureus. Galea viridi-flava paulo exserta.	3. <i>C. gracilis.</i>

SECTIO II. EUCHROMA (Nutt.) Benth. l. c. 529. *Euchroma* Nutt. Gen. ii. 54 (1818).

Calyx in duas partes subaequaliter fissus, segmentis integris vel obtuse bilobatis vel acute bifidis. Folia floralia caulinis latiora, apice dilatata et semper colorata. Flores et bracteae in spicis confertae, demum interruptae.

- a. Annua vel biennis, radice brevi, b.
- b. Caules recti solitarii vel pauci 1-2 dm. alti. Stigma crassum, c.
- c. Folia nunc integra nunc pinnatisecta. Bracteae floribus breviores.
- Puberulens. Folia lanceolata. Stigma exsertum bisectum, partibus recurvatis. 4. *C. macrostigma*.
- Pilosa et glandulosa. Folia lanceolata. Stigma vix exsertum bilobatum. 5. *C. pediaca*.
- Albo-puberulens. Folia vulgo pinnatisecta, laciniis linearibus. Stigma globosum vix exsertum. 6. *C. sphaerostigma*.
- c. Folia et caulinea et floralia integra.
- Glandulare puberulens. Folia lanceolata saepe undulata. Bracteae obovatae flores excedentes. Stigma bilobatum exsertum. 7. *C. Palmeri*.
- Sublanata. Folia linearia. Bracteae lanceolatae flores aequantes vel excedentes. Stigma bilobatum vix exsertum. 8. *C. angustata*.
- Glandulare pilosa. Folia oblonga vel lanceolata. Bracteae spatulatae floribus breviores. Stigma bilobatum. Styli superior pars et galea exsertae. 9. *C. ornata*.
- b. Caules a basi ramosi, infra ramulos squamulose tuberculati, e.
- e. Folia oblanceolata basi angustata. Capsula apice truncata. Bracteae paulo dilatatae. Stigma bilobatum vix exsertum. 10. *C. communis*.
- Bracteae dilatatae. Stigma bilobatum exsertum. Flores foliaque eis praecedentis majora. 11. *C. arvensis*.
- e. Folia lineari-lanceolata basi dilatata. Capsula apice acuminata. 12. *C. nitricola*.
- a. Perennis nana saepe caespitosa. Alpina vel subalpina. Folia integra vel pinnatisecta, f.
- f. Caules recti, non caespitosi.
- Spici breves densique. Galea lata. Labium inferius exsertum. 13. *C. saltensis*.
- f. Caules caespitosi.
- Galea exserta.
- Flores 3-3.8 cm. longi. 14. *C. Pringlei*.
- Flores 2.5 cm. longi. 15. *C. Schaffneri*.
- Galea vix exserta.
- Folia apice obtusa. Corolla et calyx subaequantes. 16. *C. toluensis*.
- Folia acuta. Corolla calycem vix superans. 17. *C. moranensis*.
- a. Perennis. Caules alti saepissime recti. Bracteae latae coloratae, g.
- g. Calycis segmenta integra.
- Folia integra valde nervata, inferiora basi angustata. 18. *C. nervata*.
- Folia integra vel saepissime pinnatisecta.
- Calyx viridis 1.2-2 cm. longus. 19. *C. Conzattii*.
- Calyx viridis apice coccineus 2.3 cm. longus. 20. *C. rigida*.
- Calyx subfalcatu apice coccineus 3-3.2 cm. longus, segmentis vix dilatatis. 21. *C. falcata*.
- Calyx divaricatus, usque ad ovarium coccineus; segmentis dilatatis. 22. *C. hirsuta*.

- g.* Calycis segmenta apice emarginata vel obtuse bilobata, *h.*
h. Folia basi dilatata.
 Folia bracteis longiora.
 Pilosa. Corollae labium inferius quinquedentatum. 23. *C. scorzonifolia.* ✓
 Pilosa et glandulosa. Corollae labium inferius tridentatum, sinibus latis involutis. 24. *C. glandulosa.* ✓
 Folia superiora bracteis breviora. Scabrido-hispida. Folia ovata valde nervata. 25. *C. crypiandra.*
h. Folia basi non dilatata, bracteis longiora.
 Scabrido-hispida. Folia lanceolata valde nervata. 26. *C. lithospermoides.*
 Glabrescens. Inflorescentia pilosa. Folia ovato-acuminata longa lataque. 27. *C. Nelsoni.* ✓
 Lanata densissime. Folia lineari-lanceolata. 28. *C. lanata.* ✓
 Caules in vetustate glabri. Folia lanata anguste longeque spatulata. 29. *C. guadalupensis.* ✓
g. Calycis segmenta acute bilobata, *i.*
i. Folia integra.
 Tomentosa. Folia lineari-lanceolata. 30. *C. integra.* ✓
 Scabrido-hispida et glandulari-pilosa. Folia valde nervata lanceolata. 31. *C. aspera.*
i. Folia saepissime pinnatisecta. Flores subfalcati. (Transitio ad *Hemichromam.*)
 Folia regulariter pectinata, laciniis brevibus subfiliformibus. 32. *C. ctenodonta.* ✓
 Folia filiformi-pinnatisecta. Corolla breviter exserta. Capsula anguste et oblique cylindracea. 33. *C. Bryanti.*
 Folia lanceolata saepe pinnatisecta. Corolla exserta 5-15 mm. 34. *C. affinis.* ✓
 Folia anguste linearia apice attenuata. Flores parvi pedicellati. Capsula anguste cylindraceo-ovoideo. 35. *C. minor.* ✓

SECTIO III. CALLICHROMA Benth. l. c. 531 (1846).

Calyx postice breviter, antice profundius fissus, lobis bifidis, laciniis ovatis vel oblongis vel linearibus plerumque acutis vulgo coloratis. Folia floralia (praesertim superiora) caulinis saepius magis incisa, latiora et colorata.

Folia caulinia et floralia pinnatifida, lobis linearibus elongatis. Calycis segmenta linearia bifida. Corollae labii subaequales calycem multo superantes. 36. *C. mexicana.* ✓

C. sessiliflora auct. quoad speciminibus mexicanis est me iudice ad *C. mexicanam* referenda.

SECTIO IV. HEMICHROMA Benth. l. c. 532 (1846).

Calyx incurvus, antice profunde fissus, postice vix vel paulo fissus integer vel 2-4-dentatis. Folia floralia vulgo caulinis minora et apice vix colorata. Corolla e fissura calycis saepius longiuscule exserta.

a. Flores spicati, b.

b. Folia distincte auriculata, auriculis 1-2 mm. longis et latis, c.

c. Pubescentia dense canescens et minute glandulosa, caulibus idem pilosis.

Folia deltoidea densissime imbricata. 37. *C. auriculata*.

Folia ovato-lanceolata non imbricata. 38. *C. longiflora*.

c. Pubescentia divaricate pilosa et scabrido-puberula. Folia viridia lanceolata. Flores subrecti. 39. *C. subalpina*.

c. Pubescentia plerumque adpressis et scabrido-puberula. Flores divaricati.

Folia lineari-lanceolata saepe 5 cm. longa divaricata, in siccitate atra. 40. *C. tenuiflora*.

Folia eis praecedentis breviora et crassiora. Pubescentia densior.

41. *C. canescens*.

b. Folia obscure auriculata.

Folia lineari-lanceolata viridia, divaricate pilosa. 42. *C. xylorrhiza*.

Folia linearia viridia scabridula. 43. *C. scabridula*.

b. Folia basi non dilatata.

Folia lineari-lanceolata saepe deflexa, canescente pubescentia. Flores multo exserti divaricati. 44. *C. laxa*.

Folia subfiliformia in siccitate atra. Flores recti. 45. *C. stenophylla*.

a. Flores racemosi, c.

c. Folia integra.

Bractae summae obovatae apice fimbriatae. 46. *C. longibracteata*.

Bractae summae lineares. 47. *C. integrifolia*.

c. Folia pinnatisecta, laciniis elongatis.

Folia scabrido-hispidula tenuia, laciniis linearibus plurimis.

48. *C. patriotica*.

Folia hispida, superiora trifida, lobo medio lateralibus multo longiori.

49. *C. Purpusi*.

Folia pectinato-laciniata, laciniis linearibus distantibus 2-3-jugis.

50. *C. pectinata*.

c. Folia pinnatisecta, laciniis crassis obtusis, saepissime in siccitate atris.

Folia pubescens, laciniis brevibus. 51. *C. fissifolia*.

Folia glabra. 52. *C. irasuensis*.

C. linearifolia Benth., Sonora, *Geo. Thurber*, no. 981, species hujus sectionis sed valde dubia est.

Locus in clave dubius { 53. *C. tapeinclada*.
54. *C. katakyptusa*.

1. *C. TENUIFOLIA* Mart. & Gal., herbacea glabra vel puberula 1.5-6 dm. alta ramosa; foliis pinnatisectis, segmentis filiformibus vel lineari-subulatis elongatis in siccitate contortis, floralibus simplicioribus

et minoribus; spicis vel racemis gracilibus; floribus divaricatis ca. 2-3 cm. longis; calyce tubuloso vel saepissime infundibuliformi 1.5-2.5 cm. longo; galea 5-10 mm. exserta obtusa inferiore labio protuberanti nunc exserto nunc incluso; styli superiore parte et stigmate bilamellato exsertis; capsula oblonga 7 mm. longa apice truncata. — Mart. & Gal. in Bull. Acad. Brux. xii. pt. 2, 30 (1845); Walp. Rep. vi. 651; Hemsl. Biol. Cent.-Am. Bot. ii. 463; Loesen. in Bull. Herb. Boiss. ser. 2, iii. 285. *C. anthemidifolia* Benth. in DC. Prodr. x. 528 (1846). — Southern Mexico in the states of Oaxaca, Michoacan, Guerrero, Morelos. The type was collected in Oaxaca, *Galeotti*, no. 995. OAXACA: Zimatlan, Sta. Inés del Monte, altitude 2800 m., *C. Conzatti*, no. 1358; Sierra de Clavellinas, altitude 2440 m., *C. G. Pringle*, no. 5692. MICHOACAN: Ignatio, *C. & E. Seler*, no. 1209; dry hills near Patzcuaro, *C. G. Pringle*, no. 3348; rock fields near Coru Station, altitude 1830 m., *C. G. Pringle*, no. 13,142. GUERRERO: between Tlapa and Ayusinapa, altitude 1372-1740 m., *E. W. Nelson*, no. 2106. MORELOS: thin soil of the knobs of the Sierra de Tepoxtlan, altitude 2287 m., *C. G. Pringle*, no. 9123.

2. *C. AUREA* Robinson & Greenman, glabra supra puberula 3 dm. alta graciliter ramosa; laciniis pinnatisectis 2.5-4 cm. longis; laciniis 6-9 lineari-filiformibus; floribus 2-2.5 cm. longis subsecundis in racemis, pedicellis 2-10 mm. longis rectis, saepe in fructu divaricatis; galea obtusa exserta 8 mm.; labio inferiore saepissime exserto; capsula oblongo-acuminata ca. 6 mm. longa. — Proc. Am. Acad. xxxii. 39 (1896). — MORELOS: wet bluffs of barrancas above Cuernavaca, altitude 2135 m., *C. G. Pringle*, no. 6204 (type, in hb. Gray).

3. *C. GRACILIS* Benth., praecedenti similis; floribus 10-15 mm. longis, saepe sessilibus; galea obtusa 4-6 mm. exserta, calyce non ampliato et viridi-flavo. — Benth. in DC. Prodr. x. 528 (1846); Hemsl. l. c. 460. — OAXACA: Cerro de San Felipe, altitude 1800 m., *Conzatti & González*, no. 490; dry banks in same mountain range, altitude 2287 m., *C. G. Pringle*, no. 4968. FEDERAL DISTRICT: lava fields, valley of Mexico, altitude 2287 m., *C. G. Pringle*, no. 7977. These specimens have not been compared with authenticated ones.

4. *C. MACROSTIGMA* Robinson, caule basi ramoso et saepe cum ramulis gracilibus brevibus sterilibus in axillis, puberulenti 1-2 dm. alto; foliis viridibus, inferioribus subimbricatis, superioribus integris undulatis vel sparse pinnatisectis lineari-lanceolatis 1-4 cm. longis 2-3 mm. latis 1-5 nerviis; floribus flavis 1.5-2 cm. longis; spicis brevibus demum elongatis; calyce fisso 4-5 mm., segmentis bidentatis; corollae galea obtusa; labio inferiore non protuberanti, laciniis lineari-acuminatis 1-5 cm. longis, media brevior; stigmatibus exsertis, 1-2 mm. longis,

recurvatis; capsula elliptica acuta compressa 8 mm. longa. — Proc. Am. Acad. xxvi. 173 (1891). — STATE OF MEXICO: grassy slopes, Flor de Maria, 28 July, 1890, *C. G. Pringle*, no. 3194 (type, in hb. Gray), also from same locality, altitude 2440 m., no. 9429. To this species, at the time of its original description, was doubtfully referred a specimen collected in Chihuahua by *C. G. Pringle*, no. 1545, which is below made the type of *C. pediaca*. In hb. U. S. Nat. Mus. sheet no. 396,150 contains a specimen of *C. macrostigma* collected at the type locality by *Rose & Hay*, no. 6330, together with a specimen of *C. Schaffneri*.

5. *C. pediaca*, n. sp., annua albo-pilosa et glandulare puberulens; caulibus prope basim recte ramosis, 2 dm. altis; foliis tenuibus lanceolato-acuminatis integris 3-5-nerviis, 2-3 cm. longis 1-2 mm. latis, basi amplexicaulibus 5-10 mm. latis; floribus sessilibus interruptis acclini-bus ad axim spicae gracilis; bracteis flores subaequantibus et investi-entibus, spatulatis 10-12 mm. longis, superiore parte flavo densissime glandulare puberulenti, apice truncato vel obtuso, inferiore parte pilosa nervia; calyce membranacea 12 mm. longo, fisso 6 mm., duobus partibus truncatis vel emarginatis 5 mm. latis; corolla recta 18 mm. longa, galea acuminata apice glandulare pilosa, labio inferiore membranaceo non protuberanti, laciniis linearibus obtusis glandulare ciliatis 1.5 mm. longis, sinubus inter laciniis 1 mm. latis; stigmatе bilobo crasso, fere exserto; ovario subcylindrico; capsula compressa oblonga 8 mm. longa 3 mm. diametro, apice acuminata; seminibus rhomboideis 1 mm. diametro, testa membranacea profunde foveolata. — CHIHUAHUA: plains, base of the Sierra Madre, 27 September, 1887, *C. G. Pringle*, no. 1545 (type, in hb. Gray), distributed as *C. lithospermoides*, var. (?) *flava* Watson; also included under *C. macrostigma* Robinson in Proc. Amer. Acad. xxvi. 173 (1891). From this latter species it differs in having a more closely flowered spike, pilose instead of puberulent indumentum and less exserted stigma. The flowers too are dissimilar, but the differences are not so obvious. It is even further removed from *C. lithospermoides*, being a slender-stemmed annual, while that is a robust perennial with somewhat harsh pubescence. The slender spikes of *C. pediaca* have flowers about 1 cm. apart, somewhat distichous and appressed to an axis that is slightly tortuous, and are quite unlike the showy thickly flowered spikes of *C. lithospermoides*.

6. *C. sphaerostigma*, n. sp., caulibus 1-2 simplicibus 1.5-2.5 dm. altis gracilibus adpressi-pubescentibus; foliis integris vel pinnatisectis 1-3-nerviis puberulenti-subscabridis, basi amplexicaulibus, apice obtusis, margine frequente involutis, laciniis 2-6 anguste linearibus; floribus in spicis elongantibus sessilibus, bracteis galeam fere aequantibus vel (sub floribus primis) eam superantibus simplicibus cum margine undulata

vel 2-3-lobatis pruinosis; calycis segmentis 1 cm. longis 3 mm. latis emarginatis pruinosis tubum aequantibus; galea apice acuta 1 cm. longa purpurea glandulare puberulenti; labio inferiore membranaceo, laciniis linearibus acutis 2 mm. longis; stylo crasso; stigmatе globoso 1.25 mm. diametro vix exserto; capsula elliptica acuta compressa. — DURANGO: Otinapa, July-August, 1906, *E. Palmer*, no. 361 (type, in hb. Gray). The peculiar pruinose appearance of the inflorescence is due to the white puberulence closely covering the purplish bracts and flowers.

7. *C. Palmeri*, n. sp., sparse pilosa et glandulari-puberulens; caulibus 1-2 simplicibus rectis 1.5 dm. altis; foliis radicalibus imbricatis caulinis lanceolatis 2-3 cm. longis 1-3 mm. latis trinerviis, basi amplexicaulibus 5-10 mm. latis, apice obtusis vel acutis, margine integris vel undulatis; spicis flavis brevibus compactis, fructiferis elongatis; bracteis flores sessiles superantibus vel aequantibus spatulatis 2-3 cm. longis integris, apice rotundatis; calyce fisso 7 mm., laciniis emarginatis 5 mm. latis; corolla 14 mm. longa, galea acuta, dorso glandulari-puberulenti, calycem superanti; labio inferiore membranaceo protuberanti, lobis subulatis acuminatis 2 mm. longis glandulari-ciliatis; stigmatе bilobato crasso paulo exserto; capsula ovato-acuminata compressa; seminibus foveolatis cum testa membranacea. — DURANGO: Otinapa, July-August, 1906, *E. Palmer*, no. 376 (type, in hb. Gray). This species is related to *C. macrostigma*, differing in pubescence, densely flowered spike, and large bracts; from *C. angustata* it differs in pubescence, stigma, foliage, and flowers. There are resemblances to *C. glandulosa* chiefly in the form of the spike, but the bracts in *C. Palmeri* are rounded at apex rather than rhomboid. The corolla is quite dissimilar, the lower lip with three long almost equal divisions, and the body extending outward like a shelf, being very different from the trisaccate lower lip of *C. glandulosa* with its short divisions separated by the folds forming the sacs.

8. *C. angustata* (Robinson & Seaton), n. comb., caulibus 1-2 rectis gracilibus purpurascens 1-1.5 dm. altis, basi squamulosis, inferiore parte minute adpresso-pubescenti, superiore parte spicisque albo-tomentosis; foliis integris linearibus 2-4 cm. longis 1-3 mm. latis; bracteis lanceolatis acutis flores subaequantibus, supra viridibus glabrescentibus, subter albo-tomentosis, confertis cum floribus in spicis brevibus; calycis segmentis bidentatis vel crenatis albo-puberulentibus; corollae galea calycem paulo superanti, apice acuta, dorso glandulari-puberulenti; labio inferiore non protuberanti, laciniis 3 lineari-obtusis ciliatis 1.25 mm. longis, sinibus angustis; stigmatе crasso bilobato, paulo exserto; capsula ovato-oblonga acuta 5-7 mm. longa. — *C. pallida* Kunth, var. ? *angustata* Robinson & Seaton in Proc. Am. Acad. xxviii. 114 (1893). MICHOACAN: grassy slopes near Patzcuaro, 18 July, 1892,

C. G. Pringle, no. 4117 (type, in hb. Gray).—This is well distinguished in the group in which it has been placed by the almost lanate pubescence. Often at the base of the stem there is a peculiar thickening due to the old crowded leaf-bases. The leaves are probably present during the wet season.

9. *C. ornata*, n. sp., caulibus 1-2 rectis simplicibus 1.7-2.5 dm. altis glandulari-pilosis striatis; foliis lanceolatis vel oblongis, apice acutis vel obtusis, basi amplexicaulibus, margine integris vel crispis-undulatis, 2-3.5 cm. longis 2-6 mm. latis trinerviis; foliis radicalibus rosulatis, caulinis propinquis, supremis apice coccineis; floribus bracteisque confertis in spicis ornatis; bracteis spatulatis glandulari-puberulentibus, apice rotundatis vel rhomboideis 2-2.5 cm. longis 5-10 mm. latis calycem excedentibus; calyce fisso 1 cm., segmentis undulatis 5 mm. latis; galea exserta 5 mm., apice acuta, dorso viridi puberulenti, antice albo-membranacea; labio inferiore trisaccato membranaceo, laciniis subulati-acuminatis 2 mm. longis; stylo filiformi exserto, stigmatе crasso bilobato, in fructu galea stigmatеque contortis; capsula oblongo-ovata acuminata compressa 1 cm. longa. — CHIHUAHUA: near Colonia Juarez, Sierra Madre, June-July, 1899, *E. W. Nelson*, no. 6073 (type, in hb. Gray). This approaches more closely to *C. glandulosa* than any other species and resembles it in the trisaccate lower lip with the divisions separated by the folds forming the three sacs below. It has different pubescence and generally obtuse leaves. *C. glandulosa* does not appear ever to have the basal leaves rosulate, but their persistence in this species may be due to a season or locality of greater moisture.

10. *C. COMMUNIS* Benth., pilosa et hispida ramosa alta; caulis inferiore parte squamulose tuberculata; foliis lanceolatis integris basi angustatis apice acutis vel obtusis; spicis elongatis basi interruptis; bracteis apice coloratis vix dilatatis flores parum aequantibus apice glandulosus viridibus; corolla non exserta; capsula lata obtusa siccitate nigra. — Benth. in DC. Prodr. x. 529; Hemsl. Biol. Cent.-Am. Bot. ii. 460; Schmidt in Mart. Fl. Bras. viii. pt. 1, 323, t. 56, fig. 2; Loesen. l. c. 285. — Southern Mexico, Central America to South America. — GUATEMALA: Alta Verapaz, *H. von Türckheim*, no. II. 1318, also Coban, no. 28; San Miguel Uspantan, *Heyde & Lux*, no. 2878 (both ex hb. John Donnell Smith). NICARAGUA: *Oersted*. COSTA RICA: San Jose, *Tonduz*, no. 7096; Cartago, *Juan J. Cooper*, no. 5873 (both ex hb. John Donnell Smith). YUCATAN: *G. F. Gaumer*, no. 416. VERA CRUZ: Santa Lucrecia, Isthmus Tehuantepec, *Chas. L. Smith*, no. 1102. TEPIC: San Blas, *Frank H. Lamb*, no. 608. Additional specimens in hb. U. S. Nat. Museum. — ORIZABA: Boca del Monte, *E. W. Nelson*, no. 204. This is mounted on sheet no. 257,518 with a specimen of *C. canescens*.

GUERRERO : between Tlapa and Tlaliscatilla, *E. W. Nelson*, no. 2048.

JALISCO : vicinity of San Sebastian, *E. W. Nelson*, no. 4070.

11. *C. ARVENSIS* Schlecht. & Cham., precedenti similis, omnifariam major, bracteis obovatis dilatatis coloratis corollam superantibus. — *Linnaea*, v. 103 (1830); *Benth.* l. c. 529; *Mart. & Gal.* l. c. 31; *Hemsl.* l. c. 460; *Loesen.* l. c. 285. — ORIZABA : *Botteri*, nos. 339, 437. MICHOACAN : near Guanajuato, *C. & E. Seler*, no. 1148; corn fields near Patzcuaro, *C. G. Pringle*, no. 3349. AGUAS CALIENTES : *Hartweg*, no. 192. JALISCO : Guadalajara, *C. G. Pringle*, nos. 5348, 11,646; *E. Palmer*, no. 575, coll. of 1886. OAXACA : Sierra de San Felipe, altitude 3050 m., *C. G. Pringle*, no. 5664; same locality, altitude 2000 m., *Conzatti & González*, no. 507; Etna, altitude 1600 m., *Lucius C. Smith*, no. 963. STATE OF MEXICO : Vallée de Mexico, *Schaffner*, no. 375; Atusco, *L. Hahn*, 1865–1866; Salto de Agua, *C. A. Purpus*, no. 1712. VERA CRUZ : Zacuapan and vicinity, dry meadows, *C. A. Purpus*, no. 1925; Cordoba, *Bourgeau*, no. 1893; same locality, altitude 850 m., *Conzatti & González*, no. 1135. S. W. CHIHUAHUA : *E. Palmer*, year 1885, number missing. MEXICO : without locality, *Bilimek*, no. 296; *Uhde*, no. 945.

12. *C. nitricola*, n. sp., herbacea; caule basi ramoso piloso 2 dm. alto; foliis lineari-oblongis apice obtusis basi amplexicaulibus, integris 3–4 cm. longis 2–5 mm. latis, investis pilis basi subpapillosis; foliis superioribus et floralibus flores aequantibus vel floribus brevioribus ovatis vel spatulatis, apice obtusis glandulosis; floribus sessilibus in spicis angustis; calycis segmentis obtusis integris 6 mm. longis puberulente glandulosis; corolla calycem paulo superanti; galea acuta, dorso puberula exserta curvata, labium inferius duplo superanti, 7 mm. longo; labii laciniis membranaceis acuminatis 1.5 mm. longis; stigmatibus vix exserto capitato-emarginato; capsula ovato-acuminata. — SAN LUIS POTOSI : knolls of alkaline meadows, Hacienda de Angostura, 10 July, 1891, *C. G. Pringle*, no. 3756 (type, in hb. Gray). This was distributed as *C. scorzonerifolia*, "a narrow-bracted form." It seems quite distinct, peculiar in the group in the erect divisions of the lower lip which somewhat resemble those of *C. mexicana*. The plant has a pallid fleshy appearance like many of the *Chenopodiaceae*. The lower part of the stem is marked by bunches of leaf-scales resembling tubercles like those on *C. communis* and *C. arvensis*. The flowers are ochroleucous.

13. *C. saltensis*, n. sp., herbacea sparse arachnoidea 1 dm. alta; caulibus 2–4 simplicibus; foliis radicalibus subrosulatis lineari-lanceolatis 1–1.5 cm. longis; foliis caulinis pinnatisectis, laciniis 3–5 divaricatis linearibus, imis saepe tantum longis quantum mediis; bracteis coloratis similibus foliis superioribus, laciniis latioribus; flori-

bus purpureis sessilibus in spicis brevibus; calyce 18 mm. longo, fisso 7 mm., laciniis obtuse lobatis vel profunde emarginatis binerviis arachnoideo-pilosis et glandulosis; corollae galea et labio inferiore calycem superantibus, priori 8 mm. longa, basi 3-4 mm. lata, apice acuta, dorso glandulari-puberulenti, antice purpurea membranacea; labio inferiore viridi protuberanti tridentato, dentibus obtusis incurvis infra triplicatis; stigmatate exserto bilobato, apice styli curvato; capsula ovato-acuminata 1 cm. longa. — DURANGO: near El Salto, altitude 2440-2600 m., 12 July, 1898, *E. W. Nelson*, no. 4553 (type, in hb. U. S. Nat. Mus., dupl. in hb. Gray). This is related to *C. Schaffneri* and *C. Pringlei*, but differs from all of the same alliance in general habit of growth, pubescence, and most especially in the lower lip of the corolla, which has the divisions separated by a plicate sinus that is often toothed at the top.

➤ 14. *C. PRINGLEI* Fernald, caulibus plurimis decumbentibus 3-6 cm. altis; foliis imis confertis et bracteiformibus ovatis 3-4 mm. longis, superioribus lanceolatis vel oblongo-lanceolatis simplicibus vel apice trilobatis pilosis 1.5-2 cm. longis; bracteis foliis similibus, laciniis angustis coloratis; calyce tubuloso 2.5-3.5 cm. longo, infra ochroleuco piloso, supra rubro puberulenti, segmentis 6-8 mm. longis obtuse bilobatis; corolla vix exserta, galea angusta pilosa, labio inferiore tri-saccato, lobis 1 mm. longis. — Proc. Am. Acad. xl. 56 (1904). — HIDALGO: Sierra de Pachuca, *C. G. Pringle*, nos. 9647, 8666 (type, in hb. Gray); *Rose & Hay*, no. 5581. MORELOS: Mount Popocatepetl, *Rose & Hay*, no. 6022. Related to *C. Schaffneri* but with much larger flowers and densely pilose calyx.

➤ 15. *C. SCHAFFNERI* Hemsl., hirsuta scabrida basi ramosa, ramis vel caulibus erectis vel adscendentibus, 2.5-5 cm. altis densissime foliosis; foliis integris anguste lineari-lanceolatis subacutis ca. 2 cm. longis; bracteis trinerviis trifidis, lobis linearibus acutis, medio longiore; calycis lobis rotundatis vel obscure emarginatis; corollae galea paulo exserta, dorso hirsuta; labio inferiore tridentato. — Hemsl. l. c. 462, t. lxiii. B. f. 7-13 (1882). — STATE OF MEXICO: in the valley of Mexico, *Schaffner*, no. 373 (dupl. of type, in hb. Gray); Desierto Viejo, same region, *Bourgeau*, no. 874; Flor de Maria, *C. G. Pringle*, no. 3193; Mount Ixtaccihuatl, altitude 3355-3660 m., *C. A. Purpus*, no. 218. MORELOS: meadows about Tres Marias, altitude 2897 m., *C. G. Pringle*, no. 13,141.

➤ Var. *cinerascens*, n. var., nana pallida foliosa cinerascens; caulibus ramosis caespitosis 1 dm. altis retrorse pilosis; foliis linearibus vel saepissime divaricate pinnatisectis, laciniis 3-5 attenuatis (media elongata) nervatis scabrido-hispidis; bracteis foliis superioribus similibus, apice ochroleucis puberulenti-glandulosis; calyce 1.5 cm. longo

fisso 7 mm., segmentis oblique emarginatis 4 mm. latis 4-nerviis scabrido-glandulosis; corollae galea calycem superanti 1.5 mm. lata 8 mm. longa, dorso puberulenti-glandulosa; labio inferiore paulo protuberanti triplicato, dentibus acutis; stigmatate exserto capitato; capsula elliptica acuta 1 cm. longa, in calyce inclusa. — PUEBLA: dry hills about Chalchicomula, altitude 2592 m., 27 July, 1901, *C. G. Pringle*, no. 8545 (type, in hb. Gray); same locality, *Rose & Hay*, no. 5809.

16. *C. TOLUCENSIS* HBK., procumbens ramosa; caulibus vel ramis 5–6 cm. altis; foliis lanceolatis obtusis hispidis, inferioribus integris, superioribus apice trifidis, laciniis obtusis ca. 2 cm. longis; bracteis trifidis trinerviis, lobo intermedio oblongo obtuso, lateralibus linearibus intermedium subaequantibus; floribus 2 cm. longis sessilibus; calycis segmentis rotundatis; corollae galea vix exserta, dorso hirta; labio inferiore acute tridentato. — HBK. *Nov. Gen. et Spec.* ii. 329 (1817); Benth. l. c. 530; Mart. & Gal. l. c. 29; Hemsl. l. c. 463. — High mountains of southern MEXICO: Mt. Ixtaccihuatl, *C. A. Purpus*, no. 230; bare summits of Nevada de Toluca, *C. G. Pringle*, no. 4250; Mt. Orizaba, *Rose & Hay*, no. 5770. In hb. U. S. Nat. Mus. there is also a specimen collected by *E. W. Nelson* on Mt. Toluca.

17. *C. MORANENSIS* HBK. "caulibus suffruticosis, simplicibus, prostratis, pubescenti-hispidis; foliis lanceolatis, acutis, hispidis, integris, superioribus trifidis; floribus axillaribus, sessilibus; corolla calycem paulo superante; calycis lobis rotundatis emarginatis; corollae labio inferiori brevissimo, dentato." — HBK. *Nov. Gen. et Spec.* ii. 329 (1817); Benth. l. c. 530; Mart. & Gal. l. c. 30; Hemsl. l. c. 462. — There seem to be no specimens of this in hb. Gray. The type was collected in temperate localities between Pachuca and Moran, State of Hidalgo probably.

18. *C. nervata*, n. sp., herbacea, caulibus 1–5, 1–3 dm. altis divaricate pilosis et glandulare pubescentibus; foliis 3–5-nerviis, inferioribus oblanceolatis apice obtusis rectis integris 3–6 cm. longis, 1 cm. latis, superioribus oblongis apice obtusis basi angustatis et amplexicaulibus, floribus inferioribus sessilibus in axillis foliorum, superioribus confertis et occultis in spicis ornatis, bracteis obovatis 2–3 cm. longis apice coccineis; calyce 2 cm. longo 4 mm. lato vix corollam superanti, fisso 5 mm., segmentis 4-nerviis apice rotundatis; corollae galea 1 cm. longa dorso glandulari-pilosa, labio inferiore protuberanti trisaccato infra lacinias tuberculati-rugoso, laciniis exterioribus 3 triangularibus obtusis, interioribus 2 brevioribus sinus terminantibus; stylo stigmatateque exsertis; capsula oblique oblonga compressa 1 cm. longa. — CHIHUAHUA: vicinity of Madera, May to June, 1908, altitude 2250 m., *F. Palmer*, no. 274 (type, in hb. Gray). There is also in hb. Gray a fragmentary

specimen from the same region, *C. V. Hartman*, no. 150 (Lumholtz Exped.), which may be this species. *C. nervata* resembles *C. aspera* in the tuberculate-rugose sac-like lower lip of the corolla, but differs in having the segments of the calyx quite entire and in the glandular pubescence. The flowers are smaller and the capsules less ovoid. The strongly nerved leaves suggest *C. lithospermoides*, but otherwise it is quite different.

19. *C. CONZATTII* Fernald, "suffruticosa; caulibus simplicibus erectis glanduloso-puberulis; foliis linearibus vel lineari-lanceolatis, 3-5-nerviis, 2-7 cm. longis dense puberulis, inferioribus integris, superioribus pectinatis, laciniis linearibus patentibus; bracteis oblongis 1.5-2.5 cm. longis, summis coccineis trifidis, lobis lateralibus linearibus vel spatulatis, intermedio majore anguste obovato integro vel obsolete trilobo; pedicellis 1 mm. longis; calyce mediam tantum corollam paululo superante 1.5-1.8 cm. longo viridi et albo, antice et postice aequaliter fisso, lobis oblongis subtruncatis 5-6 mm. longis; corolla viridi et rubella 2.2-2.5 cm. longa, tubo 1.2-1.3 cm. longo, galea elongata, labii lobis obtusis 1 mm. longis." — Proc. Am. Acad. xliii. 67 (1907). — OAXACA: Santa Ines del Monte, Zimatlan, altitude 2700 m. *Conzatti*, no. 1360 (type, in hb. Gray); 25 km. southwest of City of Oaxaca, altitude 2287-2897 m., *E. W. Nelson*, no. 1368.

20. *C. rigida*, n. sp., perennis rigida recte sparseque ramosa 3 dm. alta; caulibus et foliis purpurascensibus albo-pubescentibus; foliis inferioribus oblanceolatis, ceteris lanceolatis apice obtusis basi non dilatatis ca. 3-4 cm. longis 2-5 mm. latis; floribus sessilibus in spicis elongatis; bracteis oblongis apice rotundatis vel acutis coccineis puberulis flores subaequantibus, basi pilosis 2-2.5 cm. longis 5-8 mm. latis; calyce fisso 1 cm., segmentis ca. 5 mm. latis, apice oblique truncatis, 4-nerviis coccineis puberulis; galea exserta 5 mm., dorso puberula viridi, antice membranacea coccinea; labio inferiore obtuso, lobis membranaceis, lateralibus oblique truncatis, medio deltoideo obtuso, 1 mm. longo et lato, sinibus crassis involutis; stylo exserto 3 mm., stigmatibus bilamellatis; capsulis caulibus adpressis oblongo-cylindraceis acuminatis 15 mm. longis. — Hills near Chihuahua, 16 April, 1885, *C. G. Pringle*, no. 188, in part (type, in hb. Gray). As in *C. Conzattii*, to which this species is related, the flower after anthesis has a tendency to curve outward above the capsule.

21. *C. falcata*, n. sp., caule simplici recto 3-3.5 dm. alto glandulare puberulenti et tenuiter piloso rubro angulato; foliis oblongo-lanceolatis integris vel sparse et irregulariter laciniatis 2-2.5 cm. longis, basi 3-10 mm. latis dilatate et auriculate amplexicaulibus 3-5-nerviis glandulare pilosis; bracteis foliis latioribus et longioribus, inferioribus viri-

dibus, supremis apice coccineis; floribus sessilibus interruptis in spicis elongatis, falcatis bracteis superantibus; calyce fisso 12 mm., tubo anguste cylindrico piloso, segmentis dilatatis 4-5 mm. latis coccineis puberulentibus; galea et labio inferiore calycem superantibus; galea 1 cm. longa, basi 3-4 mm. lata, dorso viridi glandulare pilosa, antice coccinea membranacea; labio inferiore protuberanti trisaccato, dentibus acutis viridibus, sinibus implicatis cum plicaturis interioribus; stylo apice et stigmatibus subclavato exsertis; capsula ovata oblique-acuminata. — PUEBLA: Mount Orizaba, altitude 3660 m., 14 Aug., 1901, *C. G. Pringle*, no. 8560 (type, in hb. Gray). This is related to *C. Conzattii*, differing in having much longer flowers, with segments of the calyx red instead of green. The falcate flowers spreading outwards resemble those of § *Hemichroma*, but the equally cleft calyx is that of § *Euchroma*. It is a showy species.

22. *C. HIRSUTA* Mart. & Gal., "caule fruticuloso humili ramoso dense hirsuto-villoso; foliis obovato-spatulatis 3-nerviis apice rotundatis integerrimis villosis scabris, corolla calycem coccineum longe excedente. — Folia $\frac{1}{2}$ -pollicaria, flores pollicares. Dans les champs de Zacuapan, à 3000 pieds. Fl. rouge vif. Février-juillet." — Bull. Acad. Brux. xii. pt. 2, 29 (1845); Walp. Rep. vi. 651; Hemsl. l. c. 460; Greenman, Proc. Am. Acad. xli. 460. *C. obovata* Benth. l. c. 528. — HIDALGO: in a barranca below Trinidad Iron Works, altitude 1525 m., *C. G. Pringle*, no. 8935. Through the kindness of Dr. Prain, Director of the Royal Gardens at Kew, specimens under this number were compared with authenticated specimens in hb. Kew and reported as similar. There is a tendency in the specimens in hb. Gray to have incised dentate or lacinate leaves. Bentham placed this in § *Epichroma* on account of the somewhat ampliate calyx-limb. It is entirely unlike the other species in that section in habit, foliage, bracts, and flowers, and has the characteristic equally cleft calyx-divisions of § *Euchroma*, so in this synopsis it is included under the latter section.

23. *C. SCORZONERIFOLIA* HBK., simplex vel basi ramosa perennis; caulibus piloso-hispidis; foliis linearibus vel lanceolatis hispidulis; apice saepe angustatis; floribus spicatis sessilibus; bracteis oblongis acutis integris pilosis coccineis vel purpurascensibus florem subaequantibus; calycis segmentis coloratis emarginato-bidentatis; corolla calycem vix superanti; galea lineari dorso pilosa; labio inferiori quinque-dentato; stylo exserto filiformi; stigmatibus capitato emarginato-bilobato; capsula oblonga compressa acuminata vel acuta. — HBK. Nov. Gen. et Spec. ii. 331, t. 165 (1817); Mart. & Gal. l. c. 29. *C. scorzoneraefolia* Benth. l. c. 529; Hemsl. l. c. 462. *C. speciosa* Mart. & Gal. l. c. 30 (1845). The following are in hb. Gray: — PUEBLA: Mt. Orizaba,

altitude 3350 m., *H. E. Seaton*, no. 208. SAN LUIS POTOSI: altitude 1830–2440 m., *Parry & Palmer*, no. 690, coll. of 1878; hillsides, Las Canoas, *C. G. Pringle*, no. 3066. STATE OF MEXICO: Nevada de Toluca, about timber-line, altitude 4000 m., *C. G. Pringle*, no. 4225; Sierra de Ajusco, *J. W. Harshberger*, no. 123 a. COAHUILA: Sierra de Parras, *C. A. Purpus*, no. 1051; Levios, 67 km. east of Saltillo, *E. Palmer*, no. 2026, coll. of 1880. NUEVO LEON: near Monterey, *C. G. Pringle*, no. 2236; north-east side of Volcano Colima, *P. Goldsmith*, no. 80 a. DURANGO: Otinapa, *E. Palmer*, no. 367, coll. of 1906, in part. Mexico without locality: *Dr. J. Gregg*, no. 407. The following have been examined from hb. U. S. Nat. Mus. — Mount Orizaba, *E. W. Nelson*, no. 282, *Rose & Hay*, no. 5741. TAMAULIPAS: mountains near Miquihuana, altitude 2135–2745 m., *E. W. Nelson*, no. 4485. This is a showy plant, distinguished from allied species by the pilose pubescence (somewhat glandular only on the inflorescence) and by the five-toothed lower lip of the corolla. The species may prove to be an aggregate when more fully understood. The forms with strictly acuminate capsules do not seem exactly similar to those with capsules subtruncate to acute, but the material has not been sufficient to warrant a division.

→ 24. *C. GLANDULOSA* Greenman, annua vel perennis basi indurata, pilosa et glandulari-pubescens; caulibus simplicibus rectis 1–3 dm. altis; foliis viridibus vel purpurascensibus sessilibus, paulo basi dilatatis et amplexicaulibus, lanceolato-attenuatis 1.5–5 cm. longis 1–6 mm. latis, acutis integris et saepe crispe undulatis trinerviis; floribus sessilibus et confertis 2–2.8 cm. longis in spicis ornatis 2–18 cm. longis, floribus inferioribus distantibus; bracteis inferioribus lanceolato-acuminatis foliaceis, superioribus oblongis apice rhomboideis coccineis vel flavis saepe flores superantibus; calyce fisso 8 mm., segmentis obtusis vel vix emarginatis; corolla 2–2.7 cm. longa calycem superanti 3–5 mm., galea recta 7–9 mm. longa dorso viridi glandulari-puberulenti, antice alba membranacea; capsula ovoidea acuminata 10–12 mm. longa. — Proc. Am. Acad. xli. 247 (1905). — STATE OF MEXICO: hills near Lecheria Station, altitude 2200 m., *C. G. Pringle*, no. 10,000 (type, in hb. Gray); hills above Santa Fé, altitude 2440 m., *C. G. Pringle*, no. 7979; *Schaffner*, no. 322. DURANGO: Otinapa, *E. Palmer*, no. 367, coll. of 1906, in part; City of Durango, *E. W. Nelson*, no. 4601. OAXACA: Sierra de San Felipe, altitude 3140 m., *C. G. Pringle*, no. 4722, in part; 10 km. above Domingullo, altitude 1980 m., *E. W. Nelson*, no. 1644; summit of Mt. Zempoaltepec, altitude 3470 m., *E. W. Nelson*, no. 626 (hb. U. S. Nat. Mus.); Sierra de Tápalo, altitude 2500 m., *González & Conzatti*, no. 759 (doubtful).

HIDALGO: Ixmiquilpan, mountain slopes, *C. A. Purpus*, no. 1411 a; Sierra de Pachuca, altitude 2897 m., *C. G. Pringle*, no. 7618, in part; hills near Julianaciugo, *C. G. Pringle*, no. 13,278. PUEBLA: Mt. Orizaba, *Rose & Hay*, no. 5686. SAN LUIS POTOSI: in montibus San Miguelito, *J. G. Schaffner*, no. 741; *Parry & Palmer*, no. 691. COAHUILA: north-east side of Mt. Colima, *P. Goldsmith*, no. 80. Seemann's plant from northwest Mexico is doubtfully included. These specimens probably represent an aggregate of perhaps two or more species which it seems impossible with the present knowledge to segregate. The line between this species and the preceding is not very clear. It is somewhat doubtful in the light of present investigation how much weight is to be placed on the form of the lower lip of the corolla. The above specimens are all characterized by a lower lip with three teeth incurving in age, separated by a broad infolding sinus, so that when it is spread open the teeth are quite separated. *C. scorzonerifolia* has the teeth of the lower lip rather close and the sinus marked by smaller teeth. The indumentum of *C. glandulosa* is in general pilose, but there is also present a close glandular pubescence or almost puberulence, the glands under a lens appearing shortly and finely stipitate. The leaves are somewhat variable, though the typical specimens in each species have rather long acuminate leaves. Some specimens included among the above have obtuse leaves not at all acuminate.

25. *C. cryptandra*, n. sp., pilosa et hirsuti-scabrida, striata; foliis superioribus ovatis acuminatis integris 3-5-nerviis, apice obtusis, basi cordato-amplexicaulibus, nerviis hispido-scabridis; spicis coccineis, floribus confertis breviter pedicellatis, bracteis obovatis coloratis flores superantibus, 3 cm. longis, 1-1.5 cm. latis integris apice rotundatis; calyce fisso 1 cm., 2.5 cm. longo, laciniis obtuse bilobatis 4 mm. longis, glandulari-pilosis; galea paulo calycem superanti dorso pilosa et glandulosa; stylo curvato exserto, stigmatate clavato; capsula compressa ovato-acuminata. — COLIMA: Cuchilla, northeast side of Volcano Colima, 22 July, 1905, *P. Goldsmith*, no. 76 (type, in hb. Gray). — This is a showy species related to *C. scorzonerifolia*, differing in its more veiny leaves, coarse and rough pubescence, and in having the lower lip of the corolla with three instead of five teeth. It is also related to *C. lithospermoides*, but the bracts are much larger, almost completely concealing the flowers.

26. *C. LITHOSPERMOIDES* HBK., caule recto simplici piloso-hispido; foliis lanceolato-linearibus, apice angustatis et obtusis, integris valde trinerviis piloso-hispidis ca. 5-7 mm. latis 3-6 cm. longis; floribus spicatis sessilibus; bracteis apice dilatatis rubicundis flores excedentibus; calycis segmentis bilobatis, lobis rotundatis; corolla albida vix calyce

longiore; galea dorso pubescenti; labio inferiore brevissimo tridentato, dentibus incurvis; stylo exserto, stigmatе capitato-emarginato; capsula ovata vix acuta. — HBK. Nov. Gen. et Spec. ii. 331, t. 164 (1817); Benth. l. c. 530; Mart. & Gal. l. c. 28; Hemsl. l. c. 461. *C. angustifolia* Mart. & Gal. l. c. 29 (1845) is considered a synonym of this, but the name is preoccupied. The range of this species, if all that seem to agree with the description and authenticated specimens are correctly identified, is from South America to N. W. Mexico. The type was collected probably in the State of Hidalgo near Real del Monte. Specimens in hb. Gray. — JALISCO: Guadalajara, *C. G. Pringle*, nos. 2565, 9348, 9461. OAXACA: Santa Domingo, *E. W. Nelson*, no. 2679. ORIZABA: San Cristobal, *Bourgeau*, no. 2904; N. W. Mexico, *Seemann*. There is also included no. 4168, collected by *C. G. Pringle* in Michoacan, distributed as *C. angustifolia* Mart. & Gal.

27. *C. Nelsonii*, n. sp., suffrutescens; caulibus simplicibus 3-4 dm. altis striatis glabrescentibus; foliis ovato-acuminatis 3-5-nerviis auriculati-amplexicaulibus apice obtusis integris 5-7 cm. longis 1.5-2 cm. latis desuper glabris, nerviis inferioribus puberulentibus; spicis coccineis investis pilis longis albis, floribus confertis, bracteis apice dilatatis integris et undulatis vel obtuse et breviter lobatis calyces superantibus; calyce 18 mm. longo, 7 mm. lato ad 1 cm. fisso, laciniis inaequale et obtuse bilobatis; galea recta tubum aequanti, calycem superanti, dorso glandulari-puberulenti; labio inferiore triplicato, laciniis 3 rectis acuminatis; stylo curvato exserto; stigmatе capitato obscure emarginato; capsula ovata acuminata compressa. — SOUTHWEST CHIHUAHUA: Mount Mohinora, 1 September, 1898, *E. W. Nelson*, no. 4895 (type, in hb. U. S. Nat. Mus. and hb. Gray). This species is related to *C. scorzonnerifolia*, but differs in having much larger almost smooth leaves. The corolla is dissimilar, with three rather long acuminate divisions instead of five short teeth. *C. Nelsonii* is a showy plant with a large subcapitate spike of scarlet bracts and flowers terminating the tall stems.

28. *C. LANATA* Gray, tomentosa floccosa simplici denso undique incana; foliis linearibus integerrimis, floralibus nunc trifidis apice coloratis; spicis demum interruptis; calycis lobis obovato-oblongis integerrimis retusisve. — Gray in Torr. Bot. Mex. Bound. Surv. 118 (1859); Gray, Synop. Fl. N. Am. ii. pt. 1, 298; Hemsl. l. c. 461. — The type (in hb. Gray) was collected along and near the Rio Grande river from Eagle Pass to El Paso. COAHUILA: Saltillo, *E. Palmer*, no. 76, coll. of 1898, and no. 990, coll. of 1880; *C. C. Parry*, no. 20; near Diaz, *C. G. Pringle*, no. 9032, and Carneros Pass, no. 3192. NORTHERN ZACATECAS: Cedros, *F. E. Lloyd*, no. 102. San Luis Potosi to San Antonio, Texas, *C. C. Parry*, no. 689.

29. *C. GUADALUPENSIS* Brandegee, frutescens intricate ramosa, 2-3 dm. alta; caulibus senioribus glabris atris, junioribus tomentosis; foliis anguste spatulatis 15-18 mm. longis, 2-4 mm. latis dense tomentosis; calycis segmentis tubum aequantibus; galea calycem paulo superanti tubum aequanti; labio inferiore brevissimo tridentato. — Zoe, v. 166 (1903). — Guadalupe Island off the coast of Lower California, *A. W. Anthony*, 1896 (type, in hb. Univ. Calif.), *Harry Drent*, 1898, *Dr. E. Palmer*, no. 59 (coll. of 1875). This species is related to *C. foliolosa*, but is more intricately and divaricately branched. The stems are harder and more woody, while the leaves are longer and narrower at base. In Dr. Palmer's specimen the longest leaves are 6 cm. long and the broadest almost 1 cm. wide. It is a younger and more vigorous shoot than the type, which has been examined through the kindness of T. S. Brandegee and H. M. Hall.

30. *C. INTEGRA* Gray, perennis; caulibus tomentosis, basi ramosis 3-7 dm. altis; foliis lineari-lanceolatis tomentulosis integris 3-8 cm. longis 4-8 mm. latis; floribus sessilibus in spicis brevibus demum elongatis; bracteis oblongis obovatis coccineis subpetaloideis floribus paulo brevioribus; calyce 2-3 cm. longo colorato, lobis bifidis lanceolatis obtusiusculis; corolla viridi-coccinea ca. 1.6 cm. longa; labio inferiore brevissimo. — Torr. Bot. Mex. Bound. Surv. 119 (1859); Gray, Synop. Fl. N. Am. ii. pt. 1, 298; Hemsl. l. c. 461. *C. tomentosa* Gray in Torr. Bot. Mex. Bound. Surv. 118 (1859). — CHIHUAHUA: near Colonia Garcia, Sierra Madre, altitude 2287 m., *Townsend & Barber*, no. 448; Santa Eulalia Mts., *C. G. Pringle*, no. 226; hills near Chihuahua, *Palmer*, no. 87, coll. of 1908; Puerto de San Diego, altitude 1982 m., *C. V. Hartman*, no. 598 (Lumboltz Exped.). SONORA: Mabibi, *Geo. Thurber*, no. 438 (type of *C. tomentosa*). In hb. U. S. Nat. Mus. are specimens from Chihuahua, Sierra Madre, *E. W. Nelson*, no. 6495.

31. *C. aspera*, n. sp., suffruticosa; caulibus simplicibus sparse pilosis et scabrido-puberulentibus angulatis rectis 3 dm. altis vel majoribus; foliis oblongis trinerviis scabrido-hispidis 4 cm. longis 5-10 mm. latis, apice obtusis vel acutis; bracteis inferioribus foliis similibus, flores superantibus, superioribus brevioribus apice margineque coloratis quam flores brevioribus; calyce 2.2 cm. longo subaequaliter in altitudinem 8 mm. fisso, segmentis bilobatis, lobulis subulatis 5 mm. longis, tubo nervato; corollae galea calycem superanti 1-2 mm. obtusa, dorso glandulare puberulenti; labio inferiore trisaccato rugoso-tuberculato, laciniis viridibus, media incurva bicarinata acuta, lateralibus latioribus dentatis; stylo exserto curvato, stigmatate capitato; ovario oblique acuminato. — CHIHUAHUA: near Colonia Garcia, Sierra Madre, altitude

2287 m., 3 June, 1899, *Townsend & Barber*, no. 449 (type, in hb. Gray), also no. 250; same locality, *E. W. Nelson*, nos. 6227, 6101 (hb. U. S. Nat. Mus.). DUBANGO: Otinapa, *E. Palmer*, no. 367 in part, July–August, 1906. The two equal segments of the calyx place this in *Euchroma*, but these parts are sharply cleft as in *Hemichroma*. The lower lip of the corolla resembles that of *C. nervata*.

32. *C. ctenodonta*, n. sp., perennis glandulari-pilosa; rhizoma gracili; caule simplici recto gracili 2–3.5 dm. alto; foliis infimis non rosulatis sed imbricatis lanceolatis integris trinerviis 3 cm. longis 5 mm. latis, apice acuminatis; foliis ceteris imbricatis vel distantibus lanceolato-acuminatis pectinatis cum lobulis filiformibus 1–5 mm. longis distantibus 2–8 mm., saepe pectinato-dentatis, basi cordato-amplexicaulibus et paulo decurrentibus; spicis capitatis non-numquam pedunculatis et demum elongatis; bracteis supremis pectinatis vel anguste laciniatis quam flores brevioribus, apice coccineis; floribus sessilibus paucis subdivaricatis; calyce coccineo nunc paulo longiore nunc corolla brevior, segmentis acuti 1–2 mm. in altitudinem bifidis; corollae galea obtusa exserta 4–7 mm. dorso barbata; labio inferiore non viso; stylo exserto 1–2 mm. gracili; stigmatе clavato integro; capsula elliptica acuta. — OAXACA: wet meadows, Sierra de Clavellinas, altitude 2745 m., 16 October, 1894, *C. G. Pringle*, no. 4986 (type, in hb. Gray). — This number was distributed as *C. pectinata*, but cannot be that shrubby plant, nor is it to be classed in the same alliance. It more nearly approaches *C. patriotica*, but differs from that well-marked species in leaves, pubescence, and flowers. It is a more slender plant with simple stems. There are features which ally it to *C. minor*, such as, the narrow segments of the calyx-divisions, the slender red-tipped divisions of the uppermost bracts, and the conspicuously colored lower lip of the corolla. The leaves are typically pectinate with the rachis lanceolate. It is doubtfully placed in *Euchroma*.

33. *C. BRYANTI* Brandege, annua 1.5–3 dm. alta divaricate pilosa ramosa, ramulis gracilibus rectis; foliis inferioribus linearibus integris, ceteris pinnatisectis, laciniis 3–7 linearibus acutis; floribus spicatis apice confertis infra elongatis et interruptis; bracteis similibus foliis superioribus, apice coccineis vel ochroleucis; calycis segmentis 7–9 mm. longis 2–3 mm. in altitudinem bisectis, laciniis lanceolatis; corolla calycem aequanti 15–18 mm. longa, galea brevi, labii inferioris lobis brevibus incurvatis; capsula oblongo-cylindracea vel subellipsoidea 1 cm. longa. — Proc. Cal. Acad. ser. 2, ii. 192 (1889), iii. 157. — In habit of growth and foliage this species resembles *Orthocarpus*, but the flowers are those of *Castilleja*, approaching *C. affinis*, though much smaller and less exserted. The pods are different from those of any

other species, being much narrower, approaching those of *C. minor*. The lower part of the stem is very leafy, the leaves becoming 1 dm. long, the rhachis and divisions 0.5–2 mm. broad. The type and all specimens are in hb. Univ. Calif. except a small part of a flowering branch in hb. Gray and perhaps also in hb. U. S. Nat. Mus., collected by Lyman Belding no. 4, at Laguna, Lower California, altitude 915 m. The specimens from hb. Univ. Calif. were kindly loaned by T. S. Brandegee and H. M. Hall. The species has been found only in Lower California and at the following localities: San Jorge, San Estaban, Sierra de Laguna, Sierra de San Francisquito, San Jose del Cabo.

34. *C. AFFINIS* H. & A., perennis herbacea; caule simplici pilosohispido 3–6 dm. alto; foliis lineari-lanceolatis trinerviis integris raro pinnatisectis; floribus subracemosis, inferioribus pedunculatis, superioribus confertis; bracteis similibus foliis brevioribus; calycis segmentis acute bilobis; corolla calycem superanti et valde divaricate exserta; labio inferiore exserto protuberanti. — Bot. Beech. 154 (1833); Benth. in DC. Prodr. x. 532; Gray in Bot. Cal. i. 573, and Synop. Fl. N. Am. ii. pt. 1, 296; Hemsl. l. c. 460. — This species is distinctively Californian and peculiar to the coast region. It varies extremely in foliage and flowers but can scarcely be divided into varieties. The Mexican specimens in hb. Gray are all from the coast of Lower California, — Todos Santos Island, *A. W. Anthony*, no. 198; San Quentin, *E. Palmer*, no. 642, coll. of 1889.

35. *C. MINOR* Gray, annua, vel perennis glandulosa et sparse pilosa; caulibus simplicibus vel ramosis 1–plurimis 3–6 dm. altis gracilibus foliosis; foliis anguste linearibus apice attenuatis 2–5 cm. longis; floribus racemosis, pedicellis brevibus filiformibus rectis; bracteis terminalibus fasciculatis apice coloratis anguste linearibus et attenuatis; calyce subfalcato in altitudinem 1.5 cm. fisso, laciniis 2 filiformibus 1–5 mm. longis; galea et labio e fissura exsertis, galeae dentibus triangularibus coccineis exsertis; capsula anguste ovoideo-cylindracea acuta. — Gray in Bot. Cal. i. 573 (1876), and Synop. Fl. N. Am. ii. pt. 2, 295. *C. affinis*, var. *minor* Gray in Torr. Bot. Mex. Bound. Surv. 119. *C. affinis* Seemann, Bot. Voy. Herald, 323, not H. & A. — NEW MEXICO: beds of exsiccated streams near the copper mines, *Wright*, no. 1494 (type, in hb. Gray). CHIHUAHUA: *C. V. Hartman*, no. 583 (Lumholtz Exped.); *Bigelow*; *Wright*, no. 1493; Presidio del Norte, *Schott*. SONORA: Los Animas, *Thurber*, no. 330; Tubac, *Parry*; Santa Cruz Mountains, *Captain E. K. Smith*. N. W. Mexico, *Seemann*, distributed as *C. affinis*. This species has more slender flowers than its allies. At the summit of the stem the bracts and flowers are

closely clustered, the ribbon-like bracts surpassing the flowers; later the flowers become rather distant on the flowering axis.

36. *C. MEXICANA* (Hemsl.) Gray, annua vel biennis nana 7–15 cm. alta hirsuta; caulibus dense foliosis; foliis pinnatifidis sessilibus, lobis linearibus utrinque saepius 2; floribus sessilibus 5–6 cm. longis rectis, post anthesim divaricatis; bracteis calyce brevioribus basi latis trinerviis, alte trilobatis, lobis linearibus obtusiusculis, lateralibus paulo brevioribus; calycis lobis viridibus, laciniis anguste linearibus non-numquam idem bifidis; corolla calycem triplo superanti gracili puberula; labiis subaequalibus inferiore tripartito basi obscure saccato. — Gray in Proc. Am. Acad. xxi. 404 (1886). *Orthocarpus mexicanus* Hemsl. Biol. Cent.-Am. Bot. ii. 463, t. 63 A. f. 1–6 (1882). — The type is in hb. Kew and was collected in Zacatecas, North Mexico, by Coulter. COAHUILA: Sierra Pata Galana, *C. A. Purpus*, no. 1050; Saltillo, *E. Palmer*, no. 530, coll. of 1905, 992 and 993, coll. of 1880, also no. 13, coll. of 1898; same locality, *C. C. Parry*, no. 20½. NUEVO LEON: near Monterey, altitude 610 m., *C. G. Pringle*, no. 10,156. SAN LUIS POTOSI: San Miguelito Mountains, *Dr. J. G. Schaffner*, no. 82. CHIHUAHUA: on rocky hills near town, *C. G. Pringle*, no. 209; Pueblo de Galleana, no. 657, and Puerto de St. Diego, *C. V. Hartman*, no. 631 (Lumholtz Exped.). *C. sessiliflora* Pursh is excluded as all specimens seen appear to be *C. mexicana*. The two are very closely related.

37. *C. auriculata*, n. sp., suffruticosa canescens pilosa et glandulosa; caulibus ramosis; ramis ascendentibus; foliis imbricatis anguste deltoideis acutis vel apice obtusis, basi auriculate amplexicaulibus, integris 1–3 cm. longis 5–15 mm. latis, palmate trinerviis, nervio medio distinctissimo, cinereis scabridis cum glandulis et pilis glandulosis; floribus imbricate spicatis; bracteis foliis similibus, supremis coloratis; spicis confertis, floribus subsessilibus; calyce 2.5 cm. longo antice in altitudinem 2.5 cm., postice 7 mm. fisso, laciniis integris vel bidentatis, 2–3-nerviis; corolla 3.7 cm. longa, galea paulo tubo longiore, antice membranacea, dorso glandulosa, exserta 5–10 mm.; labii inferioris lobis 3, exterioribus linearibus acutis 3 mm. longis paulo medium excedentibus sinibus intus plicatis; stylo exserto; stigmatе clavato apice capitato et obscure emarginato; capsula rhomboideo-orbiculata acuminata compressa 1 cm. longa. — Between Huajuapán, OAXACA, and Retlatzingo, PUEBLA, November 19, 1894, *E. W. Nelson*, no. 1992 (type, in hb. Gray and duplicate in hb. U. S. Nat. Mus.). This species is nearest to *C. longiflora*, differing most noticeably in its broader, conspicuously auriculate, closely imbricated leaves. The flowers are more erect and the corolla in anthesis more in a line with the calyx.

38. *C. LONGIFLORA* Kunze, "caule suffruticoso, tenui, erecto, imprimis

basi ramoso, foliis, inferioribus suboppositis, horizontalibus deflexisque, e basi amplexente dilatato-auriculata linearibus acuminatis, superioribus latioribus, omnibus trinerviis; bracteis ovato-acuminatis, trinerviis, pallidis, summo apice lateritiis, divergenti-divaricatis; floribus brevissime pedunculatis terminalibus, subracemosis, paucis, calycis tubulosi compressi lobis elongatis, bidentatis (aurantiis), corolla longe exserta, labio superiori attenuato, obtuso, recto (apice rubello), inferiore minuto, bi-, rarius trifido, lobis porrectis, obtusis, stylo parum exserto." — *Linnaea*, xvi. 312 (1842); *Mart. & Gal.* l. c. 28; *Benth.* l. c. 533; *Hemsl.* l. c. 461. — PUEBLA: near Tehuacan, altitude 1700 m., *C. G. Pringle*, no. 9517, *C. A. Purpus*, no. 1287, *Rose & Hay*, no. 5844 (hb. U. S. Nat. Mus.); also in calcareous soil, altitude 1677 m., *C. G. Pringle*, no. 6250. MICHUACAN: Las Reyes, *E. W. Nelson*, no. 6859; Volcano Jorullo, *E. W. Nelson*, no. 6949. OAXACA: valley of Oaxaca, alt. 1675–2290 m., *E. W. Nelson*, no. 1459 in part (hb. U. S. Nat. Mus.).

39. *C. subalpina*, n. sp., perennis herbacea; rhizomatibus ligneis gracilibus; caulibus 3 dm. altis simplicibus angulatis albo-pilosis; foliis lanceolatis apice acutis basi auriculati-amplexicaulibus 2.5–3.5 cm. longis ca. 5 mm. latis trinerviis sparse pilosis et dense scabrido-puberulis et obscure glandulosis; foliis floralibus quam caulina paulo latioribus apice nunc coloratis nunc viridibus; floribus rectis subsessilibus in spicis demum elongatis; calyce 3 cm. longo piloso antice 2 cm. postice 16 mm. in altitudinem fisso; segmentis pilosis coccineis acute bidentatis; corolla recta 4 mm. longa, galea obtusa 2 mm. longa, dorso barbata, antice rubra membranacea, labio inferiore brevi protuberanti, laciniis incurvis ovato-subulatis brevibus, sinubus similibus glandulis, stylo filiformi exserto 5 mm.; stigmatibus clavatis; capsula ovato-acuminata cauli adpressa, 12 mm. longa. — OAXACA: Sierra de San Felipe, altitude 3140 m., 26 June, 1894, *C. G. Pringle*, no. 4722 in part, distributed under *C. scorzoniferifolia* HBK. (type, in hb. Gray). It belongs near *C. longiflora* but has different pubescence, and generally longer and narrower leaves. The flowers are more slender and less crowded than in the other species and generally more erect.

40. *C. tenuiflora* Benth., fruticosa scabrido-pubescentis ramosa vel simplex; foliis linearibus vel lanceolatis basi amplexicauli-dilatatis integris; floribus spicatis; bracteis lanceolatis acutis, supremis apice coloratis quam folia latioribus; calyce elongato acute 2–4-dentato; corollae galea elongata; labio inferiore protuberanti, lobis brevibus subulato-acuminatis, primum inflexis demum reflexis. — *Pl. Hartweg*, 22 (1839); *DC. Prodr.* x. 533; *Hemsl.* l. c. 463; *Loesen.* l. c. 285. — The following Mexican specimens are in hb. Gray unless otherwise

indicated: *Hartweg*, no. 191, type; *Coulter*, no. 1354. STATE OF MEXICO: Tacubaya (Tokabaya), *Bilimek*, no. 288; Sierra de Ajusco, 2592 m. alt., *C. G. Pringle*, nos. 9476 and 11,063; Chapultepec, *C. G. Pringle*, no. 1472; valley of Mexico, *Bourgeau*, no. 125. OAXACA: Cerro San Felipe, *E. W. Nelson*, no. 1146; also in hb. U. S. Nat. Mus. nos. 1166 and 1076; west slope of Mount Zempoaltepec, 2300–2440 m. alt., *E. W. Nelson*, no. 559, hb. U. S. Nat. Mus.; near Reyes, *E. W. Nelson*, no. 1735, hb. U. S. Nat. Mus. COAHUILA: 9.6 km. east of Saltillo, *E. Palmer*, no. 991, April, 1880; San Lorenzo Cañon, *E. Palmer*, no. 415, coll. of 1904. HIDALGO: Ixmiquilpan, *C. A. Purpus*, no. 1411; Sierra de Pachuca, *Rose & Hay*, no. 5582. PUEBLA: San Martin, *E. W. Nelson*, no. 8, and on same sheet without separate numbers is a specimen from Mexico and another from Vera Cruz, hb. U. S. Nat. Mus.; in plaza near Calchicomula, *Rose & Hay*, no. 5807; near town of Puebla, *Lucius C. Smith*, no. 905. JALISCO: Guadalajara, *E. Palmer*, no. 265, July, 1886; *C. G. Pringle*, no. 8763. MICHOACAN: north slope of Mount Patamban, 2897–3355 m. alt., *E. W. Nelson*, no. 6587; *C. & E. Seler*, no. 1281, SAN LUIS POTOSI: *E. Palmer*, no. 724, coll. of 1898; no. 88, coll. of 1902; *Parry & Palmer*, no. 692, coll. of 1878. MORELOS: Tres Marias Mountains, *C. G. Pringle*, no. 11, 647. SONORA: Huchuerachi, 1220 m. alt., *C. V. Hartman*, no. 299, and *F. E. Lloyd*, no. 436 (Lumholtz Exped.). VERA CRUZ: Mount Orizaba, 2745 m. alt., *H. E. Seaton*, no. 160; Boca del Monte, *E. W. Nelson*, no. 194, hb. U. S. Nat. Mus. STATE OF MEXICO: Mount Popocatepetl, *Rose & Hay*, no. 6063; foot-hills of Mount Ixtaccihuatl, *Chas. C. Deam*, no. 19; Cholula, *Chas. C. Deam*, no. 85.

41. *C. CANESCENS* Benth., suffruticosa ramosa canescenti-hispida; foliis linearibus lanceolatisve basi dilatato-amplexicaulibus, floralibus latioribus acutis, summis rarius apice coloratis; spicis confertis; calyce elongato hinc fisso, postice obtuso vel acute 2–4-dentato, corollae galea elongata, labii lobis brevibus obtusis vel acutiusculis. — Benth. in DC. Prodr. x. 533 (1846); Seem. Bot. Voy. Herald, 323; Hemsl. l. c. 460. — It is doubtful if this species can be maintained as distinct from the preceding, though certainly *Hartweg*, no. 191 (*C. tenuiflora*), and *Andrieux*, no. 156 (*C. canescens*), specimens cited by Bentham and represented in hb. Gray, are dissimilar, as is indicated in the above key. The flowers seem alike in the dried specimens, though perhaps those of *C. canescens* spread more widely from the flowering axis. The following are in hb. Gray, — SAN LUIS POTOSI: *Parry & Palmer*, no. 688, coll. of 1878; in the mountains of San Miguelito, *Schaffner*, no. 740, also near town of San Luis Potosi, no. 739. OAXACA: Cerro San Felipe, *C. Conzatti*, no. 689½, April, 1898; Huaquilla, Nochixtlan, alt. 2000 m.,

Conzatti & González, no. 1225; San Juan del Estado, 1920 m. alt., *Lucius C. Smith*, no. 407. CHIHUAHUA: near Batopilas, *E. A. Goldman*, no. 195. DURANGO: vicinity of city, *E. Palmer*, nos. 114 and 648, coll. of 1896. VERA CRUZ: Orizaba, *Botteri*, nos. 590 and 431. STATE OF MEXICO: Tacubaya, *W. Schumann*, no. 1013; near Toluca, *G. Andrieux*, no. 156; Vallée de Mexico, *E. Bourgeau*, no. 104. GUANAJUATO: Guanajuato, *A. Dugès*, no. 388. N. W. Mexico, *Seemann*: Mexico without locality, *Dr. J. Gregg*, nos. 434 and 610.

42. *C. xylorrhiza*, n. sp., perennis, investa pilis albis crispis simplicibus vel basi furcatis; radice lignea crassa; caulibus pluribus basi ramosis, supra simplicibus rectis 1.5–2 dm. altis (gracilibus in specimine viso sed anni praecedentis caulibus ligneis grandis); foliis lanceolatis trinerviis 2–3 cm. longis, 2–3 mm. latis, apice acutis, basi obscure auriculatis; floribus breve pedicellatis divaricatis in spicis brevibus confertis, bracteis floribus brevioribus similibus foliis; calyce 2.5 cm. longo, basi ventricoso, laciniis bidentatis; corolla 3.5 cm. longa, galea exserta 5–15 mm., dorso glandulari-pubescenti; labio inferiore protuberanti acuminato-tridentato, sinubus inter dentes angustis crassis, similibus glandibus; stylo filiformi exserto, stigmatate integro clavato; capsula oblonga, basi et apice acuminata, compressa, 1.5 cm. longa. — COAHUILA: Sierra Encarnacion, 28 July, 1896, *E. W. Nelson*, no. 3895 (type, in hb. Gray). This species is related to *C. tenuiflora*, differing in the peculiar pubescence, the habit of growth, and fewer-flowered more capitate spikes.

43. *C. scabridula*, n. sp., suffruticosa scabriduli-puberulens ramosa alta; foliis lineari-lanceolatis apice acutis vel obtusis basi rotundatis vel rarissime auriculatis, trinerviis 2–3 cm. longis, 2–5 mm. latis; foliis floralibus latioribus et brevioribus; floribus breve pedicellatis, junioribus in spicis capitatis, senioribus in racemis; pedicellis filiformibus 3–5 mm. longis; bracteis supremis attenuatis apice coccineis; calyce basi obliquo tubuloso 3 cm. longo, in altitudinem postice 6 mm., antice 2 cm. fisso, segmentis acuminato-laciniatis glandulari-puberulentis, superiore parte coccinea, inferiore psittacina; corollae galea exserta 15 mm., obtusa sed lateraliter emarginata, 2 cm. longa, apice 2 mm. lata, basi 5 mm.; labio inferiore atro-rubro exserto et protuberanti 1 mm., laciniis lineari-acuminatis 1 mm. longis, exterioribus divaricatis, media incurvata, sinubus crassis; stigmata fere exserto clavato; ovario ovato-acuminato. — DURANGO: Tejaman, August, 1906, *E. Palmer*, no. 468 (type, in hb. Gray). Dr. Palmer notes this as one of the showiest of plants, with flowers bright yellow and scarlet. It grows in compact masses on stony hills among other plants, but is not common. The stems are brittle and the plant is not eaten by

animals. It is related to *C. linariaefolia*, but differs in its shorter tri-nerved leaves, its pubescence, its pedicellate flowers, and the peculiar lower lip of the corolla, which stands out like a small shelf and must be very conspicuous in the living flower, its dark red contrasting strongly with the light red and yellowish green of the other parts of the flower and bracts.

44. *C. LAXA* Gray, herbacea cinereo-pubescentis; caulibus e radice perennis subdiffusis ramosis gracilibus; foliis tenuibus scabridis linearilanceolatis integerrimis basi haud dilatatis, floralibus calyce brevioribus rubro-coloratis; floribus paucis confertis breviter pedicellatis; calyce rubello antice profundius postice breviter fisso, dentibus brevibus obtusis; corollae galea magna, lobis labii inferioris brevissimis obtusis. — Gray in Torr. Bot. Mex. Bound. Surv. 119 (1859); Gray, Synop. Fl. N. Am. ii. pt. 1, 296; Hemsl. l. c. 461. — SONORA: mountain sides near Santa Cruz, Wright, no. 1490; Los Pinitos, altitude 1830 m., *C. V. Hartman*, no. 142 (Lumholtz Exped.). DURANGO: San Ramon, *E. Palmer*, no. 59, coll. of 1906. ARIZONA: Santa Catalina Mts., *J. G. Lemmon*, no. 264. There is an abnormal specimen collected at Alamos in 1890, by *E. Palmer*, no. 366.

45. *C. STENOPHYLLA* Jones, suffruticosa 6 dm. alta ramosissima, ramulis rectis subcinereis; foliis subfiliformibus obtusis 2–5 cm. longis; floribus rectis in spicis capitatis demum elongatis; bracteis oblongis acutis nervatis integris vel laciniatis, laciniis lateralibus paucis linearibus brevibus, media lata; calyce 2 cm. longo, postice in altitudinem 5 mm. fisso, segmentis irregulariter acuminatis vel laciniatis; corolla calycem superanti 3 mm., galea basi 3 mm. lata, apice 1 mm., dorso glandulosa; labio inferiore triplicato, lobis subulatis incurvatis 1 mm. longis; capsula oblongo-ovata 1.5 cm. longa. — Contributions to Western Botany, xii. 67 (1908). The type was collected at Garcia and in San Diego cañon, Sierra Madre, CHIHUAHUA, September, 1903 (hb. Marcus E. Jones). The specimens in hb. Gray are from Colonia Garcia, altitude 2287 m., *Townsend & Barber*, no. 209, also *E. W. Nelson*, no. 6210 a, in part. According to Marcus E. Jones, the flowers have a green back and red face. At almost all the leaf-axils there are small sterile branchlets slender and very leafy.

46. *C. LONGIBRACTEATA* Mart. & Gal., "caule fruticoso erecto glabriusculo, foliis linearibus acuminatis elongatis 3-nerviis subglabris, floralibus lanceolato-linearibus flore sublongioribus, superioribus vel bracteis obovato-lanceolatis apice fimbriatis, floribus longepedunculatis racemoso-spicatis; calyce tubuloso-inflato glabriusculo, corolla calycem longe excedente apice pilosa. — Flores 1.5 pollicares, pedunculi semipollicares. — A *Castilleja integrifolia* L., cui affinis praesertim

bracteis majoribus pedunculisque longioribus differt. Dans les bois de Juquila del Sur (côte pacifique d'Oaxaca) à 5000 pieds, à Talea et dans le Rincon (Cordill. orientale d'Oaxaca), de 3000 à 4000 pieds. Fl. rouges. Septembre." — Bull. Acad. Brux. xii. pt. 2, 28 (1845); Walp. Rep. vi. 651; Hemsl. l.c. 461. The following specimens are in hb. Gray, — Mexico, *Dr. Coulter*, no. 1353. OAXACA: Sierra de San Felipe, altitude 1830 m., *C. G. Pringle*, no. 4817; hills, San Felipe del Agua, altitude 1750 m., *Conzatti*, no. 570. In hb. U. S. Nat. Mus., Valley of Oaxaca, altitude 1830–2287 m., *E. W. Nelson*, no. 1194; 29 km. southwest of City of Oaxaca, altitude 2287–2897 m., *E. W. Nelson*, no. 1459, as to material in hb. Gray.

47. *C. INTEGRIFOLIA* Linn. f., suffruticosa ramosa glabriuscula vel tenuiter canescenti-hispidula; foliis linearibus integris basi vix dilatatis, floralibus paulo latioribus apice raro coloratis; racemo secundo; calyce elongato hinc fisso postice brevissime 2–4-dentato; corollae galea elongata glabriuscula, labii lobis brevissimis acutis. — Linn. f. Suppl. 293 (1781); Smith, Icon. Ined. 39; Benth. in DC. Prodr. x. 533; Mart. & Gal. l. c. 27; Hemsl. l. c. 461. The species was founded upon specimens collected by *Mutis* in Nova Granata and is also a native of Central America and Mexico. The flowers are conspicuous, falcately spreading, and turning black in drying. The calyx is nearly 2 cm. long and the corolla exerted about 5 cm. — CHIAPAS: *Ghiesbrecht*, nos. 152, 654, and 655. GUATEMALA: *Hyde & Lux*, no. 3099 (distrib. of J. Donnell Smith); *Sutton Hayes*; between Jacaltenango and San Martin, altitude 1670–2135 m., *E. W. Nelson*, no. 3609. OAXACA: between Juquila and Nopala, altitude 1372–2135 m., *E. W. Nelson*, no. 2426. NUEVO LEON: near Monterey, *C. G. Pringle*, no. 1951.

48. *C. PATRIOTICA* Fernald, simplex vel ramosa, 3–5.5 dm. alta; caulibus piloso-hirsutis vel glabrescentibus; foliis tenuibus hispidulis 3–5 cm. longis lineari-lanceolatis vel pinnatisectis, laciniis 2–6 lineari-lanceolatis; floribus racemosis; pedicellis ca. 1 cm. longis; bracteis foliis similibus minoribus et minus laciniatis; calyce tubuloso 3–4 cm. longo piloso-puberulo rubro viridi et albescenti; corolla 4.5–5.25 cm. longa viridi et albescenti dorso; galea 2.75–3 cm. longa exserta; labio inferiore viridi protuberanti ca. 3 mm., lobis lanceolatis; capsula oblongo-acuminata 1.5 cm. longa. — Fernald in Proc. Am. Acad. xl. 56 (1904). — CHIHUAHUA: near Colonia Garcia, altitude 2310 m., *Townsend & Barber*, no. 156; Cumbre, *E. Palmer*, no. 363, coll. of 1885; Mapula Mts., altitude 2200 m., and cool slopes of the Sierra Madre *C. G. Pringle*, nos. 1154, 1350 (type, in hb. Gray); Colonia Juarez, *E. W. Nelson*, no. 6062. DURANGO: barranca below Sandia Station,

C. G. Pringle, no. 13,659 ; in hb. U. S. Nat. Mus., near La Providencia, altitude 1982–2440 m., *E. W. Nelson*, no. 4989 ; Sierra Madre, 45 km. north of Guanacevi, *E. W. Nelson*, no. 4766.

49. *C. PURPUSI* Brandegee, perennis suffruticosa hirsuta ; caulibus multis 1 dm. altis simplicibus ex rhizomatibus longis ramosis ; foliis inferioribus lineari-lanceolatis obtusis vel acutis, basi subattenuatis 1.5–2 cm. longis 3–4 mm. latis ; foliis superioribus bracteisque trifidis, segmento medio longissimo ; calyce antice profunde fisso, postice paulo, segmentis integris vel emarginatis ; corolla 3.5 cm. longa exserta ; galea tomentosa dorso viridi ; labio inferiore brevissimo, dentibus 3 acuminatis, medio brevior. — *Zoe*, v. 181 (1905). — Mt. Ixtaccihuatl, rocky slopes above timber-line, *C. A. Purpus*, nos. 320 (type), 1711 (both in hb. Univ. Calif., duplicates in hb. Gray). The bracts and calyx are more or less tinged with red, but the entire plant becomes black in drying. The leaves are rather thickly covered with loose spreading long white hairs, and some of the upper leaves are trifid.

50. *C. PECTINATA* Mart. & Gal., “fruticulosa pilosa ; foliis pectinato-subpinnatis, laciniis linearibus distantibus elongatis 2–3-jugis, bracteis laciniato-pectinatis, floribus racemoso-spicatis, pedunculis et calycibus pilosis. — Folia pollicaria pectinato-laciniata, flores rubri similes floribus *Castillejæ integrifoliae* L. ; sed pedunculati. — Affinis *Castillejæ laciniatae* Hook. Dans les forêts de pins de la Cueva del Temascal, au pic d'Orizaba, de 9500 à 12,500 pieds (limites de la végétation phanérogame). Fl. rouge-vermillon. Août.” — *Bull. Acad. Brux.* xii. pt. 2, 27 (1845) ; *Walp. Rep.* vi. 651 ; *Hemsl. l. c.* 462. — *C. Orizabae* Benth. in *DC. Prodr.* x. 533, is founded partly on the same number (1074) in Galeotti's collection, also on *Linden*, no. 223. Bentham gives these additional characteristics under *C. Orizabae*, — “canescenti-hispidula, foliis inferioribus integris linearibus sublanceolatisve, superioribus dilatatis incisissimis, floralibus vix apice coloratis, racemo laxo, calyce elongato amplo hinc fisso postice obtuse 2–4-dentato, corollae galea tubo suo multo longiore, labii lobis brevibus acuminatis. Habitus fere *C. integrifoliae* sed folia pleraque incisa lobis elongatis et flores multo majores. Calyx 15 lin. longus. Corollae galea dorso villosa, calycem lineis 5–6 superans.” In hb. Gray the species is represented by a doubtfully identified specimen collected in GUATEMALA : Volcan de Agua, Depart. Zacatepequez, altitude 3670 m., April, 1890, *John Donnell Smith*, no. 2146.

51. *C. FISSIFOLIA* Linn. f., herbacea quandoque suffruticosa ; caulibus erectis parum ramosis foliosis pubescentibus ; foliis sessilibus patentissimis, basi ovatis integris, apice pinnatifidis, laciniis patentibus obtusis fere alternis utrinque pubescentibus subtrinerviis ; floribus versus apices

ramorum majorum axillaribus solitariis pedunculatis speciosis coccineis; bracteis propriis nullis; calyce tubuloso antice ultra medietatem longitudinaliter fisso, nervoso pubescenti colorato, basi subventricoso, superne compresso; labio superiore longissimo incurvo, apice emarginato dorso pubescenti; inferiore brevissimo trifido, laciniis acutis; sinibus similibus glandulis; stigmatibus obtusis; capsula ovato-acuminata compressa. — Linn. f. Suppl. 293 (1781); Benth. l. c. 533; Smith, Icon. Ined. t. 40; Hemsl. l. c. 460. — This species can scarcely be considered Mexican, as it has so far been collected only in South and Central America. There are no specimens in hb. Gray from Mexico or Central America.

52. *C. IRASUENSIS* Oerst., "suffruticosa glabra, foliis linearibus apice trifidis, lacinia intermedia subtrifida, racemo elongato laxo, calyce elongato hinc fisso postice bilobo, lobis retusis, corollae galea tubo subduplo longiore labii lobis brevissimis acuminatis. — Suffrutex erectus, ramosus, 1-2 pedalis. Caulis ramique teretes, glabri, nitiduli. Folia alterna, sessilia, amplexicaulia, linearia, supra medium trifida, glabra, 8-14 lin. longa, lobis linearibus obtusiusculis, intermedio majore sub 3-4-fido. Folia floralia indivisa, cuneata, apice obtusa, 8 lin. longa, trinervia, rubicunda, glabra. Flores pedicellati, 15 lin. longi. Pedicelli 2 lin. longi, villiusculi demum glabriusculi. Calyx elongatus, tubulosus, compressus, tomentosus, fuscus margine flavescente, hinc fissus inde bilobus, 6-7 lin. longus, lobis rotundatis vel retusis. Corolla bilabiata subrecta, calyce tres lineas longior, antice virescens postice rubicunda, labio superiore (galea) apice retuso, inferiore 3-fido, laciniis acuminatis incurvis. Stamina exserta, anticis corolla lineam longioribus, posticis ei aequilongis. Stylus exsertus. Stigma capitatum. Capsula ovato-oblonga, breviter acuminata, fusca, glabra calyce demum tecta, 6 lin. longa. Semina oblonga, numerosa, minutissima, testa laxa, diaphana, reticulata." — Oerst. in Vidensk. Meddel. 1853, p. 27; Hemsl. l. c. 461. — COSTA RICA: alpine region, Volcano Irasu, altitude 2745-3050 m., Oersted, part of type material in hb. Gray; same locality, John Donnell Smith, no. 4901; Volcan de Turrialba, Pittier, no. 13,079 (hb. Nat. Costa Rica, distr. by John Donnell Smith). COLUMBIA: Santa Marta, H.H. Smith, no. 1387.

53. *C. TEPEINOCLADA* Loesen., "humilis atque procumbens, tota planta tantum circ. 6-9 cm. alta; ramulis subglabris vel hirtis; foliis parvis sessilibus linearibus vel lineari-lanceolatis integris, acutis vel subacutis, glabris vel pulvereo-puberulis, uninerviis vel obsolete trinerviis, 6-13 mm. longis, circ. 1-2 mm. latis; bracteis longioribus usque 17 mm. longis et latioribus usque 3 mm. latis, summis ipsis plerumque utrinque uni- vel bifimbriatis, fimbriis lateralibus usque 6 mm. longis; pedicellis

circ. 3 mm. longis vel brevioribus; calyce mediam tantum corollam paullulo superante circ. 2.2 cm. longo, flavo et rubello, antice profunde fisso, ad circ. 1/3 altitud. connato, postice minute exciso, rotundato; corolla flava et rubella e calycis fissura longe exserta, 3.5–3.7 cm. longo, tubo circ. 1.5 cm. longo, galea elongata, labii lobis acutis, naviculari-subcorniformibus vix 1 mm. longis.

“Var. *α*. SUBGLABRA Loesen.; ramulis subglabris, foliis glabris. Hab. in GUATEMALA, in dept. Quezaltenango in pratis alpinis supra Totonicapam in 3000 m. altitud.: Sel. n. 2357. — Flor.: Sept.

“Var. *β*. HIRTA Loesen.; ramulis hirtis, foliis pulvereo-puberulis. Hab. in GUATEMALA, in dept. eodem in pratis alpinis ad Zihâ in 2840 m. altitud.: Sel. n. 2933. — Flor.: Jun.” Loesen. in Bull. Herb. Boiss. ser. 2, iii. 285 (1903).

54. *C. KATAKYPTUSA* Loesen., “humilis atque procumbens, tantum circ. 9 cm. alta; ramulis dense hirtis; foliis parvulis, sessilibus, linearibus vel superioribus lineari-lanceolatis, integris, acutiusculis, pulvereo-puberulis, obsolete uni-trinerviis, 8–20 mm. longis, vix 1–4 mm. latis, inferioribus angustioribus brevioribus, superioribus longioribus praecipueque basi latioribus sensim in bracteas transformatis, bracteis summis etiam maioribus, usque 23 mm. longis, et 4 mm. latis, margine utrinque 1–2-fimbriatis, fimbriis ipsis tantum usque 4 mm. longis, linearibus, lamina igitur fimbriis additis tota circ. 10 mm. lata; pedicellis tantum vix 2 mm. longis; calyce circ. 2.5 cm. longo, postice minute atque etiam minus excisulo quam in praecedente, rotundato, corolla circ. 4 cm. longa, tubo circ. 1.7 cm. longo, labii lobis obtusis vel subobtusis, extrinsecus pilosis; cetera ut in praecedente. — Habitat in GUATEMALA: in dept. Huehuetenango in pratis et silvestribus in jugo montium inter Todos los Santos et Chiantla, in 3000 m. altitud.: Sel. n. 2750. — Flor.: Sept.” Loesen. in Bull. Herb. Boiss. ser. 2. iii. 286.

II. A REVISION OF THE GENUS RUMFORDIA.

BY B. L. ROBINSON.

The genus *Rumfordia*, originally described by the eldest De Candolle and dedicated to Count Rumford, was founded upon a single species, *R. floribunda*, a showy-flowered shrub from the uplands of central and southern Mexico. The genus was for more than fifty years believed to be monotypic, but in 1892 Mr. T. S. Brandegee published the description of a second and very distinct species, which he had discovered in the mountains of southern Lower California. From 1903 to 1905 Dr. Greenman amplified the records of the genus by characterizing two species from Costa Rica and a pubescent form of the original *R. floribunda*. As two more new species of *Rumfordia* have now been found in a very interesting collection of plants secured by the late E. Langlassé, it seems worth while to present here a résumé of the genus as far as it is known to date. The group is notable for its entire freedom from synonymy and nomenclatorial difficulties. Of its members not one appears to have borne any other name than the one here recognized.

RUMFORDIA DC. (ad equitem clarissimum *Benjaminem Thompson* comitem de *Rumford* dedicata). — Capitula mediocria vel majuscula heterogama. Flosculi ♀ 6–20 liguliferi fertiles; ligulis ellipticis vel oblongis vel linearibus tenuibus et flavis vel aetate indurescentibus et albicantibus nunc simplicibus nunc obscure bilabiatis. Flosculi disci ca. 10 vel multo numerosiores ♂ fertiles, corollis tubulosis flavis, tubo proprio gracili pubescenti quam fauces subcylindrici glabriusculi distincte brevioris vel eos subaequantis, dentibus limbi 5 brevibus deltoideis. Achaenia obovoidea modice compressa calva glabra conformia. Involucrum duplex, squamis exterioribus herbaceis ovatis vel ellipticis vel oblongo-lanceolatis laxè patentibus, squamis interioribus multo minoribus ovatis vel lanceolatis paleiformibus erectis cucullatis achaenia flosculorum exteriorum amplectentibus. Receptaculum plano-convexum paleiferum. — Prod. v. 549 (1836); Deless. Ic. Sel. iv. t. 30 (1839); Benth. et Hook. f. Gen. ii. 359 (1873); Hemsl. Biol. Cent.-Am. Bot. ii. (1881); Baill. Hist. Pl. viii. 215 (1886); Hoffm. in Eng. et Prantl, Nat. Pflanzenf. iv. Ab. 5, 230 (1890); Brandegee, Zoe, iii. 241, t. 23 (1892); Greenman, Proc. Am. Acad. xxxix. 99 (1903), xl. 38 (1904), xli. 261 (1905). — Frutices vel rarius herbae elatae perennes, caulibus

sæpe fistulosis laxè ramosis. Folia opposita sæpissime ovata vel rhomboideo-lanceolata nunc petiolata nunc connata et perfoliata, petiolo plerumque cuneato-alato, lamina serrata vel denticulata nunc margine rotundata nunc utriusque latere unilobata vel uniangulata. Capitula in paniculam laxiusculam ovoideam vel planiusculam disposita.

Species hujusque cognitae 6, quarum tres mexicanæ sunt, una in montibus Californiae inferioris inventa est, ceterae reipublicae Costae Ricæ incolae sunt.

Clavis specierum.

- a. Folia utriusque latere regulariter rotundata nec lobata nec angulata, b.
 b. Flosculi disci ca. 12. Involucri squamae exteriores obovati-spatulatae integerrimae ca. 6 mm. longae. Folia omnino disjuncta vel obscure angustissimeque connata. 1. *R. floribunda*.
 b. Flosculi disci ca. 100. Involucri squamae ovati-oblongis vel ellipticis ca. 15 mm. longae, aliae integrae aliae 2-3-dentatae. Folia late conspicueque connati-perfoliata. 2. *R. connata*.
 a. Folia utriusque latere unilobata vel uniangulata subhastatiformi-rhomboides, c.
 c. Involucrum exterius puberulum solum vel quasi pulverulentum, d.
 d. Pedicelli glanduloso-puberuli. Ligulae 10-12 mm. longae conspicue exsertae. Petioli veri breves 3-5 mm. solum longi vix alati. 3. *R. attenuata*.
 d. Pedicelli puberuli sed eglandulosi. Ligulae 5 mm. longae ex involucro vix exsertae. Petioli per totam longitudinem conspicue alati 3-4 cm. longi. 4. *R. aragonensis*.
 c. Involucrum exterius laxè pubescens, pilis albidis moniliformibus modice longis, e.
 e. Ligulae conspicuae 16 mm. longae valde exsertae. Petioli basin versus graciles exalati. 5. *R. oreopola*.
 e. Ligulae parvae inconspicuae involucrum non superantes. Petioli per totam longitudinem alati. 6. *R. polymnioides*.

1. *R. FLORIBUNDA* DC. (*Palo gogo* mexicanorum) fruticosa elata speciosa; foliis ovatis serratis breviter acuminatis firmissculis utrinque glabriusculis 7-16 cm. longis 5-12 cm. latis supra basin conspicue 3-nerviis basi in petiolum abrupte contractis deinde cuneatis; panicula ovoidea 1-2 dm. diametro multicapitulata oppositiramea, bracteis primariis foliaceis, secundariis multo minoribus quam ramuli pedicellique saepius brevioribus; involucri squamis exterioribus 5 patentibus obovato-spatulatis striato-venosis integerrimis obtusis 6 mm. longis utrinque granuloso-puberulis, squamis interioribus cucullato-cymbiformibus 4-5 mm. longis acutiusculis dorso glanduloso-scaberrimis; flosculis ♀ 7-11, tubo proprio gracili 2 mm. longo pubescenti, ligula elliptica striato-nervia ca. 12 mm. longa 8 mm. lata apice breviter obtuseque 2-3-dentata maturitate durescenti et persistenti; flosculis disci 10-14, corollis

flavis, tubo proprio gracili 1.3 mm. longo pubescenti, faucibus cylindricis 3 mm. longis glabriusculis; achaeniis nigrescentibus compressiusculis obovatis striatulo-sulcatis 2.5 mm. longis. — Prod. v. 550 (1836); Deless. Ic. Sel. iv. t. 30 (1839); Hemsl. Biol. Cent.-Am. Bot. ii. 157 (1881). — Locis montanis mexicanis praecipue in terra argillacea prope rivulis altitudine 1500–2500 m. haud rara. JALISCO: *Nelson*, nn. 4024, 4172. MICHOACAN: *Pringle*, n. 3940; *Nelson*, nn. 6570, 6889. MORELOS: *Pringle*, nn. 9955, 13,902, 13,086 (infeliciter sub nomine *Trigonospermum floribundum* errore distributa). OAXACA: *Ghiesbreght*, anno 1842. Sierra Madre inter Michoacan et Guerrero, *Langlassé*, nn. 83, 801.

Forma PUBESCENS Greenman, foliis subtus saltim nervos versin permanenter laxequae floccoso-lanosis; ligulis quam eae formae typicae paulo longioribus etiam ad 2 cm. attingentibus. — Proc. Am. Acad. xli. 261 (1905). — Cerro de San Felipe, alt. 2500 m., *Conzatti*, n. 30.

2. *R. connata* Brandegee, herbacea perennis multicaulis 1–2 m. alta; caulibus teretibus striatulis pubescentibus apicem versus trichotomoramosis; foliis ovati-lanceolatis regulariter serratis gradatim acutatis basi paulo angustatis late perfoliato-connatis 5–9 cm. longis 2–4 cm. latis utrinque pubescentibus; capitulis laxè paniculatis; pedicellis 3–6 cm. longis saepissime nutantibus glanduloso-pubescentibus; squamis involucri exterioribus 5 inaequalibus ovati-oblongis vel ellipticis integris vel apice 2–3-dentatis ca. 13–16 mm. longis ca. 8 mm. latis utrinque laxè glanduloso-pubescentibus, squamis interioribus tenuibus pallide viridibus ovato-lanceolatis conduplicatis acutis 5–6 mm. longis dorso glanduloso-pubescentibus; flosculis ♀ ca. 19, ligulis saepissime bilabiatis, labio inferiore 1 cm. longo ca. 7-nervio 3–4 mm. lato apice 3-dentato, labio superiore e lobulis 1–2 lineari-oblongis saepe obscuris 1.7–2 mm. longis composito; flosculis disci numerosissimis (ca. 100), corollis 8 mm. longis, tubo proprio 2.5 mm. longo pubescenti, faucibus graciliter cylindricis 5.5 mm. longis; achaeniis valde immaturis glabris. — Zoe, iii. 241, t. 23 (1892). — In montibus prope capnum Sancti Lucae Californiae inferioris australis, *Brandegee*.

3. *R. attenuata* Robinson, n. sp., verisimiliter fruticosa 2.5 m. alta glabriuscula; ramis trichotomis subteretibus fistulosis striato-angulatis, internodiis 1–1.5 dm. longis; foliis oppositis lanceolatis vel rhomboideo-lanceolatis tenuissimis breviter petiolatis 1.4–1.8 dm. longis 2–7 cm. latis longissime attenuatis in latere utriusque 8-angulatis mucronulato-denticulatis vel subintegris utrinque viridibus subglabris, petiolo 3–5 mm. longo vix alato; capitibus 1.5–2 cm. diametro laxè cymoso-paniculatis; pedicellis gracilibus saepe nutantibus glanduloso-

pubescentibus ; involucri squamis exterioribus 5 ovati-ellipticis acutis 8–10 mm. longis 3–4 mm. latis herbaceis glabriusculis margine albide granuloso-puberulis ; squamis interioribus ovatis acuminatis cucullatis dorso breviter hispidulis ; flosculis ♀ ca. 6–8, ligulis lineari-oblongis 10–12 mm. longis flavis conspicue exsertis et patentibus ; corollis disci hispidulis 6 mm. longis, tubo gracili fauces cylindricos subaequantibus ; achaeniis glabris. — In terra humo pingui montium Sierra Madre inter Michoacan et Guerrero, alt. 1750 m., 26 Apr. 1899, *E. Langlassé*, n. 800 (specimine typico in hb. Grayano conservato).

4. *R. ARAGONENSIS* Greenman, verisimiliter fruticosa ; caulibus teretibus fistulosis ; foliis rhomboideo-ovatis mucronulato-denticulatis membranaceis supra glabriusculis subtus sparse pubescentibus ca. 1.2 dm. longis 9–10 cm. latis latere utriusque unilobatis vel uniangulatis basi ad petiolum per totam longitudinem alatum 3–4 cm. longum angustatis ; foliis supremis ovati-lanceolatis caudato-acuminatis non angulatis ; panicula planiuscula laxa ; involucri squamis exterioribus 5–6 ovatis acuminatis venosis 1.6 cm. longis 7–8 mm. latis tenuibus inconspicue puberulis, squamis interioribus ovatis acuminatis dorso breviter glanduloso-hispidulis 5 mm. longis ; ligulis linearibus tenuibus 5 mm. solum longis 0.8 mm. latis flavis, tubo 2 mm. longo pubescenti ; flosculi disci 20–30, corollis 5–6 mm. longis, tubo proprio gracili pubescenti fauces subcylindricos subaequantibus basin versus bulboso-ampliatis ; achaeniis obovatis nigrescentibus nitidis 2 mm. longis. — Proc. Am. Acad. xl. 38 (1904). — Arbusculetis prope Aragon, Turrialba, Costa Rica, alt. 630 m., *Pittier*, n. 13,246.

5. *R. oreopola* Robinson, n. sp., verisimiliter fruticosa 3 m. alta ; ramis trichotomis subteretibus fistulosis glabriusculis purpurascens ; foliis oppositis ovatis caudato-acuminatis serrulatis ca. 1 dm. longis ca. 7 cm. latis a loco paulo supra basin 3-nervatis cum dente unico arcuato acuminato in latere utriusque instructis utrinque viridibus inconspicue sparseque puberulis basi rotundatis deinde cuneatis, petiolo proprio brevissimo obcompressa margine lanoso-ciliato ; capitibus modice numerosis in paniculam laxam folioso-bracteata dispositis 3–3.5 cm. diametro (ligulis inclusis) ; ramulis paniculae glanduloso-tomentosis ; involucri squamis exterioribus viridibus plerumque 5 lanceolatis attenuatis 1.3–1.9 cm. longis 6 mm. latis tenuibus subtrinerviis laxe glanduloso-pilosis, pilis albidis longiusculis moniliformibus ; flosculis ♀ ca. 10, ligulis anguste oblongis 1.6 cm. longis 4 mm. latis flavis late patentibus ; flosculis disci numerosis flavis, corollae tubo proprio gracili fauces cylindricos vix aequanti pilosiusculo basin versus bulboso-ampliatis, dentibus limbi brevibus deltoideis ; achaeniis obovoideis atrobrunneis glaberrimis lucidulis. — In terra argillacea summorum

montium Sierra Madre inter Michoacan et Guerrero, alt. 2250 m., 16 Feb. 1899, *E. Langlassé*, n. 878 (specimine typico in hb. Grayano conservato).

6. *R. POLYMNIODES* Greenman, verisimiliter herbacea vel subherbacea; caule purpurascenti striatulo-angulato crispe albido-pubescenti fistuloso; foliis oppositis late ovatis acute acuminatis 1-1.2 dm. longis ca. 8 cm. latis 3-nerviis reticulato-venosis mucronato-denticulatis supra viridibus breviter pubescentibus subtus pallidioribus griseo-tomentellis et resinoso-atomiferis basi primo abrupte deinde cuneate ad petiolum 2-3 cm. longum per totam longitudinem alatum angustatis; capitulis in paniculam laxam planiusculam 2-3 dm. diametro dispositis, pedicellis griseo-hirsutis gracilibus 1-3 cm. longis saepe nutantibus; involucri squamis exterioribus 5 late ovatis acutis herbaceis 3-nerviis et reticulato-venosis extus laxe griseo-hirsutis intus paulo pallidioribus glaberrimis margine albido-puberulis vel -pulverulis, squamis interioribus linearibus conduplicatis attenuatis hispidulis; flosculis ♀ ca. 15, ligulis minimis, tubo gracili hispido ca. 3 mm. longo, lamina oblonga ca. 4 mm. longa 1.8 mm. lata apice 3-lobata flava; flosculis disci ca. 80, corolla flava, tubo proprio hispidulo 3 mm. longo basin versus non ampliato fauces cylindricos aequanti; achaeniis laevibus pallide brunneis oblique obovatis modice compressis plus minusve 4-gonis. — Proc. Am. Acad. xxxix. 99 (1903). — In agris ubi colitur *Zea Mais*, Copey, Costa Rica, alt. 1800 m., Apr. 1898, *Tonduz*, n. 11,947.

III. A SYNOPSIS OF THE AMERICAN SPECIES OF LITSEA.

BY HARLEY HARRIS BARTLETT.

The following synopsis of the American species of *Litsea* includes the six species recognized by Mez¹ in 1889, together with five heretofore undescribed species from Mexico and Central America. No attempt has been made to cite full synonymy, nor, with one exception, to re-describe species recognized by Mez, hence this paper may be considered as supplementary to his treatment of the genus.

For the loan of valuable Central American material, without which the new species from Costa Rica must have remained undescribed, I am indebted to Captain John Donnell Smith. Except for the specimens from his herbarium, the *exsiccatae* cited are all at the Gray Herbarium.

- Folia decidua. 1. *L. geniculata*.
 Folia persistentia.
 Inflorescentiae plerumque corymbosae, rarius paniculatae.
 Folia subtus glabra.
 Folia basi rotundata vel subcordata.
 Pedicelli quam flores multo longiores; inflorescentiae fere omnes in paniculam terminalem dispositae 2. *L. pedicellata*.
 Pedicelli quam flores breviores; inflorescentiae non modo terminales sed etiam in axillis foliorum mediis corymbosae. 3. *L. Pringlei*.
 Folia basi acuta. 4. *L. glaucescens*.
 Folia subtus pubescentia.
 Folia subtus plus minusve strigosa. 5. *L. guatemalensis*.
 Folia subtus ochraceo-tomentosa. 6. *L. Neesiana*.
 Inflorescentiae solitariae vel fasciculatae.
 Folia basi acuta.
 Folia subtus albescentia, molliter tomentosa. 7. *L. Orizabae*.
 Folia glabra.
 Folia plus quam 2 cm. lata.
 Folia subtus glauca. (4) *L. glaucescens* var. *subsolitaria*.
 Folia haud glauca. 8. *L. flavescens*.
 Folia maxima 1.5 cm. lata. 9. *L. Schaffneri*.
 Folia basi subcordata vel rotundata.
 Folia orbiculari-ovata, apice obtusa. 10. *L. parvifolia*.
 Folia ovato-lanceolata, apice acuta. 11. *L. novoleontis*.

¹ Carl Mez, Lauraceae Americanae monographice descriptae. Jahrbuch des königlichen botanischen Gartens und des botanischen Museums zu Berlin. Band V, 1889.

1. *LITSEA GENICULATA* (Walt.) Benth. & Hook. Mez says of this species: "Hab. in paludosis a Virginia ad Floridam." There seem to be no specimens in American herbaria from further north than North Carolina. Perhaps the reference to Virginia is merely traditional, coming from the name of the work (Gronovius's *Flora Virginica*) in which this shrub was first described, as "*LAURUS foliis lanceolatis enerviis annuis.*"

2. *Litsea pedicellata*, n. sp. Frutex 1-2 m. altus, ramulis furcatis glabris atro-bruneis. Folia glabra coriacea quam internodia duplo longiora, laminis orbiculari-ovatis utrinque albicantius viridibus 2-3 cm. longis 1.5-2 cm. latis, basi subcordatis, apice obtusis saepe mucronulatis, petiolis brunnescentibus 2-3 mm. longis. Inflorescentiae solum in axillis superioribus positae, plerumque in ramulis brevibus quorum terminalis paniculiformis est et foliis multo longior. Ramuli floriferi in gemmam parvam paucisquamosam terminantes. Pedunculi 6-9 mm. longi glabri prope apicem incrassatum glauci. Involucrum triflorum, squamis tribus late suborbicularibus deciduis, extus mox glabratis intus pubescentibus. *Flores* ♂. Pedicelli quam in speciebus aliis mexicanis multo longiores, saepissime pedunculis fere aequilongi, superne glabrati, prope basin aequae quam in pedunculi apice, intra involucrum, albo-tomentelli. Perianthii tubus brevis; segmenta ovata apice obtusa. Stamina 10, filamentis glabris quam antheris brevioribus vel eis aequilongis, tribus interioribus biglanduliferis, glandulis majusculis convolutis. Antherae subrectangulares ad apicem versus valde angustatae. Loculi superiores inferioribus parviores, semper introrsum dehiscentes. Loculi inferiores staminum glanduliferorum sublateraliter, reliqui omnes introrsum, dehiscentes. Ovarium abortivum stylo apice breviter bilobato. *Flores* ♀ fructusque desunt in specimine authentico. — Mountains near Saltillo, State of Coahuila, Mexico, alt. 2135 m., 12 April, 1906, *Pringle*, no. 10,239 (type, in hb. Gray).

3. *Litsea Pringlei*, n. sp. Frutex 1-2 m. altus, ramulis gracilibus glabris olivaceis. Internodia plerumque quam folia duplo breviora. Folia glabra coriacea, laminis ovato-lanceolatis 4.5 cm. longis, supra basin 2 cm. latis, apice acutis saepe mucronulatis, basi subcordatis vel rotundatis; petiolis subolivaceis 5-7 mm. longis. Axillae foliorum omnes ramulos breves floriferos gerentes quorum terminalis haud paniculiformis est, sed aliis similis et foliis brevior. Ramuli floriferi, ut in *L. pedicellata*, apice gemmiferi. Pedunculi 6-9 mm. longi apice excepto glabri, ad apicem, intus in involucrio, albido-hirtelli. Involucrisquamae 3 late suborbiculares deciduae, extus mox glabratae, intus pubescentes. Involucrum 3- vel 5-florum. *Flores* ♂. Pedicelli glabri inaequilongi, is floris medii longitudine perianthium saepe aequans, ei

florum lateralium aliquanto breviores. Perianthium tubo brevi, segmentis ovatis obtusis 3.2 mm. longis. Stamina 9, filamentis glabris antheris aequilongis vel eis paulo brevioribus, tribus interioribus biglanduliferis, glandulis majusculis convolutis. Antherae subrectangulares supra mediam paulo angustatae, apice emarginatae, loculis omnibus introrsum dehiscentibus. Ovarium abortivum. Flores ♀ quam masculi multo parviores. Perianthii tubus brevis; segmenta ovata obtusa 2.2 mm. longa. Staminodia 9, interiora 3 glandulifera, glandulis eis florum ♂ similibus. Stylus 1.2 mm. longus. Stigma discoideum subreniforme. Fructus ignotus. — On limestone ledges in the Sierra Madre above Monterey, State of Nuevo Leon, Mexico, alt. 850 m., 8 March, 1906, *Pringle*, no. 10,238 (type, in hb. Gray).

4. *LITSEA GLAUDESCENS* HBK. The following specimens, all from the State of Vera Cruz, are in the Gray Herbarium: Orizaba, *Botteri*, nos. 7 & 549 (error for 945 ?); Orizaba, 10 April, 1867, *Bilimek*, no. 359; hills near Jalapa, 16 April, 1899, *Pringle*, no. 8156. Since the Pringle specimen shows a strong habital resemblance to *Litsea guatemalensis* Mez, it may represent the *Litsea glaucescens* var. *major* (Meissn.) Hemsl., from which Mez segregated his species.

Var. *SUBSOLITARIA* (Meissn.) Hemsl. — Mexico, 1848-'49, *Gregg*, no. 639. Leaves much more glaucous beneath than in the typical form. None of the inflorescences arranged in axillary corymbs.

5. *LITSEA GUATEMALENSIS* Mez. — MEXICO. Chiapas: "Bergwald zwischen Huitztan und Oxchuc," 11 March, 1896, *Caec. & Ed. Seler*. GUATEMALA. Department of Quiché: San Miguel Uspantan, alt. 2440 m., *Heyde & Lux*. Department of Zacatepequez: San Rafael, alt. 1980 m., *John Donnell Smith*, no. 1276.

6. *LITSEA NEESIANA* (Schauer) Hemsl. Nothing has been seen which answers to the description of this species. The plant cited by Mr. John Donnell Smith as *Litsea Neesiana* in his *Enumeratio Plantarum Guatemalensium* is *Litsea guatemalensis*.

7. *LITSEA ORIZABAE* (Mart. & Gal.) Mez. — State of Vera Cruz: Orizaba, alt. 2440 m., *Liebmann*, *Lauraceae* no. 65. This shrub has larger leaves than any other American member of the genus.

8. *Litsea flavescens*, n. sp. Arbuscula (fide cl. Tonduz), ramis numerosis ochraceo-brunneis, gemmis quam in speciebus *Litsea* ceteris majoribus. Folia coriacea glabra quam internodia 6-7-plo longiora, laminis griseo-viridibus, supra subnitidis, subtus pallidis, lanceolatis ca. 2 cm. latis 6.5 cm. longis, basi acutis, apice caudato-acutis mucronatis; petiolis 1-1.5 cm. longis. Petioli et costae laminarum mediae marginisque latiusculi flavescentes. Inflorescentiae solitariae vel fasciculatae. Pedunculi glabri 7-9 mm. longi. Involucrum 3-7-florum, squamis

deciduis 5 (vel 7) suborbicularibus, extus mox glabratis, exterioribus apice acutiusculis, interioribus obtusis. *Flores* ♂. Pedicelli quam perianthium breviores vel idem aequantes, juventate tomentosi. Perianthii tubus fere nullus; segmenta 6 oblonga 3 mm. longa, basi paulo angustata. Stamina 9. Filamenta antheris paululo breviora, tria interiora biglandulifera, glandulis mediocribus varie lobatis sed non convolutis. Antherae oblongae ad apicem versus sensim angustatae, apice obtusae. Loculi antherarum omnes introrsum dehiscentes, sed ei inferiores seriei interioris aspectu sublaterales. Ovarium abortivum sine stylo. *Flores* ♀. Pedicelli quam perianthium longiores (is floris medii duplo longior), juventate tomentelli, aetate glabri incrassati. Perianthii tubus fere nullus; segmenta 6 anguste oblonga 2.4 mm. longa. Staminodia 9 graciliter spatuliforma, tria interiora biglandulifera, glandulis reniformibus ad hilum stipitatis. Stylus curvatus, stigmatate disciformi irregulariter bilobo. Fructus immaturus ovoideus. — “Petit arbre, à port élancé. Collines au dessus de Belmira près Santa Maria de Dota,” Prov. San José, Costa Rica, alt. 1600 m., January, 1898, *Tonduz*, no. 11,638 (= no. 7352 of Mr. John Donnell Smith's distribution, type, in hb. Gray); Cuesta de Tarrazú, April, 1893, *Tonduz*, no. 7796. Vernacular name, “Lentisco.” In all probability the Costa Rican specimens cited by Mez under *Litsea glaucescens* var. *subsolitaria* belong to this species, but unfortunately none of them are available for examination. *Litsea flavescens* may be distinguished from *L. glaucescens* not only by the characters given in the key, but also by its smaller flowers, tomentose pedicels, and obtuse, not emarginate, anthers.

9. *Litsea Schaffneri*, n. sp. Frutex 2–3 m. altus, ramulis gracilibus ochraceis; internodiis quam foliis 3–4-plo brevioribus. Folia glabra subtus glaucescentia, laminis anguste lanceolatis 6–14 mm. latis 2–5 cm. longis, basi acutis, apice acutis saepe mucronulatis; petiolis 5–10 mm. longis. Inflorescentiae solitariae vel fasciculatae. Pedunculi nutantes 5–10 mm. longi glabri. Involucrum triflorum, squamis 5 suborbicularibus deciduis, duabus exterioribus mucronulatis extus glabratis intus pubescentibus, interioribus obtusis utrinque pubescentibus. Pedicelli aut glabri aut tomentosi, inaequales, is floris medii aliis multo longior sed ipse perianthio brevior. *Flores* ♂. Tubus perianthii brevis; segmenta 6 ovata obtusa 3 mm. longa. Stamina 9. Filamenta antheris paulo breviora, tria interiora biglandulifera, glandulis valde stipitatis convolutis. Antherae subquadrangulares ad apicem versus paulo angustatae apice emarginatae, loculis omnibus introrsum dehiscentibus. Ovarium abortivum stylo brevi integro instructum. *Flores* ♀. Perianthii segmenta 9 ovata 2 mm. longa, exteriora 6 obtusa,

interiora tria (an staminodia?) acuta. Staminodia vera 9, ea seriei interioris biglandulifera, glandulis longe stipitatis. Stylus apice stigma disciforme lateraliter gerens. Fructus (siccatus) globosus, diametro usque ad 9 mm., niger (?). — This species constitutes a part of *Litsea parvifolia* (Hemsl.) Mez, as defined by Mez. The following specimens may be referred to it. San Luis Potosi: "in montibus San Miguelito," Schaffner, nos. 23 (type, in hb. Gray) & 710; Schaffner, nos. 431 & 463; Parry & Palmer, no. 798. State of Guanajuato: near Guanajuato, 1880, A. Dugès; Palmilla, Dept. Victoria, Berlandier, no. 2185. The last specimen is cited by Meissner in the original description of *Litsea glaucescens* var. *subsolitaria*, and is the same as the unnumbered plant cited by Hemsley as follows: "Vittoria to Tula (Berlandier)." The original label reads: "No. 2185 = 765. Arbuste 8-10 pds., d'les gorges ombragées — avant d'arriver à Palmilla. De Victoria à Tula, Nov. 1830." Probably the citation by Mez, under *Litsea glaucescens*, of "*Berlandier* n. 2158 (*non vidi*)" is an error for no. 2185, since there is no record of a "no. 2158" in the manuscript catalog of Berlandier's collections at the Gray Herbarium. According to the Parry & Palmer label, *Litsea Schaffneri* is the "Sacred Laurel" of the Mexicans. The Schaffner labels give "Laurel" as the vernacular name.

10. *LITSEA PARVIFOLIA* (Hemsl.) Mez, fruticosa, ramulis gracilibus juventate griseis puberulis, aetate ochraceo-brunneis glabris. Internodia foliis 2-3-plo breviora. Folia utrinque glabra, laminis orbiculari-ovatis vel maximis non raro ovatis 1.2-3 cm. latis 1.3-4 cm. longis, supra pallide viridibus, subtus albidis, basi cordatis vel subcordatis, apice plerumque rotundatis vel obtusis sed in foliis maximis saepe acutiusculis; petiolis 2-5 mm. longis ochraceo-olivaceis. Inflorescentiae axillares saepissime solitariae, raro fasciculatae. Pedunculi 5-9 mm. longi nutantes tenuissime puberuli. Involucrum 3(-5)-florum, squamis 3(-5) deciduis puberulis. Pedicelli subaequales floribus multo breviores albotomentosi. Flores ♂. Perianthii tubus perbrevis; segmenta 6 ovata obtusa. Stamina 9. Antherae late rectangulares filamentis longiores apice truncatae minute apiculatae, loculis omnibus introrsum dehiscen-tibus. Filamenta seriei staminum interioris glandulos brevistipitados convolutos gerentia. Ovarium abortivum stylo apice indistincte trilobo instructum. Flores ♀ non vidi. Fructus diametro 8-10 mm. globosus. — The original characterization of this species was probably drawn up from insufficient material. Mez's description includes at least two and perhaps even three species. Specimens examined: Mexico, 1848-'49, Gregg, no. 314; Saltillo, State of Coahuila, 15-30 April, 1898, Palmer, no. 68.

11. *Litsea novoleontis*, n. sp. Frutex 3-5 m. altus, ramulis

furcatis ; internodiis quam foliis 3-4-plo brevioribus. Folia glabra vel glabrata, laminis ovato-lanceolatis 1.2-3 cm. latis 3-7 cm. longis, supra viridibus, subtus albido-viridibus, apice acuta saepe mucronulata, basi rotundata vel aetate subcordata ; petiolis 4-7 mm. longis. Inflorescentiae in foliorum axillis solitariae vel fasciculatae. Pedunculi 5-7 mm. longi glabri, prope apicem glauci. Involucrum 3(-5)-florum, squamis saepissime 4 suborbicularibus, duabus exterioribus extus mox glabratis, apice mucronatis, interioribus utrinque pubescentibus, apice obtusis. Pedicelli ante florum anthesin tomentosi, maturitate fructus glabri valde incrassati pedunculis aequilongi, apice in discum diametro 5 mm. expansi. *Flores* ♂ (a gemmis nondum florescentibus descripti). Perianthii tubus brevis ; segmenta 6 ovata apice obtusa. Stamina 9, interiorum 3 filamentis biglanduliferis. Loculi inferiores seriei antherarum interioris simulate lateraliter, ceteri introrsum, dehiscentes. Ovarium abortivum sine stylo. *Flores* ♀ non visi. Fructus (siccatus) niger usque ad 11 mm. diametro. Nucula 7 mm. diametro, cotyledonibus apice emarginatis corculum minutum includentibus. — Nuevo Leon: Sierra Madre near Monterey, *Pringle*, nos. 2837 (type, in hb. Gray) & 2078. San Luis Potosi: Alvarez, Sept. 1902, *Palmer*, no. 62 ; mountains, San Jose Pass, *Pringle*, no. 3146.

IV. SOME UNDESCRIBED SPECIES OF MEXICAN PHANEROGAMS.

BY ALICE EASTWOOD.

Aristolochia oaxacana, n. sp., caulibus 1-paucis ex radice tuberosa prostratis tenuiter pilosissimis ramosis 1-2 dm. longis; foliis ovato-cordatis 2-4 cm. longis 2 cm. latis, apice acutis basi cordato-auriculatis ad petiolum brevem inter auriculas cuneate decurrentibus; floribus in axillis solitariis, bracteis obscuris ovatis ad basim pedunculi brevis insertis; calyce albo-purpureo unilabiato 3.5 cm. longo recto, tubo 12 mm. longo paulo constricto ad squamam interiorem infundibuliformem, limbo lineari antice ad tubum decurrenti; columna crasso-stipitata; antheris 5; stigmate peltato quinquelobato; ovario clavato pilosissimo; capsula turbinata quinquevalvata pilosa, apice dehiscenti. — OAXACA: Clajiaco, *Galeotti*, no. 214. This belongs to Sect. *Gymnolobus* Detre. in Ann. Sci. Nat. ser. 4, ii. 30, and is related to *C. cordata*, which, however, has a bilabiate calyx.

Aristolochia cordata, n. sp., caulibus plurimis ex radice longa flava, simplicibus vel ramosis prostratis gracilibus striatis tenuiter albo-pilosissimis; foliis subsecundis ovato-cordatis 2-4 cm. longis et latis, apice obtusis, basi cordatis, palmate quinquenerviis reticulatis, investis sparse supra, densiore subter cum pilis tenuissimis obscure articulatis adpressis simplicibus vel basi bifurcatis; petiolis 5-12 mm. longis pilosissimis; floribus solitariis in axillis, pedunculis laminatis striatis pilosissimis cum bractea ovata apice inserta; calyce bilabiato albo-purpureo exteriore piloso, interiore glabro; labio superiore cucullato 6-10 mm. longo, inferiore deflexo et conduplicato obcordato 1 cm. lato; tubo flavo-lineato 11-12 mm. longo paulo constricto ad squamam interiorem infundibuliformam et sub os; columna sessili; antheris 5; stigmate peltato quinquelobato; ovario clavato pilosissimo basi ad pedicellum attenuata; capsula oblongo-turbinata quinquevalvata rugulosa, valvulis dorso crenati-alata, apice dehiscentibus. — DURANGO: Otinapa, July-August, 1906, *E. Palmer*, no. 431 (type, in hb. Gray). This belongs to Sect. *Gymnolobus* Detre. l. c. 30 and is distinguished from the other pentandrous species of the section by the remarkable two-lipped flower.

Aristolochia Nelsonii, n. sp., suffruticosa prostrata; caule prope basim ramoso velutino, ramis diffusis angulatis; foliis ovato-cordatis vel saepius auriculato-trilobatis, apice acuminatis, basi ad petiolum cuneate excurrentibus (auriculis rotundatis), palmate trinerviis et reticulatis, supra investis regulariter adpressis pilis basi minute pustulatis, subter subvelutinis; petiolis canaliculatis 1-2 cm. longis; floribus solitariis in axillis, pedunculis gracilibus 2 cm. longis, apice cum bractea sessili ovato-cordata acuminata 1 cm. longa 5-7 mm. lata; calycis limbo patulo peripherico longe caudato, basi purpureo-marginato, flavo circa os, cauda flava 4-5 cm. longa 2 mm. lata; tubo geniculato 4 mm. diametro; columna superne quinquelobata basi stipitata; antheris 5; ovario clavato albo-pilosissimo pedicellato. — OAXACA: San Geronimo, 61 m. altitude, July 1-5, 1895, *E. W. Nelson*, no. 2769 (type, in hb. Gray). This approaches *A. longicaudata* Watson, but differs in much broader limb, and in the form of the leaves. It belongs to Sect. *Gymnolobus* Dctre. l. c. and to the pentandrous group.

Passiflora platyneura, n. sp., caulibus angulatis et striatis hispidis pilis albis uncinatis; cirrhis nullis; foliis infra mediam partem trilobatis 2-4 cm. longis 3-5.5 cm. latis, lobo medio oblongo-ovato lateralibus inaequaliter bilobatis, basi late reniformibus, lobis margine integris vel saepissime irregulariter dentatis, dentibus apice aristatis, nerviis supra filiformibus subter planis; petiolis ca. 1 cm. longis apice biglandulosis glandulis crasse stipitatis; stipulis viridibus oblique ovatis subfalcatis apice aristate attenuatis 3 mm. longis; floribus axillaribus pedunculis 1.5-2 cm. longis; bracteis 2-3 proximis angustissime linearibus attenuatis 2 mm. longis; calycis tubo rotato-campanulato 1.5 cm. lato, lobis lineari-oblongis apice obtusis 1.5 cm. longis 6 mm. latis uninerviis, interiore glabris exterioribus hispidis; petalis tenuibus oblongo-lanceolatis ca. 1 cm. longis 2.5 mm. latis; corona exteriori filamentosa, filamentibus 1.3 cm. longis ad basim liberis; corona interiori membranacea, apice fimbriata, duos annulos inferiores occultanti; gynandrophora 9 mm. longa glabra; fructibus globosis basi cuneatis. — OAXACA: Cuilopan Mountains, altitude 2135 m., 27 July, 1894, *Rev. Lucius C. Smith*, no. 44 (type, in hb. Gray); Sierra de San Felipe, altitude 2287 m., 31 May, 1894, *C. G. Pringle*, no. 5750. This species is probably nearest *P. Pringlei* Robinson & Greenman, differing most noticeably in the shape of the leaf, the position of the stipular glands, and the white instead of dark pubescence. The differences in the flowers seem to be rather of degree than of kind.

Diospyros Palmeri, n. sp., arborescens; ramulis divaricatis griseis glabris; foliis alternis obovatis 3-5 cm. longis 2 cm. latis, basi cuneatis breviter petiolatis, apice rotundatis vel truncatis, coriaceis superne nitida

subter reticulatis ; calyce fructifero quinquepartito, segmentis inflexis obovatis vel oblongis parallele nerviis praeter basim fusco-puberulentem glabris ; fructibus globosis depressis glabris nitidis 2.5 cm. diametro ; pedunculis solitariis 5 mm. longis fusco-pubescentibus ; seminibus oblongis 12 mm. longis 7 mm. latis, una facie convexa, altera plana. — SAN LUIS POTOSI : San Dieguito, 7-10 June, 1905, *Dr. Edward Palmer*, no. 631 (type, in hb. Gray). Dr. Palmer notes this as a large shrub or small tree 2-4 m. high with considerable top and a profusion of dark green leaves, the fruit thinly scattered, having the appearance of persimmons, light green but with a patch of red and brown at the exposed or lower end. Without the flowers its affinities are doubtful. Compared with the species listed by Hemsley (Biol. Cent.-Am. Bot. ii. 300) it differs as follows: from *D. ciliata* A. DC. in having obovate instead of ovate leaves ; from *D. cuneifolia* Hiern, in being glabrous instead of hispid or pubescent, as well as in having leaves larger, and fruit three times the size ; from *D. Ebenaster* Retz. it differs in the shape and size of leaves, much smaller fruit, and quite entire calyxlobes ; from *D. velutina* Hiern, it differs in the shape of leaves and absence of fulvous velutinous pubescence, and from *D. texana* Scheele it also differs in leaves and pubescence.

Forestiera puberula, n. sp., divaricate ramosa ; ramulis griseis et atro-puberulis, verrucosis cum squamulis marcescentibus alabastro-rum ; foliis fasciculatis lineari-spatulatis apice obtusis basi breve petiolatis 5-10 mm. longis 1-nervatis, margine revolutis, superne puberulis, subter glabris porulosis ; pedunculis cum foliis fasciculatis, 3-5 mm. longis ; fructibus (immaturis) cylindraceutis falcatis obtusis 8 mm. longis, 3 mm. diametro. — ZACATECAS : in arroyas, Cedros, June, 1908, *J. E. Kirkwood*, no. 12 (type, in hb. Gray).

Related to *F. angustifolia* Torr., differing chiefly in the puberulent stems and leaves, the latter smaller and strongly revolute. The cylindrical falcate fruit also distinguishes it. The flowers are unknown.

Centaurium pusillum, n. sp., nanum 4-8 cm. altum ramosissimum glabrum ; ramis tenuissimis quadrangulatis ; foliis imis rosulatis, primis spatulatis, ceteris oblanceolatis acutis 1 cm. longis 2 mm. latis, nerviis obscuris ; foliis caulinis lanceolatis acuminatis vel apice acutis basi amplexicaulibus ; floribus longe pedunculatis non-numquam sessilibus tetrameris 7 mm. longis ; pedunculis inter angulos striatis ; calycis laciniis fere liberis lanceolatis acutis carinatis, margine membranaceis 3-4 mm. longis, tubo brevi multo longioribus ; corollae laciniis oblongis vel ellipticis obtusis 4 mm. longis 2 mm. latis contortis et supra capsulam marcescentibus, tubo calycem aequanti, faucibus constrictis ; filamentis in faucibus insertis capillaribus 2 mm. longis ; antheris ovato-cordatis

brevibus stigma superantibus; stylo brevi recto; stigmatibus bilamellato, partibus obovatis 1 mm. longis 0.5 mm. latis; capsulis calycem superantibus oblongo-ellipticis ad basim dehiscentibus cum duabus valvulis divergentibus; placentis paulo intrusis muricatis; seminibus numerosis brunneis suborbiculatis minute papilloso vel irregulariter et interrupte corrugatis. — MICHUACAN: Morelia, on a bare damp mesa, 29 November, 1907, *C. G. Pringle*, no. 10,408 (type, in hb. Gray). This tiny plant seems nearest to *Centaurium tetramerum* (Schiede), n. comb. (*Erythraea tetramera* Schiede ex Schl. in Bot. Zeit. xiii 920), and resembles that species in its 4-merous flowers and dehiscent fruit. It differs, however, in the short corolla-tube not exceeding the calyx, the leaves with scarcely perceptible nerves, the fasciculate flowering stems, the persistent basal leaves, the striate peduncles, and the bilamellate stigma. The color of the flowers is not readily discernible in the dried specimens, but the lower part of the limb of the corolla appears to be yellow and the tips of the lobes tinged with pink.

→ *Spigelia quaternata*, n. sp., radicibus fasciculatis; caulibus multis ex caudice breve, 3 dm. altis purpureis minute scabridis, parte superiore angulatis; foliis saepissime quaternatis supremis oppositis ovato-oblongis apice acuminatis 4–8 cm. longis 1–3 cm. latis integris superne glabris vel scabridulis subter pallidioribus et glabris, nerviis primariis et secundariis hispido-scabridis; stipulis brevibus triangularibus basi semi-amplexicaulibus folia conjungentibus; tot ramulis quot foliis ad nodos, terminantibus in spicis gracilibus; floribus flavis sessilibus secundis, in alabastro confertis, in fructu 3–6 mm. distantibus; sepalis lineari-lanceolatis acuminatis 4 mm. longis 1 mm. latis cum duabus glandibus interioribus; corollae tubo 8 mm. longo, laciniis oblongis acutis 3 mm. longis, superiore paulo longiore; capsulae basi persistente; seminibus globosis punctatis. — SAN LUIS POTOSI: Rascon, *Dr. Edward Palmer*, 19–22 June, 1905, no. 671 (type, in hb. Gray). This species is most closely related to *S. Humboldtiana* Cham. & Schlecht. and is easily distinguished by its much smaller flowers and its scabrid and more or less hispid pubescence.

Bourreria obovata, n. sp., ramulis senioribus minute albo-punctatis, junioribus canescentibus cum pilis brevibus adpressis; foliis obovatis superne scabridulis cum pilis brevibus adpressis basi minute pustulatis subter pallidioribus non scabridis, apice truncatis obtusis vel retusis, basi ad petiolum brevem attenuatis; pedunculis terminalibus cymosis cum pedicellis brevibus; bracteis foliaceis; calyce fere ad mediam partem 5-dentato, dentibus triangularibus acutis 4 mm. longis, utrinque adpresso-pilosellis; corolla rotata, tubo calycem aequanti, lobis 5–6 rotundatis, 5 mm. longis, basi auriculatis; staminibus 5–6,

insertis ad mediam tubi; antheris exsertis obscure mucronulatis; filamentis glandulosis et pubescentibus; stylo crasso, apice bifido, stigmatibus peltatis. — OAXACA: on hills, altitude 1300 m. at Jayacatlan, *Lucius C. Smith*, July 27, 1895, no. 549 (type, in hb. Gray), also Cuicatlan hills, June 17, 1895, no. 399.

Seymeria deflexa, n. sp., scabrida et glandulosa; foliis deflexis, majoribus oblongo-ovatis obtuse dentato-laciniatis, segmentis inferioribus crenatis apice obtusis, basi decurrentibus ad petiolum; minoribus oblongis integris basi cuneatis, superiore parte dentatis; petiolis brevibus; floribus divaricate-paniculatis, pedicellis capillaribus saepe decurvatis 5 mm. longis; calycis laciniis tubum campanulatum aequantibus, oblongo-ovatis obtusis recurvatis 2 mm. longis, in fructu patentibus; corolla campanulata 8 mm. longa, laciniis inaequalibus suborbiculatis ciliatis reflexis basi auriculatis; filamentis subulatis brevibus crassis pilosis; antheris exsertis flavis nervatis 3 mm. longis 1.3 mm. latis papillosis, apice dehiscentibus; stylo antheras superante, in fructu declinato apice tenuiter clavato; ovario punctato-scabrido sub-cydoniformi. — NUEVO LEON: limestone ledges of the Sierra Madre above Monterey, 19 September, 1907, *C. G. Pringle*, no. 10,398 (type, in hb. Gray). This differs from other described species in having deflexed less dissected leaves, and pyramidal paniculate inflorescence. The color of the flowers is not known, but the exserted stamens, as well as the recurved divisions of the calyx and corolla, give the flowers a slight resemblance to some Californian species of *Dodecatheon* belonging to the *D. patula* group. The type specimen consists of the upper part of the stem, therefore the lowest leaves are unknown.

Dicliptera floribunda, n. sp., perennis, erecte et diffuse ramosa, 12–15 dm. alta; ramis sexangulatis sparse pubescentibus, nodis remotis foliatis et floribundis supra axillas geniculatis; foliis integerrimis ovato-lanceolatis acuminatis 1 dm. longis, 5 cm. latis apice mucronatis, basi ad brevem petiolum decurrentibus, scabridule pubescentibus subterpenninerviis et investis cum pilis brevibus furcatis; junioribus partibus albo-tomentosis; capitulis glomeratis, pedunculis brevibus vel abeuntibus; bracteis involucri 2, obovatis basi cuneatis chartaceis apice foliaceis saepe purpureo-tinctoreis scabridulis; umbellis inclusis 3-floris; bracteolis lineari-acuminatis calycem superantibus costatis et carinatis apice aristatis basi connatis: calycis segmentis trinerviis chartaceis attenuatis obscure glandulifero-pilosis 6 cm. longis; corolla verisimiliter flammea (coccinea fide Palmeri) leviter investa cum pilis furcatis 3 cm. longa, tubo gradatim ampliato, faucibus 5 mm. diametro, labiis paulo divergentibus, postice integris, antice 3-crenulatis; filamentis paulo pilosis; antheris exsertis, loculis discretis, superiore loculo

erecto, inferiore declinato; stylo glabro latitudine filamenta aequanti; stigmatibus obscure bidentato; ovario ovato-acuminato, inserto in receptaculo cupulato; capsula elliptica basi ad stipam latam contracta, apice minute glandulifera; seminibus suborbiculatis minutissime muriculatis et palmate nervatis. — DURANGO: San Ramon, April–May, 1906, *Dr. Edward Palmer*, no. 73 (type, in hb. Gray). Dr. Palmer notes that this is a loosely branching plant 12–15 dm. high, with many scarlet flowers, growing at the edge of shady woods. It belongs to Sect. *Sphenostegia* Nees in DC. Prodr. xi. 479, and is near *D. sexangularis* Juss. and *D. brachiata* Spreng. The corolla in this is larger, with the lips less spreading.

- 7 **Tetramerium flavum**, n. sp., caule erecto divaricate ramoso 6–12 dm. alto quadrangulato, inter angulos striato, scabridulo investo pilis tenuibus adpressis et pilis articulatis longioribus; ramis oppositis, junioribus glandulosis et dense albo-pubescentibus; foliis penninervatis ovato-acuminatis basi ad petiolum brevem inaequaliter attenuatis longissimis, in specimine viso 12 cm. longis, 5 cm. latis; petiolis 2 cm. longis; spicis axillaribus et terminalibus simplicibus vel compositis (ultima spica longissima); floribus imbricatis, bracteis distichis oblanceolatis aristatis trinerviis 5 mm. longis 1.5 mm. latis, apice recurvatis; involucri bracteolis connatis carinatis obovatis apice aristatis quinquenerviis 12 mm. longis, floram solitariam includentibus; calycis laciniis lineari-setaceis glandulifero-pilosis membranaceis 3 mm. longis; corollae flavae tubo anguste cylindrico 4 mm. longo, laciniis patenti-divaricatis 1 cm. longis, labio superiore erecto spatulato 1 cm. longo, inferiore ternato, segmentis patenti-divaricatis obovatis 1 cm. longis; filamentis faucibus insertis, glabris; antherarum loculis parallelis paulo inaequalibus muticis conjunctis; ovario crasso-stipitato apice hispido breve acuminato calycis lacinias superanti; receptaculo crasso clavato; stylo bifido antheras superanti. — DURANGO: San Ramon, April–May, 1906, *Dr. Edward Palmer*, no. 75 (type, in hb. Gray). This is most closely related to *T. aureum* Rose, which, however, has bracts and bracteoles obovate obtuse, leaves truncate or subcordate at base. From all other species it differs in having the cauline bracts narrower and much shorter than the involucre. It is a showy plant, rather woody, growing at base of mountains near the edge of woods. It is a free bloomer with “canary yellow flowers that close at night.”

V. NOTES ON MEXICAN AND CENTRAL AMERICAN ALDERS.

BY HARLEY HARRIS BARTLETT.

ALNUS ACUMINATA HBK. *A. acuminata a genuina* Regel, Monog. 89 (1861), *A. jorullensis* var. *acuminata* (HBK.) Ktze. Rev. Gen. ii. 638 (1891), not *A. acuminata* Mirb. Mém. Mus. Par. xiv. 464, t. 22 (1827), not *A. acuminata a genuina* Hemsl. Biol. Cent.-Am. Bot. iii. 165 (1883), not *A. acuminata* Sarg. Silva ix. 79, t. 457 (1896), not *A. jorullensis* var. η *acuminata* Winkl. Pflanzenreich, iv. 61, 127 (1904), not *A. acuminata* Fern. Proc. Am. Acad. xl. 25 (1904). Here are placed *Seemann*, no. 942, Loja, Ecuador, and, with considerable doubt, *Tonduz*, no. 11,680, "Bords des rivières au Copey," Costa Rica. The latter specimen is much more ferrugineous than the former and forms a transition to what has been called

ALNUS ACUMINATA VAR. FERRUGINEA (HBK.) Regel. ?? *Alnus ferruginea* HBK. *A. ferruginea* Fern. Proc. Am. Acad. xl. 27 (1904) *pro parte*. This name may be provisionally accepted for *Tuerckheim*, no. 351, Coban, Department of Alta Verapaz, Guatemala, which seems to be a very ferrugineous extreme of the plant here called *A. acuminata*. The pubescence is very dense, and is persistent on all but the oldest leaves.

ALNUS ARGUTA (Schlecht.) Spach. *Betula arguta* Schlecht. *Alnus arguta* Spach *a genuina* Regel, Monog. 93 (1861). In its typical form this species is accepted as interpreted by Professor Fernald. It presents, however, two variations which seem worthy of recognition. Neither of them appears to fall into any of Regel's four varieties. His var. *genuina* is here taken up as the type form of the species. Var. *Benthami* is so inadequately characterized as to be unrecognizable without access to the type. Moreover it came from Zacualtipan, to the north of the known range of either of the two varieties here proposed. Var. *ovata* was based upon material from three Mexican localities, and one Peruvian locality, but since Regel cited as a synonym *A. Mirbelii* var. Grisb. in Lechl. Pl. Peruv. the type is definitely fixed as the Peruvian element, which it is almost inconceivable should be the same as the Mexican. Var. *punctata* was purely South American.

***Alnus arguta* var. *cuprea*, n. var.** Arbor aspectu inter formam speciei typicam *Alnumque glabrata* Fern. media. Ramuli glabri juventate rubescentes aetate griseo-brunnei. Folia magnitudine valde variabilia, usque ad 8.5 cm. lata 14 cm. (petiolo excluso) longa, basi rotundata vel leviter cordata, apice acuta vel acuminata, argute dupliciter vel irregulariter dentata, utrinque paene glabra, subtus vel nihil vel minus quam ea formae typicae glauca, colore saepe cuprea, supra atriora. Amenta ♀ pedunculata 9–11 mm. crassa ca. 2 cm. longa. — Oaxaca: wet cañon near base of the summit ridge of the Sierra de San Felipe above the City of Oaxaca, alt. 2135 m., *Pringle*, no. 10,251; west slope of Mt. Zempoaltepec, alt. 2350–2440 m., *Nelson*, no. 599; road from Juquila to Nopala, alt. 1220–2135 m., *Nelson*, no. 2415; vicinity of Cerro San Felipe, alt. 2900–3350 m., *Nelson*, no. 1154. Vera Cruz: Orizaba, *Bilimek*, no. 404; Mt. Orizaba, alt. 1830–2440 m., *Nelson*, no. 296; Orizaba, *Botteri*, no. 191.

***Alnus arguta* var. *subsericea*, n. var.** *A. ferruginea* Fern. Proc. Am. Acad. xl. 27 (1904) *pro parte, non* HBK. ? *A. rufescens* Liebm. ex Hemsl. Biol. Cent.-Am. Bot. iii. 165. Arbor ramulis griseo-brunneis, junioribus ferrugineo-puberulis. Folia laminis late ovatis maximis 14 cm. longis 9 cm. latis, basi leviter cordatis vel rotundatis, apice acutis vel breviter acuminatis, supra atroviridibus tenuiter sericeo-pilosis demum glabratis, pilis longis rectis valde appressis, subtus molliter glauco-pubescentibus, nervis rufescentibus in foliis maximis utrinque 16; petiolis subferrugineo-pubescentibus saepissime quam 2 cm. brevioribus. Gemmae parvae glutinosae puberulae pedicellis suis valde longiores nec raro sessiles. Amenta ♀ maturitate ca. 1 cm. crassa 3 cm. longa vel multo breviora. Nuculae alis percoriaceis angustissime cinctae. — Oaxaca: wet cañon near the base of the summit ridge of the Sierra de San Felipe, above the City of Oaxaca, *Pringle*, no. 10,252. This is also the locality cited by Hemsley for *A. rufescens* Liebm. From the name which Liebmann chose there can be little doubt that he had this plant before him, for the only other reddish-leaved *Alnus* from the same locality is so glabrous that Hemsley would certainly not have placed it with *A. acuminata* var. *ferruginea*. Since Liebmann's name is a *nomen nudum* it does not seem at all desirable to take it up in a changed category without having seen his type. To var. *subsericea* may be referred *Ghiesbreght*, no. 160, from Chiapas, the plant upon which Mr. Fernald's description of *A. ferruginea* is largely based.

ALNUS CASTANAEAFOLIA Mirb. It is clear from the original plate and characterization that this species can have no close affinity to the Mexican plant cited by Hemsley under the name *A. jorullensis* HBK. β *castanaefolia*. The latter name should be placed, as to the Mexi-

can element, in the synonymy of *A. arguta* (Schlecht.) Spach var. *cuprea* Bartlett.

➤ *Alnus glabrata* var. *durangensis*, n. var. Arbor trunco a cortice griseo sublevi tecto. Ramuli glabri ochracei modice graciles. Folia lanceolata 14 cm. longa infra mediam 6 cm. lata argute dentata, dentibus subremote serratis, supra glabra olivaceo-viridia, subtus glauca glabra vel secus nervos minute pubescentia, exigue resinoso-punctata, apice longe acuminata, basi acuta in petiolum 1.5 cm. longum decurrentia; nervis utrinque 9-10; petiolis anguste canaliculatis exigue albido-pubescentibus. Amenta ♀ ca. 4 maturitate cylindrica 2.5 cm. longa 8 mm. crassa, pedunculis saepe 6 mm. longis. Nuculae alis coriaceis anguste cinctae. — Collected in the vicinity of the City of Durango, State of Durango, April to November, 1896, *E. Palmer*, no. 965 (type, in hb. Gray). Readily distinguished from the typical form of the species by the glaucous lower leaf-surface.

ALNUS JORULLENSIS HBK. This species has been seen from the States of Jalisco, Michoacan, Mexico, Hidalgo, and Oaxaca, the var. EXIGUA Fern. from the States of Guanajuato and Oaxaca. The material from Oaxaca, both of the species (*Pringle*, no. 10,248) and of the variety (*Pringle*, no. 10,249), is in young foliage, and future collections may show that it belongs elsewhere.

ALNUS JORULLENSIS var. *E. W. Nelson*, no. 3661, collected near the Hacienda of Chaucol, Guatemala, has small sessile buds and cuneate leaves very much like those of *A. jorullensis*, but since the pistillate strobiles are unknown it seems better to leave the form undescribed rather than to risk adding another name to the involved synonymy of this species.

A. MIRBELII Spach. The only material in American herbaria which answers to the description and plate of this species is *Bang*, no. 1893, from Bolivia. Perhaps a sheet in the Gray Herbarium collected by *Seemann* and labelled by Dr. Gray "And. Quitensis — Panama" should be placed here also.

Alnus ovalifolia, n. sp., *A. acuminata* Fern. pro parte, non HBK. Arbor ramulis junioribus brunneis glabris subangulatis. Gemmae glutinosae brevipedicellatae sparsim pubescentes vel glabratae. Folia ovalia subregulariter denticulata, apice basique rotundata obtusa vel raro acutiuscula, supra solum in nervis perexiguae pilosa, subtus secus nervorum latera plus minusve pilosa, alias glabra, laminis 1.5-5.5 cm. latis 2.5-8.0 cm. longis; petiolis 2-10 mm. longis, supra canaliculatis pilosis, subtus glabratis. Amenta ♂ 4-6 usque ad 13 cm. longa fere sessilia vel longipedunculata. Amenta ♀ in uno ramulo 3-4 ovoidea ca. 2.5 cm. longa 1.4 cm. crassa maturitate plerumque fecte sessilia

recte divergentia, duo summa propinqua. Nuculae 4 mm. longae 2.5–3 mm. latae basin versus angustatae, quam in speciebus affinibus latius coriaceo-alatae, apice saepius auriculatae. — GUATEMALA: San Lucas, Department of Zacatepequez, alt. 1700 m., *J. Donnell Smith*, no. 2188 (type, in hb. Gray); Antigua, Department of Zacatepequez, *Kellerman*, no. 4966; San Miguel Uspantán, Department of Quiché, alt. 1800 m., *Heyde et Lux*, no. 2923. It was from the type of this species, in the main, that Professor Fernald drew up the description of *Alnus acuminata* in his Synopsis of the Mexican and Central American Species of *Alnus*. There the peculiar ashy-brown color of the bark and strobiles is mentioned, a character afterward emphasized as of diagnostic worth in his characterization of *Alnus Pringlei* Fern. The color is peculiar to the type specimen and seems to be due to a thin deposit of clay, perhaps wind-borne dust. Professor Thaxter has kindly examined the specimen for fungi, with negative results.

ALNUS PRINGLEI Fern. The range of this species probably extends northward to Durango. At least the following specimens in the National Herbarium are nearer to *A. Pringlei* than to any other species: Terreria, Jalisco, *M. E. Jones*, no. 439 a; San Ramon, Durango, 21 April–18 May, 1906, *Palmer*, no. 207.

ALNUS RHOMBIFOLIA Nutt. The accrediting of this species to Mexico in the Pflanzenreich is based upon an error in determination. The number cited as *A. rhombifolia* is *A. glabrata* Fern.

VI. DIAGNOSES AND TRANSFERS OF TROPICAL AMERICAN PHANEROGAMS.

BY B. L. ROBINSON

Antigonon grandiflorum (Bertol.), n. comb. *Polygonum grandiflorum* Bertol. Bologn. Nov. Comm. iv. 412 et *Florula Guatimalensis*, 12 (1840). *Antigonon guatimalense* Meisn. in DC. Prod. xiv. 184 (1856). *A. guatemalense* Hemsl. Biol. Cent.-Am. Bot. iii. 37 (1882).

Tamonea euphrasiifolia, n. sp., fruticosa ramosissima; ramis flexuosis a cortice flavido-griseo tectis; ramulis elongatis foliatis 4-gonis striatis griseo-puberulis; foliis subdeltoideo-ovatis flabelliformi-nervatis brevibus 4–6 mm. solum longis aequalatis quam internodia plerumque brevioribus argute dentatis breviter petiolatis supra glabris rugosis viridibus subtus praecipue in nerviis puberulis; racemis spiciformibus pedunculatis 5–10 cm. longis; bracteis parvis subulatis ca. 2 mm. longis; pedicellis inferioribus ca. 4 mm. longis; calyce cylindrico demum turbinato maturitate 6 mm. longo 5-costato costis excurrentibus extus puberulo; corolla 1.7 cm. longa glabra; fructu obovoideo spinis solis e calyce exsertis. — Alta Mira, Tamaulipas, Mexico, 14–22 May, 1898, *E. W. Nelson*, no. 4415 (type, in hb. Gray and hb. U. S. Nat. Mus.).

Russelia cuneata, n. sp., modice robusta 1 m. alta verisimiliter frutescens; caulibus acute 4-gonis 4-costatis glabris laevisque prope nodos solum sparse pubescentibus, internodiis 5–10 cm. longis folia saepissime superantibus; foliis oppositis firmissculis 5–8 cm. vel ultra longis rhomboidei-oblongis supra mediam partem crenato-dentatis basi longe cuneatis integriusculis utrinque sparse puberulis vel subglabris; cymis multifloris ca. 3 cm. longis saepissime binis in axillis superioribus oppositis orientibus, pedunculis crassiusculis sordide pubescentibus ca. 6 mm. longis, pedicellis puberulis 4–6 mm. longis flexuosis ascendentibus; calycis lobis ovatis acuminatis brevissimis praecipue in costa media hispidulis margine subscariosis ca. 2 mm. longis; corolla tubulosa sanguinea in sicco nigrescenti 1 cm. longa glabra, lobis limbi brevissimis suberectis. — On granitic soil, El Ocote, Michoacan, Mexico, December, 1898, alt. 300 m., *E. Langlassé*, no. 723 (type, in hb. Gray). From its square stem and numerous flowered cymes near *R. floribunda* HBK. and *R. syringaefolia* Schlecht. & Cham., but clearly distinct by its entirely different leaf-contour, smaller flowers, etc.

Gratiola oresbia, n. sp., perennis (Sect. GRATIOLARIA § SUBDIDYNAMAE PEDUNCULATAE) erecta 7-18 cm. alta; radicibus fibrosis numerosis; caulibus flexuosis viridibus mollibus foliosis fere a basi floriferis obscure praesertim apicem versus glanduloso-puberulis; foliis lanceolati-oblongis sessilibus auriculato-amplexicaulibus 1.5-2.4 cm. longis 4-6 mm. latis plerumque acutatis rarius obtusis 3 (vel obscure multi)-nerviis saepissime crenulatis vel rarius subintegris utrinque viridibus glabris; pedicellis axillaribus 1.5-2 cm. longis nutantibus glanduloso-puberulis; bracteolis sepaloideis lineari-oblongis obtusis 4-5 mm. longis; calycis segmentis anguste oblongis obtusis 3-nerviis ca. 5 mm. longis glanduloso-puberulis; corolla intense aurea 1.3 cm. longa extus glanduloso-puberula intus villosa, lobis latis brevibus retusis; staminibus fertilibus 2, connectivo membranaceo-expanso, loculis transversis; rudimentis 2 parvis filiformibus in tubo quam stamina fertilia altius affixis; capsula compressa ovata acuta maturitate segmenta calycis aequanti. — Sierra Madre Mountains, near Colonia Garcia, Chihuahua, Mexico, 25 August, 1899, *E. W. Nelson*, no. 6099 (type, in hb. Gray); also earlier at the same station, alt. 2285 m., *Townsend & Barber*, no. 31. This species appears to be most nearly related to *G. Drummondii* Benth., which, however, has narrower more attenuate leaves and a sub-orbicular obtuse capsule scarcely half the length of the lance-linear calyx-segments.

In a recent attempt to revise and label in accordance with the Vienna Rules of Nomenclature the material of the genus *Bacopa* in the Gray Herbarium the writer has found it necessary to employ several apparently new combinations, which it may be well to record here, as follows:

Bacopa Beccabunga (Griseb.), n. comb. *Herpestis Beccabunga* Griseb. Cat. Pl. Cub. 182 (1866). *Monniera Beccabunga* Ktze. Rev. Gen. ii. 463 (1891).

Bacopa humifusa (Griseb.), n. comb. *Herpestis humifusa* Griseb. Cat. Pl. Cub. 183 (1866). *Monniera humifusa* Ktze. Rev. Gen. ii. 463 (1891).

Bacopa micromonniera (Griseb.), n. comb. *Herpestis micromonniera* Griseb. Cat. Pl. Cub. 183 (1866). *Monniera micromonniera* Ktze. Rev. Gen. ii. 463 (1891).

Bacopa monnierioides (Cham.), n. comb. *Ranaria monnierioides* Cham. Linnaea, viii. 31 (1833). *Herpestis Ranaria* Benth. in Hook. Comp. Bot. Mag. ii. 57 (1836). *Monniera monnierodes* Ktze. Rev. Gen. ii. 463 (1891). *Bacopa Ranaria* Chod. & Hassl. Bull. Herb. Boiss. ser. 2, iv. 288 (1904).

➤ **Bacopa semiserrata** (Mart.), n. comb. *Bramia semiserrata* Mart.

Amoen. Monac. (Auswahl merkwürdiger Pflanzen — Choix des plantes remarquables) 11, t. 8 (1830). *Caconapea gratioloides* Cham. & Schlecht. Linnaea, viii. 29 (1833). *Herpestis gratioloides* Benth. in Hook. Comp. Bot. Mag. ii. 57 (1836). *Monniera semiserrata* Ktze. Rev. Gen. ii. 463 (1891). *Bacopa gratioloides* Chod. & Hassl. Bull. Herb. Boiss. ser. 2, iv. 288 (1904).

> **Bacopa stricta** (Schrad.), n. comb. *Herpestis stricta* Schrad. in Link, Enum. ii. 142 (1822). *H. domingensis* Spreng. Syst. ii. 801 (1825). *H. polyantha* Benth. in Hook. Comp. Bot. Mag. ii. 57 (1836). *Monniera stricta* Ktze. Rev. Gen. ii. 463 (1891).

Heterotoma Pringlei, n. sp., annua pusilla erecta 5–11 cm. alta glaberrima glaucescens; foliis radicalibus parvis ovato-rhomboides dentato-angulatis obtusis 3–5 mm. longis 1–4 mm. latis saepius purpurascensibus basi cuneatis, petiolo glaberrimo 3–7 mm. longo; foliis caulinis 1–2 minimis bracteiformibus linearibus vel anguste lanceolatis; racemo ca. 4 cm. longo 3–5-flora; bracteis linearibus 2–4 mm. longis; pedicellis gracilibus flexuosis patentibus 6–8 mm. longis 1-floris; calyce 3–4 mm. longo valde gibboso vel breviter calcarato, dentibus limbi subaequalibus brevibus lineari-oblongis; corolla azurea 7 mm. longa, dentibus superioribus 2 angustis erectis 1.5 mm. longis, labio inferiore 3-lobato, lobis obovatis rotundatis patentibus. — Chalky mountains, Nuevo Leon, Mexico, 7 November, 1904, *C. G. Pringle*, no. 13,274 (type, in hb. Gray).

Vernonia Conzattii, n. sp., herbacea, erecta; caulibus striato-angulatis sordide tomentosis foliosis apice corymboso-ramosis; foliis ovato-oblongis vel ovato-lanceolatis firmissculis obscure serrulatis vel integriusculis acuminatis breviter petiolatis basi acutiusculis vel obtusis penninerviis supra rugosis scabris subtus paulo pallidioribus reticulato-venosis saltem juventate tomentosis; inflorescentia umbelliformi terminali valde convexa; pedicellis rectiusculis 1.2–3 cm. longis glanduloso-tomentellis cum bracteolis 1–2 parvis lanceolati-linearibus saepissime munitis; capitulis ca. 35-floris 1.2 cm. diametro; involucri campanulati squamis pluriseriatis valde inaequalibus purpurascensibus acutis mucronatisque ciliolatis, interioribus oblongis, exterioribus lanceolatis vel lanceolati-linearibus multo brevioribus; corollis purpureis glabris ca. 1 cm. longis, dentibus limbi 5 lineari-oblongis obtusis: achaeniis (immaturis) 1.8 mm. longis costatis subglabris plus minusve granuliferis; pappi setis numerosis albidis, interioribus 6–7 mm. longis, exterioribus paucis ca. 2 mm. longis. — Sta. Ines del Monte, Zimatlan, Oaxaca, Mexico, alt. 2700 m., 8–9 December, 1905, *Prof. C. Conzatti*, no. 1327 (type, in hb. Gray); also previously collected in somewhat less mature condition on the Cerro de San Felipe, Oaxaca,

alt. 1900 m., 14 November, 1897, *Conzatti & González*, no. 563 (hb. Gray). This species appears to be most nearly related to *V. Karvinskiana* DC. and *V. jaliscana* Gleason. It is distinguished from both by its somewhat larger and considerably more numerous flowered heads, as well as by the tomentose pubescence on the stem and lower surface of the leaves.

Elephantopus micropappus Klatt, Jahrb. Hamburg. wissenschaft. Anstalt. ix. pt. 2, p. 124 (1892). Dr. Klatt's memorandum regarding this plant was grounded upon Ule's no. 1184, collected "in campo bei Laguna [Brazil] März 1889." The specimen examined and labelled by Dr. Klatt and now preserved in the Gray Herbarium has nothing whatever to do with *E. micropappus* Less. but is *GOMPHRENA PERENNIS* L.

Phania Curtissii, n. sp., suffruticosa oppositiramea tomentella; caulibus teretibus obscure striatulis; foliis oppositis graciliter petiolatis late ovatis supra puberulis subtus paulo pallidioribus tomentellis puncticulatis, caulinis late cordatis 1.5–2.2 cm. longis et latis grosse crenato-lobatis vel subtripartitis, petiolo ca. 1 cm. longo, foliis ramealibus multo minoribus basi obtusis vel raro acutiusculis nec cordatis 7–15 mm. longis 5–12 mm. latis, petiolo 3–4 mm. longo; capitulis parvis graciliter pedicellatis numerosis cymosis ca. 25-floris; involucri squamis oblanceolati-linearibus acutis viridibus ca. 3 mm. longis subaequalibus; corollis albis; achaeniis nigris glabris deorsum decrescentibus 5-angulatis lucidis; pappi squamellis 5 saepissime 3–5-fidis ciliolatis dorso granuliferis. — Near Nueva Gerona, Isle of Pines, West Indies, 17 December, 1903, *A. H. Curtiss*, no. 239 (type, in hb. Gray). This species most nearly approaches *P. matricarioides* (Spreng.) Griseb., but may be readily distinguished by the very different form of its leaves, which in most cases are fully as wide as long and on the main stems are cordate.

STEVIA BERLANDIERI Gray. In this species, now known from several states of northern Mexico, it is easy to remark certain rather striking differences of pubescence and glandularity, though these do not seem to be correlated with other distinctions of importance. In the typical form, occurring in Tamaulipas and Nuevo Leon, the branchlets, leaves, and petioles are minutely and often sparingly glandular-pulverulent rather than pubescent, and the involucreal scales are rather conspicuously covered with sessile globular aureous atoms. From this very constant typical form the following varieties are easily distinguished.

Var. *podadenia*, n. var., ramulis et foliis et petiolis laxe crispeque griseo-pubescentibus; involucri squamis cum glandulis stipitatis hispidulis. — *S. Berlandieri* Hemsl. Biol. Cent.-Am. Bot. ii. 84 (1881), in

part, not Gray. — San Luis Potosi, Mexico, 22° N. Lat., alt. 1830–2400 m., *Parry & Palmer*, no. 322 (type, in hb. Gray); in mountains, San Miguelito, San Luis Potosi, August, 1876, *Schaffner*, no. 247.

Var. *anadenotricha*, n. var., dense crispeque puberula; foliis quam ea formae typicae paulo majoribus 4–5 cm. longis 3.5–4 cm. latis; involucri squamis brevioribus 3–4 mm. longis crispe puberulis, pilis omnino eglandulosis. — Southwestern Chihuahua, August to November, 1885, *Dr. Edward Palmer*, no. 257 (type, in hb. Gray).

Stevia dictyophylla, n. sp., fruticosa ramosa; caulibus teretibus foliosis brunneis crispe tomentellis; foliis oppositis ovatis vel ovati-ellipticis acutiusculis integerrimis vel obsolete crenato-dentatis 3.5–6 cm. longis 12–25 mm. latis basi cuneatis punctatis supra scabriusculis subtus paulo pallidioribus crispe puberulis prominenter reticulato-venosis supra basin subtrinerviis deinde pinnatim venosis, petiolo 3–7 mm. longo cuneato-alato; corymbis densis multicapitulatis valde convexis 12–14 cm. diametro; bracteis ovatis vel ellipticis foliaceis; capitulis subsessilibus 5-floris; involucri squamis lineari-oblongis acutiusculis dorso rotundatis vel plus minusve carinatis griseo-tomentellis 4 mm. longis; corollis 3.8 mm. longis albidis valde exsertis, tubo proprio 1.3 mm. longo extus granuloso, dentibus limbi ovatis patentibus minute hispidulis; achaeniis gracillimis nigrescentibus acute 5-gonis glabriusculis basi callosis apice cupulo brevissimo coronatis. — *S. subpubescens* Benth. Pl. Hartw. 19 (1839); Hemsl. Biol. Cent.-Am. Bot. ii. 90 (1881), in part; not Lag. — Guanajuato, Mexico, *Hartweg*, no. 37, (type, in hb. Gray); hills near Guadalajara, Jalisco, Mexico, 11 December, 1889, *C. G. Pringle*, no. 2832 (hb. Gray). *S. subpubescens* Lag., as ordinarily and with probable correctness interpreted, differs in its more oblong leaves, which are decidedly more pubescent and much less venose-reticulate, also in its smoother involucre, etc.

Stevia revoluta, n. sp., fruticosa dichotomo-ramosa griseo-puberula; ramis teretibus nodosis a cortice griseo tectis; ramulis teretibus rectiusculis foliosis griseo-puberulis; foliis oppositis lanceolato-linearibus integerrimis 5–7 cm. longis 4–6 mm. latis 1-nerviis pinnatim obscure venosis supra viridibus puberulis subtus canescenti-tomentosis margine valde revolutis; corymbis multicapitulatis densiusculis griseo-puberulis leviter convexis terminalibus; bracteis linearibus ramos ramulosque inflorescentiae subaequantibus; involucri squamis 5 oblongis acutis purpurascens, exterioribus dorso rotundatis nec carinatis crispe puberulis, interioribus plus minusve carinatis; flosculis 5; corollis 5 mm. longis, tubo externe sparse granulifero saepius purpureo, dentibus limbi 5 albis ovatis dorso hispidulis; achaeniis nigrescentibus gracilibus subglabris lucidulis acute 5-gonis 4.3 mm. longis apice cupula brevi

scariosa coronatis, aristis nullis. — Rocky slopes, Cerro de Gentile, Puebla, Mexico, August, 1907, *C. A. Purpus*, no. 2539 (type, in hb. Gray). This species most nearly approaches *S. arachnoidea* Robinson, but differs in its much narrower, entire, and revolute-margined leaves, grayish-puberulent involucre, etc.

Eupatorium malacolepis, n. sp., perenne 3–12 dm. altum herbaceum vel basi lignescens fere a basi oppositirameum; ramis teretibus brunnescentibus pubescentibus vel puberulis; foliis oppositis petiolatis ovatis vel rhomboideis tenuibus crenato-dentatis 4–6 cm. longis 2.4–5 cm. latis a basi cuneato 3-nervatis ad apicem obtusiusculum angustatis; inflorescentia trichotomo-corymbosa; capitulis parvis numerosissimis ca. 5 mm. diametro 40-floris; involucri campanulati squamis subaequalibus oblanceolati-oblongis 2.5 mm. longis pallide viridibus tenuibus 2–3-nerviis dorso tomentellis margine tenuissimis saepissime ciliolatis; corollis albis 2.4 mm. longis, tubo proprio gracili faucibus distincte ampliatis campanulatis paulo longiore; achaeniis nigris lucidis glaberrimis 5-angulatis 1 mm. longis; pappi setis paucis corollam subaequantibus laete albis tenuissimis barbularis. — In dense woods along water courses, San Ramon, Durango, Mexico, 21 April–18 May, 1906, *Dr. Edward Palmer*, no. 90 (type, in hb. Gray); oak woods on hills near Huachinango, alt. 1375–1675 m., 4 March, 1897, *E. W. Nelson*, no. 4011 (hb. Gray, distributed as *E. pazcuarensis* HBK.). *E. malacolepis* differs from *E. pazcuarensis* HBK. and *E. isolepis* Robinson, to which it bears a considerable resemblance, in having much smaller flowers and shorter glabrous achenes.

Eupatorium oresbioides, n. sp., perenne lignescens; ramis teretibus plus minusve flexuosis foliatis fulvo-tomentellis; ramulis et pedunculis et petiolis purpureo-lanatis, pilis creberrimis tenuissimis moniliformibus; foliis oppositis graciliter petiolatis late ovatis hastatis 8–11 cm. longis 6–10 cm. latis tenuibus duplici mucronato-serratis caudato-acuminatis basi rotundatis vel subtruncatis cum angulis vel lobis lateralibus 1(–3) acuminatis divaricatis utroque munitis supra viridibus glabriusculis subtus praecipue in nerviis venisque tomentellis, nerviis ca. 7 paulo supra basin pinnatim oriuntibus, petiolis 1.5–5 cm. longis; panicula corymbiformi subglobosa multicapitulata 8–10 cm. diametro; bracteis petiolatis inferioribus foliaceis superioribus minimis; bracteolis filiformibus 2 mm. longis; pedicellis gracillimis patentibus 1–3 mm. longis; capitulis ca. 17-floris 8 mm. altis; receptaculo parvo convexo brevissime setulifero; involucri anguste campanulati squamis valde inaequalibus 3–4-seriatim imbricatis, extimis minimis linearibus, intermediis lanceolatis nunc appressis nunc laxe patentibus vel reflexis, interioribus oblongis obtusis erosis puberulis violaceo-tinctis; corollis

graciliter tubulosis supra mediam partem paulo in fauces ampliatis granulosis 4 mm. longis limbum versus purpureo-violaceis, dentibus limbi brevissimis obtusis; pappi setis albis corolla distincte brevioribus; achaeniis 5-gonis glabris 1.1 mm. longis basim versus paulo decrescentibus. — Alturas de Oaxaca, Mexico, 1800 m. alt., 20 February, 1907, *Prof. C. Conzatti*, no. 1738 (type, in hb. U. S. Nat. Mus., fragments in hb. Gray). A species somewhat approaching *E. oresbium* Robinson in many of its more technical characters, but readily distinguished by its hastate-angled leaves, more globular inflorescence, purple pubescence, etc.

Eupatorium ramonense, n. sp., herbaceum vel basi paulo lignescens a basi valde decumbens multirameum, ramis oppositis teretibus flexuosis foliosis viridibus pubescentibus ascendentibus 1.5–2 dm. vel ultra altis; foliis oppositis petiolatis ovato-lanceolatis argute serratis vel biserratis acuminatis basi obtusis vel saepe plus minusve cuneatis trinerviis 3–4.5 cm. longis 1.6–1.8 cm. latis supra atroviridibus minute pubescentibus subtus laete viridibus in nerviis breviter sparseque pilosis, petiolis 0.8–3 cm. longis hispidulis; capitulis 75-floris longipedicellatis 1 cm. diametro in cymis multicapitulatis quasi fastigiatis; pedicellis filiformibus 2–3.5 cm. longis erectis breviter pubescentibus; bracteis lineari-lanceolatis acutis 3–5 mm. longis; involucri campanulati squamis subaequalibus (exterioribus 2–3 brevioribus) lanceolati-linearibus attenuatis viridibus 2–3-nerviis breviter hispidulis 4–5 mm. longis; corollis laete albis 3.8 mm. longis glabris vel sparse pilosis, tubo proprio gracili 1.7 mm. longo, faucibus subcylindrici-campanulatis distincte ampliatis, dentibus limbi deltoideis brevissimis; achaeniis nigris 2 mm. longis 5-angulatis in costis sursum hispidulis apicem basimque versus paulo decrescentibus. — In shady moist places, forming compact masses, San Ramon, Durango, Mexico, 21 April–18 May, 1906, *Dr. Edward Palmer*, no. 74 (type, in hb. Gray). This species is nearly related to *E. petiolare* Moc., but is readily distinguished by its smaller ovate-lanceolate (never cordate) and much smoother leaves, as well as by the somewhat harsher non-glandular pubescence of the pedicels and involucreal scales.

Melampodium dicoelocarpum, n. sp., gracile 4 dm. altum; caule dichotomo flexuoso striato-costato viridi sparse pubescenti vel puberulo nodos versus atropurpureo, internodiis ca. 1 dm. longis; foliis oppositis graciliter petiolatis ovato-rhomboideis tenuibus acuminatis paucidentatis basi abrupte acutatis vel etiam acuminatis 3-nervatis supra laete viridibus sparse pilosis subtus paulo pallidioribus subglabris 3.5–6 cm. longis 1.2–3.3 cm. latis; petiolo 5–10 mm. longo; pedunculis filiformibus 3–5 cm. longis in dichotomis caulis solitariis nutantibus vel etiam

deflexis puberulis ; capitulis minimis primo erectis 3-3.5 mm. diametro, involucri squamis exterioribus 3-4 ovatis herbaceis acuminatis maturitate late patentibus 2.5 mm. longis ; disco valde convexo, receptaculo columnari ; flosculis ♀ 3-5, ligulis minimis flavis ca. 1 mm. longis ; fructu (achaenio in squama involucri interioris involuto) obovato compresso apice dentibus 2 parvis rectis conicis instructo quorum uno antico altero postico, faciebus lateralibus fructus utrinque cum cavulis 2 parvis profundis insignibus, facie postica rotundata vix carinata inconspicue tuberculato-scabrido. — Clayey soil, on prairies, El Calabazal, Michoacan or Guerrero, Mexico, alt. 300 m., 20 October, 1898, *E. Langlassé*, no. 482 (type, in hb. Gray). A species related perhaps most nearly to *M. microcephalum* Less., which, however, is described as having leaves sessile by a much narrowed base. There is nothing furthermore in Lessing's description of the achene to suggest that he had before him the peculiar fruit of the present species.

Melampodium tepicense, n. sp., gracile parvum annuum basi decumbens plus minusve repens deinde erectum 5-9 cm. altum dichotomo-ramosum ; caule tenui bifariam puberulo folioso ; foliis ovatis vel rhomboideis obtusis vel obtusiusculis paucidentatis basi cuneatis 3-nerviis supra viridibus sparse pilosis subtus paulo pallidioribus praecipue marginem versus hirsutulis 10-14 mm. longis 4-7 mm. latis, petiolo 3 mm. longo gracili angustissime alato ; capitulis parvis 3 mm. diametro inconspicuis in dichotomis breviter pedicellatis, pedicellis ca. 1 mm. longis 1-capituliferis ; involucri exteriori 5-partito, lobis obovatis obtusis 2.5-3 mm. longis 3-5-nerviis ciliatis viridibus ; receptaculo parvo conico ; flosculis liguliferis 5, ligulis ovato-oblongis cucullatis viridescentibus 3-nerviis 1.8 mm. longis apice 2-dentatis, fructu (i. e. achaenio in bractea involuto) compresso semiobovato dorso tuberculato apice ecupulato exappendiculato ; flosculis disci ca. 5. — Tepic, Mexico, 5 January to 6 February, 1892, *Dr. Edward Palmer*, no. 1814 (type, in hb. Gray). This species should stand nearest to *M. arvense* Robinson, but it is readily distinguished from that species by its leaf-form, the shape of the rhombic-ovate bracts, the more numerous ray-flowers, etc.

Jaegeria glabra (Wats.), n. comb. *Sabazia glabra* Wats. Proc. Am. Acad. xxiii. 277 (1888). *Jaegeria petiolaris* Robinson, Proc. Am. Acad. xxxv. 316 (1900). When this species was transferred some years ago to *Jaegeria* its specific name was changed owing to the existence of *J. hirta*, var. *glabra* Bak. in Mart. Fl. Bras. vi. pt. 3, 167 (1884). According to the Vienna rules, however, the existence of a varietal name in a genus is no obstacle to the use of the same name in the specific category and, therefore, the combination *J. glabra* is required by priority.

Gymnolomia scaberrima (Benth.), n. comb. *Tithonia scaberrima* Benth. in Oerst. Vidensk. Meddel. 1852, p. 91. *Tithonia platylepis* Sch. Bip. ex Benth. & Hook. f. Gen. ii. 368 (1873). *Mirasolia scaberrima* Benth. & Hook. f. ex Hemsl. Biol. Cent.-Am. Bot. ii. 168 (1881). *Gymnolomia platylepis* Gray, Proc. Am. Acad. xix. 5 (1883); Robinson & Greenman, Proc. Bost. Soc. Nat. Hist. xxix. 102 (1899). *G. decurrens* Klatt, Leopoldina, xxiii. 90 (1887). *Perimeniopsis perfoliata* Sch. Bip. ex Klatt, Leopoldina, xxiii. 90 (1887).

Verbesina (§ **Saubenetia**) **Langlassei**, n. sp., fruticosa 2 m. alta; ramis 4-angulatis angustissime 4-alatis striatis scabro-tomentellis; foliis lanceolatis oppositis sessilibus utroque acuminatis serratis vel serratulis utrinque viridibus 10-12 cm. longis 2-3 cm. latis supra scaberrimis subtus vix pallidioribus flavescenti-viridibus tomentellis; capitulis radiatis 9 mm. altis ca. 20-floris in corymbo plano densiusculo ca. 6 cm. diametro basi foliaceo-bracteato dispositis; pedicellis tomentosus 4-9 mm. longis; involucri ovoideo-subcylindrici squamis subtriseriatim imbricatis extimis brevissimis suborbicularibus glabrisculis vix herbaceis, intermediis late ovati-oblongis stramineis intimis paulo longioribus angustioribusque laete flavis; flosculis ♀ 4-5 fertilibus liguliferis, ligulis flavis ellipticis 5-7 mm. longis, tubo gracillimo glabro; flosculis ♂ ca. 15, corollis flavis, tubo proprio brevi, faucibus multo longioribus, dentibus limbi deltoideis brevibus erectis; achaeniis nigris saepe sursum albido-tuberculosis 3 mm. longis bialatis biaristatis. — Granitic soil, Sierra Madre Mountains, Michoacan or Guerrero, Mexico, 1300 m. alt., 7 November, 1898, *E. Langlassé*, no. 595 (type, in hb. Gray). This species appears to belong near *V. acapulcensis* Robinson & Greenman, but is readily distinguished by its considerably smaller leaves, smaller fewer-flowered heads, and non-herbaceous involucre.

Otopappus brevipes, n. sp., fruticosus; caulibus teretibus griseis striatulis vix puberulis, internodiis 4-5 cm. longis; foliis ovati-lanceolatis acuminatis ca. 1 dm. longis 3-4 cm. latis basi attenuatis margine mucronulato-denticulatis supra scabris rugulosis subtus griseo-tomentosis reticulato-venosis; panicula 1.5-1.8 dm. longa 1-1.2 dm. diametro folioso-bracteata puberula, ramis capituliferis late patentibus racemiformibus vel spiciformibus; capitulis discoideis brevissime pedicellatis ca. 1 cm. diametro; flosculis numerosis; corollis albidis, tubo proprio gracili valde curvato sursum in fauces campanulatos abrupte dilatatis, dentibus limbi deltoideis subrectis; achaeniis 2-aristatis in latere interiore a media parte ad apicem aristae interioris late alatis. — Temperate region, Chiapas, Mexico, 1864-1870 (flowering in November and December), *Dr. Ghiesbreght*, no. 541 (type, in hb. Gray). In

its discoid heads and in the character of its corolla and achene, this species resembles *O. curviflorus* (R. Br.) Hemsl., but it is readily distinguished by its different inflorescence, the heads being very short-pedicelled; the leaves are longer and relatively narrower, and carefully examined the throat of the corolla is found to be campanulate and the deltoid segments of the limb straightish, while in *O. curviflorus* the throat is very short and funnel-formed, the limb being of lanceolate spreading-recurved segments.

Var. *glabratus* (Coulter), n. comb. *O. curviflorus*, var. *glabratus* Coulter, Bot. Gaz. xx. 50 (1895). — Foliis tenuioribus utrinque viridibus supra scabridis subtus solum in nerviis venisque obscure puberulis; inflorescentia floribusque ut formae typicae. — Volcano of Jumaytepeque, Department Santa Rosa, Guatemala, alt. 1850 m., November, 1892, *Heyde & Lux*, no. 4235 (of Mr. J. Donnell Smith's distribution).

Otopappus tequilanus (Gray), n. comb. *Zexmenia tequilana* Gray, Proc. Am. Acad. xxii. 425 (1887), pro parte, i. e. quoad pl. Palmeri no. 359. — Foliis tenuioribus levioribus vix rugosis vix reticulatis.

Var. *acuminatus* (Wats.), n. comb. *Zexmenia tequilana* Gray, Proc. Am. Acad. xxii. 425 (1887), pro parte, i. e. quoad pl. Palmeri no. 394. *O. acuminatus* Wats. Proc. Am. Acad. xxvi. 140 (1891). — Foliis quam ea formae typicae multo rugosioribus subtus tomentosissimis reticulato-venosis.

Cosmos Nelsonii Robinson & Fernald, n. sp., herbaceus perennis 6–8 dm. altus; caule tereti erecto subsimplici glabro; foliis oppositis petiolatis bipinnatifidis 5–8 cm. longis, 4–9 cm. latis, segmentis lanceolatis acutis plerisque 1–2 cm. longis, 4–6 mm. latis integris vel 2–3-lobatis supra puberulis subtus paulo pallidioribus margine scabriusculociliolatis basi cuneato-decurrentibus, rhachi glabro gracili vix alato; capitibus saepe 3 nutantibus 4–4.5 cm. (radiis inclusis) diametro; pedunculis 9–12 cm. longis; involucri campanulati squamis exterioribus ca. 8 lineari-oblongis acutatis ca. 1 cm. longis 1.7 mm. latis saepe 5-nerviis, squamis interioribus ovato-oblongis quam exteriores haud longioribus crebre striatis margine tenuibus pallidisque; flosculis disci flavis; antheris linearibus brunneo-violaceis; achaeniis graciliter fusiformibus glabris; aristis pappi saepissime 4 retrorsum barbatis quarum duae longae, aliae multo breviores; ligulis 8–10 ellipticis vel oblongis pallide purpureis ca. 2 cm. longis 1 cm. latis. — Vicinity of Cerro San Felipe, Oaxaca, Mexico, alt. 2900–3300 m., 1 September, 1894, *Nelson*, no. 1176, in part (type, in hb. Gray). — Unfortunately specimens of *Bidens pilosa* L. were by some oversight or transposition of labels distributed under the same number. — Further material of *C. Nelsonii*

was secured southwest of the City of Oaxaca, alt. 2300–2900 m., 10–20 September, 1894, *Nelson*, no. 1363 (hb. U.S. Nat. Mus.); and in the Valley of Oaxaca, alt. 1700–2300 m., 20 September, 1894, *Nelson*, no. 1449 (hb. U. S. Nat. Mus.). This species is nearly related to *C. scabiosoides* HBK., *C. Uhdeanus* Kunth, and *C. caudatus* HBK. From *C. scabiosoides* it differs in its pale rays, yellow disk-flowers, and bipinnatifid leaves; from *C. Uhdeanus* (which seems to be represented by Pringle's no. 8238) it differs in having larger heads, lighter rays, and yellow disk-flowers; and from *C. caudatus* it is distinguished by having the involucreal scales of subequal length and achenes usually 4-aristate and much less caudate-attenuate.

Cosmos Palmeri, n. sp., herbacea 3–5 dm. alta; radice e fibris 2–5 tuberiformibus graciliter fusiformibus elongatis 5–8 mm. crassis; caule tereti folioso puberulo; foliis oppositis vel alternis bipinnatifidis 3–5 cm. longis, lobis linearibus 1-nerviis acutiusculis in margine et in nervo breviter hispidulis, 4–17 mm. longis 1–2 mm. latis; pedunculis ca. 2 dm. longis nudis 1-capitatis; capitibus (ligulis inclusis) 6–8 cm. diametro; involucri squamis exterioribus ca. 8 lanceolati-oblongis ascendentibus vel saepe reflexis 8 mm. longis 2 mm. latis viridibus striatis gradatim ad apicem obtusiusculum angustatis apice paulo incrassatis interioribus ovato-oblongis acutiusculis viridi-stramineis glabris striatis margine tenuibus ca. 1.5 cm. longis ca. 5 mm. latis apice ciliolatis; ligulis ca. 8 lilacinis ellipticis 2.5–3.5 cm. longis 1.2 cm. latis; corollis disci flavis; achaeniis (valde immaturis) fusiformibus in costis hispidulis apice aristas 2 rigidiusculas erectas gerentibus; aristis levissimis apice solum aculeolis binis patenti-deflexis munitis. — Moist spots on hills and plains at Otinapa, Durango, Mexico, 25 July–5 August, 1906, *Dr. Edward Palmer*, no. 388 (type, in hb. Gray).

Cosmos Pringlei Robinson & Fernald, n. sp., e radicibus 1–2 tuberiformibus crassiusculis 5–7 cm. longis erectus 6–9 dm. altus; caule tereti flexuoso griseo-puberulo vel -pulverulo praecipue in media parte folioso; foliis petiolatis firmissimis ab ovato-oblongis indivisis apice dentatis ad formas profunde partitas vel pinnatifides cum segmentis linearibus integris obtusis variantibus; capitibus magnis (ligulis inclusis) 6 cm. diametro, pedunculis 1–3 saepe 3 dm. longis; involucri campanulati squamis ovato-oblongis exterioribus 8–11 mm. longis interioribus ca. 13 mm. longis; flosculis disci flavi; achaeniis graciliter rostratis 16 mm. longis sursum sparse hispidulis apice aristas binas arcuato-ascendentes retrorsum barbatae gerentibus; ligulis late ellipticis laete purpureis nec atro-violaceis. — Chihuahua, Mexico: pine plains at the base of the Sierra Madre, 20 September, 1887, *Pringle*, no. 1299 (type, in hb. Gray); at base of Mt. Mohinora, 12 km. from

Guadalupe y Calvo, alt. 2150 to 2300 m., *Nelson*, no. 4853; near Colonia Garcia, 25 August, 1899, *Nelson*, no. 6097; near Casas Grandas, 15 August, 1899, *Townsend & Barber*, no. 438. This species has been variously referred to *C. scabiosoides* HBK. and *C. diversifolius* Otto. From the former it is readily distinguished by its larger and much paler rays, yellow disk-flowers, and puberulent stem; from the latter in having the stem puberulent instead of sparingly to copiously beset with longer hairs, also in having a firmer leaf-texture, a more leafy stem, etc.

COSMOS SCABIOSOIDES HBK. *Nov. Gen. et Spec.* iv. 242 (1820). This species presents leaf-forms so diverse that without the numerous transitions now known it would be difficult to believe them conspecific. The extremes are certainly so marked as to merit at least formal recognition. The typical form, described as having "folia pinnatipartita, foliolis aut laciniis quinque, sessilibus, lanceolato-oblongis, acutis, basi cuneatis, apicem versus subserratis," was collected near Patzcuaro in Michoacan, and appears to be exactly represented by Pringle's no. 4263 from that locality. Differing markedly from this typical form are the following:

Forma indivisus, n. f., foliis indivisis integriusculis vel irregulariter serratis lanceolatis vel lanceolato-ovatis. — Hills of Patzcuaro, Michoacan, 11 October, *Pringle*, nos. 4263 in part, and 3589 in part; in shady places near San Miguelito, San Luis Potosi, *Schaffner*, no. 200; on the Sierra Madre, Zacatecas, 18 August, 1897, *Rose*; near Santa Teresa, Tepic, *Rose*, no. 3433; in the Sierra Madre, west of Balaños, Jalisco, *Rose*, no. 2957. Transitions to the typical form are frequent and are well illustrated by Purpus's no. 1551 (Salto de Agua, Mexico) in which the lower leaves are undivided and the upper pinnatifid with lanceolate segments.

Calea Peckii, n. sp., fruticosa scandens; caule volubile tereti lignoso lenticellis minutis prominulis scabro atrobrunneo oppositirameo; foliis oppositis ovatis subintegris breviter petiolatis acutis 2-4 cm. longis 1-2.2 cm. latis basi subrotundatis 3-nerviis utrinque scabriusculis quamquam aspectu glabris subtus paulo pallidioribus aureo-atomiferis, petiolo gracili puberulo ca. 3 mm. longo; pedicellis in axillis superioribus binis vel trinis; inflorescentia fasciculiformi vel corymbiformi rotundata multicapitulata; capitulis ca. 8 mm. diametro homogamis; involucri subcylindrici squamis valde inaequalibus exterioribus brevibus late ovatis puberulis ciliolatisque subherbaceis plus minusve squarrosis, intermediis longioribus ovato-oblongis flavescentibus rubro-striatis, intimis anguste-lanceolatis laete flavis rubro-striatis acutis; corollis flavis aureisve involucrum modice superantibus;

achaeniis graciliter obconicis tomentellis 2 mm. longis ; pappi squamulis ca. 23 anguste linearibus attenuatis ca. 5 mm. longis scariosis maturitate patentibus. — In thickets, British Honduras, *Prof. Morton E. Peck*, no. 64 (type, in hb. Gray). A species somewhat resembling *C. prunifolia* HBK., but differing in having smaller leaves, sessile fascicles from the axils of leaf-like bracts, etc.

➤ *Calea scabra* (Lag.), n. comb. *Calydermos scaber* Lag. Gen. et Spec. Nov. 25 (1816) ; DC. Prod. v. 669 (1836). *Calea peduncularis*, var. *epapposa* "HBK. Nov. Gen. et Spec. iv. 296, t. 408, f. 5" ex DC. Prod. v. 669 (1836) ; Robinson & Greenman, Proc. Am. Acad. xxxii. 23 (1896). — Foliis ovatis vel ovato-lanceolatis ; achaeniis calvis.

➤ Var. *longifolia* (Lag.), n. comb. *Calydermos longifolius* Lag. Gen. et Spec. Nov. 25 (1816) ; DC. Prod. v. 669 (1836). *Calea peduncularis*, var. *longifolia* Gray, Proc. Am. Acad. xxii. 430 (1887), as to synonym. ; Robinson & Greenman, Proc. Am. Acad. xxxii. 23 (1896). — Foliis anguste lanceolati-oblongis elongatis ; achaeniis calvis.

➤ Var. *peduncularis* (HBK.), n. comb. *Calea peduncularis* HBK. Nov. Gen. et Spec. iv. 295, t. 408, f. 1-4 (1820). *Calebrachys peduncularis* Cass. Dict. lv. 277 (1828), acc. to Hook. f. & Jack. Ind. Kew. i. 383 (1895), but the combination merely implied not actually made by Cassini. — Foliis ovatis vel ovati-lanceolatis ; involucri squamis luteis ; achaeniis papposis.

➤ Var. *livida* (Robinson & Greenman), n. comb. *Calea peduncularis*, var. *livida* Robinson & Greenman, Proc. Am. Acad. xxxii. 24 (1896). — Foliis lanceolatis vel lanceolati-oblongis ; involucri squamis atropurpureis ; achaeniis papposis.

PEREZIA HEBECLADA (DC.) Gray, var. *urolepis*, n. var., capitibus quam ea formae typicae majoribus 2.5 cm. longis ; involucri squamis exterioribus longis conspicue caudato-attenuatis interiores longitudine subaequantibus ; ceteris formae typicae simillima. — Sierra de Pachuca, Hidalgo, Mexico, alt. 2900 m., 10 December, 1907, *Pringle*, no. 13,975 (type, in hb. Gray).

Perezia nudiuscula, n. sp., gracilis erecta verisimiliter perennis ; caule gracili tereti purpurascenti glabro sparse foliato ; foliis linearibus vel lineari-oblongis erectis firmiusculis acutis 2-4 cm. longis 2-5 mm. latis glabris patente denticulatis sessilibus basi subamplexicaulibus ; capitibus ca. 12-floris laxo corymboso-paniculatis 1.5-2.2 cm. diametro graciliter pedicellatis ; pedicellis ascendentibus 1-3.5 cm. longis saepe bracteolas 1-2 subulatas gerentibus ; involucri squamis valde inaequalibus apice acuminatis et purpurascens glabris, interioribus lanceolato-oblongis ca. 1 cm. longis, intermediis ovati-lanceolatis brevioribus, extimis brevissimis parvis lanceolatis ; corollis purpureis ;

achaeniis brunneis graciliter cylindricis puberulis apice a cupula albida pappifera coronatis; pappi setis numerosis albis tenuissimis obscure barbellatis. —Tepic, Mexico, 5 January to 6 February, 1892, *Dr. Edward Palmer*, no. 2018 (type, in hb. Gray and hb. U. S. Nat. Mus.). A species readily recognized by its slender at first sight apparently naked stems and loose corymbose inflorescence. It is probably related to *P. Seemannii* Gray, which, however, has smaller heads and narrower green and granular involucre scales, larger leaves, etc.

Perezia platyptera, n. sp., herbacea robusta 1.5 m. alta; caule glabro striato basibus foliorum valde decurrentium conspicue lateque alato; alis cuneiformibus ad insertionem folii ca. 1 cm. latis herbaceis reticulato-venosis deorsum gradatim decrescentibus saepissime denticulatis; foliis lanceolati-oblongis firmissimis acute acuminatis ca. 12 cm. longis 3-4 cm. latis argute denticulatis utrinque reticulato-venosis; inflorescentia corymboso-paniculata, ramis folioso-bracteatis; bracteis lanceolatis ca. 3 cm. longis subintegris conspicue decurrentibus; capitulis ca. 15-floris 1.5 cm. longis; involucri campanulati squamis multiseriatim imbricatis linearibus attenuatis valde inaequalibus glanduloso-puberulis; corolla rosea ca. 1 cm. longa alte bilabiata; achaeniis subteretibus fusco-brunneis glandulosis; pappi setis numerosis laete albis ca. 7 mm. longis. — In clayey soil, Sierra Madre Mountains, Michoacan or Guerrero, Mexico, 22 January, 1899, alt. 1700 m., *E. Langlassé*, no. 773 (type, in hb. Gray). A species readily distinguishable by its broadly winged stems.

VII. THE PURPLE-FLOWERED ANDROCERAE OF MEXICO AND THE SOUTHERN UNITED STATES.

BY HARLEY HARRIS BARTLETT.

The Mexican *Solanums* of the sub-genus *Androcera* divide naturally into two sections, one of which is characterized by purple or white flowers and the lack of stellate pubescence except on the leaves, the other by yellow flowers and extreme development of stellate pubescence on all parts of the plant. In the only apparent exception to this grouping, *Solanum macrosolum* Fernald, the flowers are tinged with purple, but the basal color, over which the purple is suffused, is yellow. The pubescence is that of the second section, to which the plant evidently belongs. All of the species of the first section, with the single exception of *S. Grayi* Rose, which has white flowers, are purple-flowered. Those in the Gray Herbarium may be determined by the following key:

Anthers of two kinds; four subequal and straight, the fifth longer and curved.

Corolla 1 cm. long or less.

Pubescence and spines of young fruiting calyx olive-green.

S. heterodoxum.

Pubescence and spines of young fruiting calyx golden-brown.

S. heterodoxum var. *novomexicanum.*

Corolla about 2 cm. long.

Pedicels stout, about as long as the fruiting calyx.

Spines on stem scattered, separated from one another by their own length. *S. citrullifolium.*

Stem densely bristly with slightly reflexed spines.

S. citrullifolium var. *setigerum.*

Pedicels slender, longer than fruiting calyx. *S. tenuipes.*

Anthers of three kinds, two short and straight, two longer and curved, forming a transition to the still longer and more curved fifth.

S. Lumholtzianum.

SOLANUM HETERODOXUM Duval. Caulis sparsim vel dense aculeatus, pilosus vel in parte inferiore subglaber, pilis apice glanduliferis. Folia petiolata sub-bipinnatifida, partibus 5-7 oppositis, utrinque aculeata, supra glabra vel pilis paucis simplicibus conspersa, subtus et pilis stellatis et simplicibus tecta. Pedunculus 3-5 cm. longus. Pedicelli 8-12 mm. longi crassiusculi aculeati glanduloso-pilosi. Flores

ca. 5 in racemi apice aggregati. Calyx pilosus aculeatus, sub fructus maturitatem 12-14 mm. longus, aculeis minoribus pilisque atro-olivaceis: segmenta gradatim acuta in apices exaculeatos persistentis 2 mm. longos desinentia. Corolla purpurea ca. 7 mm. longa profunde subaequaliter 5-partita, extus puberula, tubo 1.4 mm, longo. Stamina 4 aequalia, filamentis 1.35 mm. longis, antheris rectis 2.5 mm. longis; quintum filamentum 1.4 mm. longo, anthera arcuata 3 mm. longa. Stylus 5 mm. longus curvatus. Bacca globosa calyce obtecta, diametro ca. 9 mm.; seminibus nigris lateraliter compressis rugoso-foveatis, 2.5 mm. latis 3 mm. longis. — Mexico: Zacoalco, Valley of Mexico, *Bourgeau*, no. 542. San Luis Potosi: *Parry & Palmer*, no. 634½; *Schaffner*, no. 696. Vera Cruz: Mt. Orizaba, *Seaton*, no. 468. — *Thurber*, no. 750, from Chihuahua is perhaps a variety of this species.

✓ *S. heterodoxum* var. *novomexicanum*, n. var., a varietate typica differt partibus omnibus densius glanduloso-pubescentibus aculeatisque; calycis segmentis aetate ad apicem versus abrupte obtusatus, in lacinias angustas exaculeatas terminantibus, aculeis pilisque aureo-brunneis, nec, ut in varietate typica, olivaceis. Corolla 10 mm. longa, tubo 1.3 mm. longo. Staminum filamenta 2 mm. longa; antherae 4 rectae 3 mm. longae, quinta arcuata 5 mm. longa. — New Mexico, *Fendler*, no. 673 (type, in hb. Gray).

Solanum citrullifolium A. Br. This species does not appear to reach Mexico in its typical form. It is clearly distinct from the Mexican *S. heterodoxum*, with which it has long been considered identical. The original description (*Ann. Sci. Nat.* ser. 3, xii. 356) is entirely adequate. Specimens examined: Fayette, Iowa, 1894, *Fink* (introduced?); Texas, August, 1848, *Lindheimer*; Hort. Freiburg, 1849, *A. Braun* (cotype, grown from Lindheimer's Texan seed); Hort. Cantab., 1849, *Gray* (from Texan seed), and 1852 (from Texan or New Mexican seed).

S. citrullifolium var. *setigerum*, n. var. Caulis persetiger aculeis reflexis violaceo-tinctis. Folia sub-bipinnatifida longe petiolata aculeata (aculeis in petiolis venisque quam his in caule inter se distantioribus) utrinque scabriuscula, subtus exigue stellato-pilosa. Inflorescentia unilateralis elongata ca. 12-flora, pedunculo 4-6 cm. longo; pedicellis aetate 1 cm. longis glanduloso-pilosis. Calyx (apicibus segmentorum persistentibus angustis 5 mm. longis exceptis) aculeatus, aetate inter spiculos fere glaber, spiculis majoribus 13 mm. longis. Corolla purpurea irregularis 18 mm. longa, tubo 1.5 mm. longo; segmentis aliquanto incurvatis. Staminum filamenta 2.1 mm. longa; antherae 4 rectae 9 mm. longae, quinta arcuata 15 mm. longa. Stylus 17 mm. longus curvatus. Bacca globosa calyce obtecta ca.

8 mm. diametro. — Plains near Chihuahua, State of Chihuahua, 30 September, 1885, *Pringle*, no. 604 (type, in hb. Gray).

Solanum tenuipes, n. sp. Caulis glanduloso-hirsutus aculeatus. Folia bipinnatifida utrinque subscabra, subtus exigue stellato-pilosa, segmentis ultimis obtuse angulatis, petiolis nervisque aculeatis glandulosis. Racemus elongatus ca. 8-florus, pedicellis gracilibus aetate quam internodiis longioribus. Calycis pars inflata 10 mm. longa nervosa inter aculeos minute glanduloso-pilosa, aculeis ca. 10 magnis, paucis minoribus: lacinae inermes lineares persistentes 5 mm. longae. Corolla purpurea 21–23 mm. longa, tubo 2.1 mm. longo, lobis quam in *S. citrullifolio* angustioribus. Stamina 5 filamenta 2.7 mm. longa; antherae 4 aequilongae rectae 9 mm. longae, quinta arcuata 18 mm. longa. Bacca globosa calyce obtecta; seminibus lateraliter compressis 2.5 mm. latis 3 mm. longis atrobrunneis foveatis. — Coahuila: mountains 39 km. northeast of Monclova, September, 1880, *Palmer*, no. 939 (type, in hb. Gray); 180 km. west of Saltillo, June, 1880, *Palmer*, no. 940.

Solanum Lumholtzianum, n. sp., omnibus partibus aculeatum, caule subherbaceo, basi glabriusculo, superne viscoso-hirto. Folia quam in speciebus sectionis *Androcerae* reliquis parviora, sub-bipinnatifida utrinque minute viscoso-hirto, juventate subtus perexigüe stellato-pilosa; segmentis ultimis angustis, eis *Botrichii lanceolati* similibus. Inflorescentia 1–3-flora, pedunculo 7–11 mm. longo; pedicellis quam pedunculo crassioribus, longitudine e 3.5 mm. in inflorescentiis trifloris usque ad 11 mm. in inflorescentiis unifloris variantibus. Calyx maturus 17 mm. longus, 11 mm. latus, nervosus glabriusculus, aculeis longioribus (ca. 10) 12–15 mm. longis, brevioribus pernumerosis. Corolla purpurea (?) profunde 5-lobata, tubo 1.7 mm. longo, 1.5 mm. diametro, faucibus ca. 2–2.5 mm. longis, segmentis 2 inferioribus 8 mm. longis, 3 superioribus 5 mm. longis. Stamina filamenta 1.7 mm. longa; antherae duae summae rectae 5 mm. longae, duae intermediae arcuatae 6.5 mm. longae, quinta (infima) arcuata 8 mm. longa. Stylus curvatus stamina superans. Bacca ovoidea, seminibus 2.5 mm. latis 3 mm. longis, configuratione formaque cornui Ammonis similibus. — Collected at La Tinaja, Sonora, alt. 1100 m., 19 November, 1890, *C. V. Hartman*, no. 246, in Plants of the Lumholtz Expedition (type, in hb. Gray).

VIII. DESCRIPTIONS OF MEXICAN PHANEROGAMS.

BY HARLEY HARRIS BARTLETT.

Struthanthus Alni, n. sp., lignosus 20–40 cm. altus omnibus partibus glaber; novellis viridibus glaucescentibus; ramis teretibus nodosis a cortice argyraceo-brunneo tectis. Folia subcoriacea lanceolata vel obovata 2–3.5 cm. longa 8–15 mm. lata, ad basin acutam in petiolum perbreve decurrentia, apice acuta vel obtusa saepe mucronulata. Inflorescentiae fere glomeratae 3- vel 6-florae quam folia triplo breviores, plerumque in ramulis lateralibus terminales sed rarius axillariae; ramuli idem aut solitarii aut binis trinisve fasciculati. Pedunculi crassiusculi saepissime perbreves nunc fere obsoleti nunc usque ad 5 mm. longi. Pedicelli nulli. Bractee bracteolaeque carnosae delapsu apicium truncatae, partem calycis inferiorem obtegentes et pedicellos brevis simulantes. *Flores* ♂. Calyx ut in floribus ♀, sed brevior. Petala linearia 6 inaequalia 7–8 mm. longa. Stamina sex dimorpha, alterna brevia atque longiora. Staminum filamenta petalis ex toto adnata sed propter colorem formamque carinatam faciliter videnda, longiorum antherae oblongae quam stylus longiores quam filamenta sua subduplo breviores, breviorum antherae usque ad aliarum bases attingentes filamentis suis aequilongae. Ovarium quam in floribus ♀ multo brevius, stylo paululo tenuiore, stigmate rudimentario disciformi nec capitato. *Flores* ♀. Calyx urceolatus 2.2 mm. longus leviter 5-denticulatus. Petala 5 linearia, tria 5 mm. longa usque ad basin libera, dua aliis paulo breviora fere usque ad styli apicem connata. Staminodia omnia subaequilonga quam petala paulo breviora et eisdem connata, antheris rudimentariis liberis exceptis. Ovarii subcylindrici discum annuliforme; stylus 4 mm. longus; stigma capitatum. Fructus ignotus.—Parasitic on *Alnus jorullensis* var. *exigua* Fern., collected on the summit ridge of the Sierra de San Felipe, above the City of Oaxaca, State of Oaxaca, alt. 3000 m., *Pringle*, no. 10,244 (type, in hb. Gray). A peculiar species on account of the difference between the corollas of the staminate and pistillate flowers.

Jacquinia Pringlei, n. sp. Arbor parva ramulis junioribus novellisque exigue pubescentibus. Folia lanceolata 3.5–5.5 cm. longa 7–11 mm. lata perbreve petiolata, utrinque lepidoto-punctata, basi acuta, apice saepissime acuta et in mucronem rigidum producta. Inflores-

centia terminalis 5–11-flora, floribus in rhachi quam ramo crassiore subumbellatim dispositis. Pedicelli ca. 6 mm. longi. Sepala marginibus atrotincta integra. Fructus subglobosus 1.5–1.8 cm. longus, 1.4–1.6 mm. latus, apice abrupte mucronatus, seminibus 8 aut abortu paucioribus. Flores ignoti. — Type (in hb. Gray) collected at Iguala Cañon, State of Guerrero, alt. 750 m., 3 October, 1906, *Pringle*, no. 10,337.

MELINIA ANGUSTIFOLIA (Torr.) Gray and M. MEXICANA Brandegee. In the Botany of the Mexican Boundary Survey Torrey published *Metastelma* (?) *angustifolia*, based upon Wright's no. 1677 from Santa Cruz, Sonora, commenting upon it as follows: "We refer this plant to *Metastelma* with much doubt, but there is no other genus to which it seems to be more allied." Gray transferred Torrey's species to *Melinia*, but with some misgivings as to its true affinity, as is evidenced by the following quotation from the Synoptical Flora: "Melinia, Decaisne. . . . Two or three extra-tropical S. American species, which have cordate leaves and slender peduncles; to which is appended the following, doubtfully, for its habit is that of *Metastelma*." When, in 1889, Watson described the genus *Pattalias*, the type species of which was *Pattalias Palmeri* Wats., he wrote: "A second species of this genus is *P. angustifolius*, a Sonora plant doubtfully referred by Dr. Torrey in the Mexican Boundary Report to *Metastelma*, and more recently by Dr. Gray to the extra-tropical South American genus *Melinia*. It is of similar habit [to *P. Palmeri*], but has petiolate leaves, a longer calyx, the crown at the base of the column, the anther-tips much more conspicuous, and the beak of the stigma narrow and columnar."

Another plant of the same dubious affinity was published in *Zoe* for August, 1905 (Vol. V, p. 216), as *Melinia mexicana* Brandegee. Although habitally similar to *Metastelma angustifolia* Torr., it is clearly distinguished from that species by its shorter rostrum, longer and more fleshy corona-scales, and its recurved anther-membranes, which are much less constricted at the base than are those of *Metastelma angustifolia* Torr. The two species are congeneric, and since they cannot be placed with *Metastelma* nor with *Melinia* nor with *Pattalias*, a new genus is here characterized for their reception.

BASISTELMA, gen. nov. Calyx alte 5-lobus, lobis saepius angustis acutis. Corolla campanulata, lobis intus infra mediam saepius retrorsum pilosis, aestivatione leviter sed manifesto dextrorsum (externo visis) obtegentibus. Coronae squamae 5 carnulosae triangulo-subulatae vel lanceolatae, ad columnae basin corollae adnatis. Stamina prope corollae basin affixa, filamentis in columnam brevem connatis. Antherarum membranae rectae vel reflexae, haud inflexae. Pollinia in

quoque loculo solitaria ovoidea pendula. Stigma in rostrum cylindricum integrum quam antheras longius productum. Folliculi teretes acuminati tenues laeves. — Herbae perennes volubiles tenues, foliis oppositis parvis linearibus petiolatis; floribus parvis solitariis vel in cymata pauciflora aggregatis. Genus habitu et squamis coronae simplicibus *Metastelmati* accedit, sed corollae lobis aestivatione obtegentibus facile distinguendum est. *Basistelma* squamis coronae simplicibus corollae adnatis et rostro integro nec bifido *Meliniae Pattaliadique*² dissimile est: a *Pattaliade* differt etiam lobis corollae reflexis nec rectis patentibusve, appendicibus antherarum magnis rectis vel interdum reflexis nec perparvis nec rostro adpressis. Species duae, *Basistelma angustifolium* (Torr.) n. comb. (*Metastelma angustifolia* Torr.) et *Basistelma mexicanum* (Brandege) n. comb. (*Melinia mexicana* Brandege), Sonorae Sinaloaeque incolae.

Marsdenia trivirgulata, n. sp., lignosa volubilis, ramis gracilibus juventate griseis aetate griseo-brunneis, in lineis longitudinalibus puberulis; lenticellis magnis conspicuis; internodiis foliis fere aequilongis. Folia opposita ovato-lanceolata, maxima 5 cm. longa 2 cm. lata, apice basique acuminata, supra viridia sparsim puberula, subtus, praecipue secus nervos, densius puberula, petiolis longitudine plerumque infra 10 mm. Cymata fere sessilia ca. 8-flora, pedicellis 2–3 mm. longis, basi bracteas ovatas minutas gerentibus. Calyx 2 mm. longus infra mediam 5-fidus, segmentis late ovatis obtusis, extus puberulus intus sub sinibus glandulis 5 papilliformibus praeditus. Corolla 6 mm. longa usque ad calycis apicem 5-fida sub sinibus callosa et appendicibus perbrevibus truncatis emarginatis praedita, segmentis angustis oblongis plus minusve patentibus, lineis tribus rectis longitudinalibus purpureis maculisque concoloribus ornatis; coronae squamis 5 carnosiss late ovatis basi connatis, margine liberis, supra sinus in auriculas callosas productis, infra antherarum loculos columnae brevi adnatis. Antherarum membranae terminales latae apice truncatae erosae mucronatae rostro adpressae. Pollinia erecta oblonga 0.4 mm. longa corpusculo virgiformi paululo breviora. Stigmatis rostrum conicum 1.8 mm. longum, apice leviter bidentatum. Folliculi ignoti. — Iguala Cañon, State of Guerrero, *Pringle*, no. 10,333 (type, in hb. Gray). In flower 13 October 1906. A species well marked by its small, thin leaves, attenuate at the base.

Cordia igualensis, n. sp., sectionis *Gerascanthi* arbor. Ramuli grisei ca. 4 mm. crassi, aetate glabri, juventate puberuli, cicatricibus foliorum

² Examination of the type material has shown that in *Pattalias Palmeri* the rostrum is distinctly bifid, and not entire, as stated in the original characterization of the genus.

paulo elevatis quam gemmis axillaribus bis terve latioribus. Folia laminis 6.5–8.5 cm. latis 15–18 cm. longis, apice basiue acutis, supra glabris, subtus in nervis axillisque nervorum hispidulis; petiolis 2–2.5 cm. longis appresse hispidulis, supra canaliculatis. Inflorescentia paucibracteata, ramis 4–5 primariis subumbellatim insertis, perlongis, floris terminalis rhachin multo superantibus; ramulis ultimis atris dense glutinoso-puberulis; bracteis foliaceis lineari-lanceolatis. Calyx cylindricus 10-sulcatus minute puberulus 6.5 mm. longus leviter 5-dentatus seu potius 5-apiculatus. Corolla alba 2.5 cm. longa, tubo quam calyce vix longiore; faucibus 11 mm. longis; segmentis limbi 5 obtrapezoideis, 6 mm. longis, inter sinus 10 mm. latis, sub angulis rotundatis 11 mm. latis. Stamina 5 ad loborum baseis vix attingentia, tubo in summo adnata; filamentis deorsum ligulatis sursum teretibus; antheris 4 mm. longis. Pistillum 14 mm. longum staminibus multo brevius. — Iguala Cañon, State of Guerrero, alt. 760 m., 28 December, 1906, *Pringle*, no. 13,912 (type, in hb. Gray). The Mexican allies of *Cordia igualensis* are *Cordia tinifolia* Willd. and *Cordia gerascanthoides* HBK. From the former it differs in its shorter, less pubescent, shallowly dentate calyx, and from the latter in its relatively short stamens, short broad corolla lobes and shallowly dentate calyx.

Hedeoma albescensifolia, n. sp. Herba perennis 1.5 dm. alta undique cano-hirta, caulibus e basi lignosa ramosa pernumerosis gracilibus purpureo-tinctis saepissime ramosis. Internodia media 1.5–3 cm. longa. Foliorum laminae circumscriptione fere orbiculares basi obtusae vel rotundatae, apice cuspidato-acuminatae margine leniter revolutae, utrinque perpallide virides, saepe generis *Chenopodii* modo purpurascens, pubescentes, supra demum glabratae, exigue punctatae, dentibus 8–10 solito acutioribus altioribusque. Petioli ca. 2 mm. longi. Verticillastri 1–3-flori, axillares, post anthesin foliis aequilongi vel longiores, breviter pedunculati, supremi fere sessiles. Pedicelli 4–5 mm. longi. Floris terminalis bracteolae calycis basin paulo superantes, anguste cuneatae, triaristatae; aliae quam pedicelli dimidio breviores, lineari-subulatae. Calyx maturus 7 mm. longus prominule nervosus, antice leviter gibbosus, intus a pilorum annulo in faucibus posito obseptus; labri dentibus setaceis leviter arcuatis quam eis labioli divergentibus paulo longioribus. Corolla gracillima 15–18 mm. longa, extus minute puberula, intus nuda; tubo anguste cylindrico, sursum vix ampliato; labro ovato apice leviter-bilobato; labiolo trilobato, lobis lateralibus ovatis apice rotundis, medio obovato apice levissime obcordato et apiculato, quam lateralibus longiore. Stamina antica fertilia in tubo summo inserta, vix lobos labioli lateralis superantia; duo postica ad staminodia 0.5 mm. longa reducta, longe infra alia inserta. Stylus nudus

apice curvatus, sub lente leviter bifidus. — Santa Eulalia Mountains, Chihuahua, April, 1885, *Pringle*, no. 133 (type, in hb. Gray), distributed as *H. costata* Gray. Its nearest affinity is with *H. plicata* Torr. From this species it is at once distinguished by the color of the foliage and shape of the leaf-base. *Hedeoma costata* Gray, based upon Ghiesbreght's no. 815, was obscurely published in the Synoptical Flora in 1878 (Vol. II, Part II, p. 363), and thus has priority over Hemsley's *H. costata*, published in the Biologia Centrali-Americana. This is indeed fortunate, for although Hemsley's description was drawn up from *Ghiesbreght*, no. 815, the first specimen which he cited, *Palmer*, no. 1095, from Chihuahua, is clearly the more recently published *H. Pringlei* Briq. (including *H. permixta* Briq.). True *H. costata* is represented in the Gray Herbarium by only the type specimen from Chiapas, and is doubtless a species of strictly southern range. Specimens which have been distributed under the name are for the most part *H. plicata* Torr., a species which, to judge from the material at hand, is confined to the arid region of northern Mexico and the southwestern United States.

Hedeoma quinquenervata, n. sp. Herba perennis ca. 2 dm. alta, ubique cano-pubescentis, caulibus e basi lignosa numerosis, sparsim ramosis vel simplicibus. Internodia media 3–4 cm. longa. Foliorum laminae usque ad 12 mm. latae, 18 mm. longae, basi obtusae, apice obtusiusculae vel acutae, margine leniter revolutae, subargute 10–12-denticulatae, exigue punctatae, utrinque permanentiter pubescentes, supra virides, subtus pallidiores, nervis alterutrinque 5(–6), ad denticulorum apices terminantibus, solum subtus prominulis. Petioli usque ad 5–6 mm. longi. Verticillastri plerumque 7-flori axillares in caule summo aggregati, folia bractiforma occultantes, pedunculis usque ad 2 mm. longis. Pedicelli 4–6 mm. longi. Bracteolae omnes uniformes pedicellis multo breviores lineares. Calyx maturus 9 mm. longus anguste cylindricus antice levissime gibbosus, intus a pilorum annulo obseptus, valde nervosus; labri dentibus aristiformibus leviter incurvatis quam eis labioli divergentibus vix longioribus. Corolla 18 mm. longa extus minute puberula, e basi tenui sursum gradatim ampliata, labro oblongo apice truncato emarginato; labiolo trilobo, lobis lateralibus semiovatis, medio oblongo apice truncato. Stamina antica fertilia in tubo summo inserta vix labioli lobos superantia, duo postica 1 mm. longa, longe infra alia inserta, antheras capitatas nec polliniferas gerentia. Stylus nudus integer. — Sierra Madre, Monterey, State of Nuevo Leon, *Pringle*, no. 10,241 (type, in hb. Gray). A species most closely allied to *Hedeoma tenella* Hemsl., but differing in the nervation of the leaves, the more profuse and persistent pubescence, and the larger flowers.

Viburnum cuneifolium, n. sp. Frutex 3–5 m. altus novellis ferrugineis lepidotis. Lepides glandulos 8 brunneos radiantis gerentes. Ramuli modice crassi obscurissime angulati grisei glabrati; lenticellis brunneis; gemmis nudis; internodiis 2–6 cm. longis. Foliorum laminae juventate secus nervos perexiguae lepidotae, aetate utrinque glabratae virides late cuneatae leviter denticulatae, in specimine florenti maximae 3.5 cm. longae 3.5 cm. latae, basi acutae, apice truncatae emarginatae; petioli 2–4 mm. longi anguste membranaceo-marginati, subtus persistenter ferrugineo-lepidoti, supra glabri atropunicei. Inflorescentiae umbelliformes diametro ca. 6 cm., floribus exceptis lepidotae, in ramulis lateralibus terminales, radiis 4 primariis 1–1.5 cm. longis. Bracteae bracteolaeque minutae glabrae obtusae scariosae saepe puniceo-tinctae. Pedicelli usque ad 3 mm. longi. Flores omnes conformes. Calycis tubus glaber subcylindricus 2 mm. longus; limbus expansus lobis brevibus obtusis. Corolla alba rotata 4 mm. longa lobis suborbicularibus. Stamina tubo inserta, corollae lobis aequilonga. Stylus perbrevis fere nullus. Stigma capitatum obscure trilobum. — Collected in the Sierra Madre above Monterey, Nuevo Leon, alt. 760 m., 27 March, 1906, *Pringle*, no. 10,234 (type, in hb. Gray). *Viburnum cuneifolium* is very readily distinguished from all the other Mexican species of the genus by its broadly cuneate emarginate leaves. It is allied to *Viburnum prunifolium* L.

Parthenium Arctium, n. sp., fruticosum, ramis juventate niveo-tomentosis aetate glabris ochraceis; internodiis quam foliis ca. 10-plo brevioribus. Folia deltoidea crenato-dentata usque ad 10 cm. lata 30 cm. longa, apice angustata acuta vel obtusa, basi cordata abrupte in petiolum usque ad 5 cm. longum decurrentia, supra viridia tenuiter arachnoideo-tomentosa, subtus niveo-tomentosa. Inflorescentia terminalis corymbosa a foliis longe superata omnibus partibus dense alboto mentosa. Bracteae minutae nec deorsum foliis similes. Capitula densius aggregata diametro et altitudine ca. 3.5 mm. Involucri squamae 10 biseriatae exteriores oblongae apice obtusae interiores suborbiculares basi truncatae apice obtusissimae. Radii flores 5, tubo brevi; limbo oblongo apice dilatato truncato emarginato. Achenia (immatura) nigra compressa ovoidea 1.5 mm. longa epapposa ad margines singula palearum aristis florum duorum sterilium adnata. Disci flores ca. 18 in axillis palearum pubescentium cuneatarum positi. — Southwestern Chihuahua, August to November, 1885, *Palmer*, no. 123 (type, in hb. Gray). *P. Arctium*, so named because its leaves so closely resemble those of the common burdock, and *P. Stramonium* Greene constitute a well defined group in De Candolle's section *Partheniastrum*. From the other species of the section they differ in having the inflorescence much ex-

ceeded by the leaves, and in the lack of leaf-like bracts subtending the larger branches of the inflorescence. From one another they differ most markedly in the size and dentation of the leaves, but also in the character of the pubescence on the upper leaf-surface. In *P. Stramonium* it is velvety, in *P. Arctium* arachnoid-tomentose. In *P. Stramonium* the panicle is nodding, in *P. Arctium* it is upright. Both species occupy the same floral region and are the northwestern congeners of the southeastern *P. tomentosum* and its allies.

Parthenium Lozanianum, n. sp., fruticosum ramosum usque ad 2.5 m. altum, ramis ochraceis subsulcatis juventate exigue albo-tomentosis, aetate glabris; internodiis quam foliis saepe duplo brevioribus. Folia plerumque lyrato-partita 2-4.5 cm. lata 4-9 cm. longa, supra viridia exigue crispo-pubescentia, subtus molliter albido-tomentosa, parte terminali circumscriptione triangula vel cuneato-lanceolata ipsa fere generis *Aceris* modo obtuse dentata lobataque, partibus inferioribus parvis vel nullis basi in petiolum 3-6 mm. longum decurrentibus. Inflorescentia terminalis ex corymbis 5-6 sublaxis constans. Bracteae deorsum foliis superioribus similes sursum gradatim minores et lanceolatae vel lineares. Inflorescentiae ramuli pedicellique puberulo-tomentosi graciles. Capitula diametro et altitudine ca. 5 mm. Involucrisquamae 10 biseriatae exteriores late ovatae acutiusculae interiores suborbiculares basi truncatae apice obtusissimae. Radii flores 5, tubo brevi, limbo suborbiculari apice emarginato aut raro tridentato. Achenia nigra hirtella compressa cuneata 2.5 mm. longa ad margines singula palearum aristis florum duorum sterilium adnata. Pappi aristae 2 nigrae arcuato-ascendentes tubum superantes albo-pubescentes. Disci flores ca. 26 in axillis palearum cuneatarum pubescentium positi. — Nuevo Leon, State of Nuevo Leon, alt. 300 m., *Lozano*, no. 10,247 (type, in hb. Gray). A member of De Candolle's section *Partheni-chaeta* and very closely allied to *P. incanum* HBK., from which it may be distinguished by its incurved, ascending pappus-awns and green upper leaf surface. In *P. incanum* the pappus-awns are divergent or often recurved, and the leaves are whitened above.

PEREZIA ADNATA Gray. This species has long been considered identical with *Perezia Alamani* Hemsl. Specimens which have accumulated in recent years afford evidence that not only may *Perezia adnata* and *P. Alamani* be distinguished, but also a third plant which is here described as a variety of the former. The following brief descriptions contrast the diagnostic characters of the three plants.

PEREZIA ALAMANI (DC.) Hemsl. involucris bracteis ca. 14 paene glabris submembranaceis anguste lanceolatis viridibus apice purpureo-tinctis basi vix callosis; pappi setulis ca. 49; labro corollae interiore

extus papilloso-pubescenti; foliis maximis 5 cm. longis. — Specimens examined: "Mexico," Alaman; "Valle de Toluca pr. Tenancingo," State of Mexico, September, 1874, and 1 October, 1876, *Schaffner*; Guanajuato, State of Guanajuato, *Dugès*; rocky hills, Cuyamaloya Station, alt. 2300 m., Hidalgo, *Pringle*, no. 12,070.

PEREZIA ADNATA Gray involucri bracteis ca. 28 viscido-pubescentibus coriaceis anguste lanceolatis ochraceis, basi insigniter callosis; pappi setulis ca. 84; corolla glabra; floribus ca. 14; foliis maximis 8–9 cm. longis. Morelia, Michoacan, *Ghiesbreght*, no. 378 (type).

Perezia adnata var. *oolepis*, n. var., involucri bracteis ca. 21 viscido-pubescentibus coriaceis ochraceis apice viridiusculis vel purpureo-tinctis, basi insigniter callosis, exterioribus ovatis, interioribus lanceolatis; pappi setulis ca. 63; corolla glabra; floribus ca. 11; foliis maximis 10–12 cm. longis. — Rocky hills at an altitude of 2500 m., Tultenango, State of Mexico, *Pringle*, nos. 3244 & 9945.

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CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD
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THE ISLANDS OF MARGARITA AND COCHE,
VENEZUELA.

BY JOHN ROBERT JOHNSTON, M.S.

BOSTON:
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 XXXVII. FLORA OF THE ISLANDS OF
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 VENEZUELA.

BY JOHN ROBERT JOHNSTON, M. S.

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GENERAL CONSIDERATIONS ON THE FLORA OF VENEZUELA.

PROFESSOR Goebel's ('91) most interesting account of the vegetative conditions to be found on the Cordilleras of Merida in Venezuela is descriptive of an excellent field for botanical research. Within 150 kilometers (93 miles) of the shores of Lake Maracaibo the moun-

tains rise to an altitude of 4000 meters (12,000 ft.) so that a traveler in passing from the Lake up to the mountains traverses the lowland forests, the higher and barren hills, the rich valleys, the forested mountain sides and gorges, to the treeless summits, some of which are capped with snow.

In this short range occur all variations from the swampy seashore and the barren hills to the luxuriant valleys, and the alpine regions. On the mountain sides occur furthermore at various altitudes not only quiet gorges in which the woods are dripping with moisture but also knolls exposed to the fierce winds, often accompanied by great changes in temperature. A greater variety of vegetative conditions is difficult to find within so small an area in any other country.

Venezuela may well be considered as consisting of three different regions: the Andean extending from Lake Maracaibo southwest over the mountain ranges to Colombia; the coastal region from Lake Maracaibo eastward to the Gulf of Paria at Trinidad, including all the coastal islands and extending inland to the llanos by the Orinoco; and the third region consisting of the Orinoco district and all of the extensive and little known forests to the south. While each of these three divisions shows some of the characteristics of the others, each has features of interest peculiar to itself, the first region being alpine, the second consisting of the barren or desert hills of the coast and of the islands, and the third being characterized by the grassy plains and forest areas of the llanos and selvas.

Such a variety of conditions as is presented in this country leads one to expect much of botanical interest. There must be both a remarkable variety of plants and many interesting adaptations of the plants to their environments. A number of collections have been made, but not nearly so many as the conditions warrant, and unfortunately the reports of these collections are scattered and incomplete. The need for more work on the flora of Venezuela is strongly felt. Brazil has the elaborate work of Martius ('40-'06); the Guianas those of Schomburgk ('47-'48) and Pulle ('06); Colombia that of Karsten ('58-'69) and also the recent collections of Smith and Pittier. The West Indies as a whole have Grisebach's ('64) well known Flora, and the recent *Symbolae Antillanae* of Professor Urban ('03). But in Venezuela, lying between these lands, no botanical work at all complete has been done.

The first recorded visit of a naturalist to Venezuela is that of Peter

Loeffling (1776). He sailed from Cadiz, February 15, 1754, for Cumaná where he spent six months. Then he journeyed to New Barcelona, the missions of Piritu, and the river Guyana, where he stayed three months. Thence he traveled to the missions on the Curoni and returned to Cumaná. In the description of his travels are noted thirty-four plants occurring about Cumaná.

In the years from 1807 to 1825 were published various works by Humboldt, Bonpland ('14-'29; '14; '08) and Kunth ('15-'25) describing the travels of the first two and then giving notes on their observations. Their list of plants, collected for the most part about Cumaná and along the Rio Negro and Cassiquiari Rivers, comprises some 1200 numbers. Most of these are now in the herbarium of the Museum of natural history at Paris.

Funck and Linden landed at La Guaira in 1840. Linden went to Peru while Funck went toward the Orinoco, visiting Cumaná, Guana-Guana, San Augustin where he made a rich collection, the Grotto de Guacharos, Caripe and its mountains. In 1842 and 1845 he visited Santa Marta, San Sebastian, and Galipan, and thence went to Curaçoa and to the region of the Silla de Caracas. His plants are in the Delessert herbarium at Geneva. There is no published list of them. Linden arrived at Caracas in January, 1842, and in May of the same year sent plants to Delessert. This collection (235 species) contained plants from the Silla de Caracas and the Cerro de Avila. In May, 1842, he left Caracas for the Andes of Merida. In January, 1843, he sent from Merida to the consul of France at Maracaibo plants collected in the high Andes of Truxillo and Merida. Linden's plants of Colombia, which may include his Venezuelan ones, are at the following places: University of Ghent, herbarium de Candolle (2066 species), herbarium of the University at Leipzig, and the herbarium of the Royal museum at Vienna.

There are plants of Funck collected at Caracas at the herbarium of the Academy of sciences at St. Petersburg (819 species).

Plants of Funck and Schlim (Reichenbach, '54b) collected in tropical America are in the herbariums of the universities of Ghent and Leipzig as well as in the Delessert herbarium.

Plants collected by Moritz (see Hampe '47a, '47b) are in the British museum, at the Royal botanical gardens in Berlin, in the herbarium of the Imperial botanical garden of St. Petersburg, and in that of the Imperial academy of St. Petersburg, of the Royal museum at Vienna, and of the University at Leipzig.

Plants of Wagner collected in Panama and Ecuador are in the royal herbarium of Munich and University of Göttingen. Possibly these include his Venezuelan plants.

Karsten ('58-'69) who published the extensive flora of Colombia and the adjacent regions included seventy-nine plants collected in Venezuela.

Plants collected by Birschel at Caracas are in the Gray herbarium.

Fendler's (see Eaton '61) collections of Venezuelan plants are in the herbariums of de Candolle, Delessert, Engelmann, Franqueville, University of Dublin, Gray herbarium, and British museum. August Fendler was a German botanist who lived in Colonia Tovar near Caracas from 1854-59. His collection comprised nearly 3000 numbers. There is no published list excepting that of the ferns and orchids, and a large part of the plants remain in the herbariums entirely or partially unidentified. Fendler was at one time an assistant at the Gray herbarium and his collecting was carried on to some extent under Dr. Gray's encouragement and patronage. It is believed that the set of his plants in the Gray herbarium is as nearly complete as any in existence.

Adolphus Ernst, who for a number of years was secretary of agriculture in Venezuela and also a professor at the University of Caracas, has contributed more to our knowledge of the Venezuelan flora than any other man since Humboldt's time. Ernst had in preparation a flora of Venezuela but owing to his death in 1899 it was never completed. He did, however, publish numerous short articles pertaining to the vegetation. A complete list of these occurs in the bibliography of his works published at Jena in 1900 (Ernst, '00b). The more important of these are the lists of the plants of Los Roques (Ernst, '72a), of La Tortuga (Ernst, '76b), of Margarita (Ernst, '86), and the list of ferns and of the orchids of Venezuela. The plants which he collected appear to be entirely inaccessible today. They are not to be found in the University museum at Caracas nor in the old National museum of natural history. It is possible that they have been sent to various European herbariums. As his lists contain merely the names of the plants with few or no notes, their identification in some cases must remain a matter of question.

In 1896, Professor H. H. Rusby ('96) and Roy W. Squires collected about the lower Orinoco. Their plants are in the New York college of pharmacy and in the Gray herbarium.

In 1900, Captain Wirt Robinson and Dr. M. W. Lyon, Jr., collected at La Guaira, Macuto, and San Julian about sixty plants which are now in the U. S. national herbarium (see Johnston, '08).

In 1901, with a party of three others I spent the months of July and August on the island of Margarita. About 300 species of plants were collected. On another trip to the same island in 1903, we increased the known flora of Margarita to 654 species. At the same time a collection was made on the island of Coche and visits were made to Carupano, Cumaná, La Guaira, and Caracas to compare their floras. Again in 1907, I was enabled to visit Venezuela although no collecting was done on Margarita. Visits to Pampatar on Margarita and to Carupano, Cumaná, Barcelona, Guanta, La Guaira, Caracas, and Valencia on the mainland, all have been of value to me in comparing the flora of Margarita with that of adjacent regions.

It is believed that the above collections comprise all that have been made in Venezuela with the exception of a few by Venezuelans. In some cases the data are incomplete and unsatisfactory but they may nevertheless furnish a basis for further research work along this line.

FLORA OF THE ISLAND OF MARGARITA.

Introduction.

The island of Margarita is only a small part of Venezuela, nevertheless its flora has proved to be of considerable interest, particularly as revealing several new species and as increasing the known geographical distribution of other species. The island was visited in 1873 by Dr. Adolphus Ernst who published a report of the plants discovered. Captain Wirt Robinson visited the island in 1898 making a collection of the birds and mammals. In 1901 a party of four students of Harvard university consisting of Austin H. Clark, O. O. Miller, Walter P. Jenkins, and myself spent the months of July and August collecting specimens of animal and plant life. In 1903, through the kindness of one of the friends of the Gray herbarium of Harvard university, I was enabled to visit Margarita again. This time I was accompanied by Dr. Albert F. Blakeslee, who devoted himself to the collection of algae and fungi, and by Clifford Wilson, who assisted us in our work. These visits to Margarita, which are all that have been reported of scientific workers, taken together furnish fairly complete data as to the character of the flora and its vegetative conditions.

Physical Features.

The island of Margarita as seen from the mainland thirty-two kilometers distant appears as two conical mountains separated by a long stretch of lowland. It may be seen on the accompanying map that it consists of two irregular polygonal areas connected by a narrow strip of land, each of these areas rising from the lowlands of the plain to the foothills and mountain ridge of the center, thus giving the conical appearance in the distance.

Located about eleven degrees north, and sixty-four degrees west, Margarita is sixty-seven kilometers long and thirty-two wide. It is eleven kilometers from the desert islands Cubagua and Coche, and is the largest of the Venezuelan islands that extend along the coast from Curaçoa to Trinidad. The highest peaks of the two ends are about forty-two kilometers apart. The relative extent of plains, foothills, and mountains can best be understood by considering the two ends separately and in detail.

The mountains of the eastern end rise to an altitude of 795 meters and have many spurs jutting out in different directions. Surrounding the mountain and its spurs are the valleys and plains which in some cases extend to the sea. On the eastern and northern sides are what may be termed outlying mountains which are less extensive than the central mountain mass, San Juan Mountain, and border directly on the sea. The top of San Juan Mountain, between the altitudes 650 and 795 meters, is destitute of trees. Bare rock ledges jut out from beneath the low shrubbery. Occasionally the summit is in clear sunshine, but quite as often the heavy clouds laden with moisture are rapidly flitting over, now completely enveloping it, and now exposing it to the warmth of the sun. Within thirty meters of the top is one spring on the El Valle side, and fifteen meters below that is another. Though these are entirely exposed they never seem to dry up. The dense woods which cover the mountains above 400 meters collect and retain the moisture of the clouds, thus together with the two springs furnishing a source for small streams below.

On the map of the island it is shown that the mountain ridge as a whole not only extends from northeast to southwest, but also rises gradually from the west in a succession of hills to the highest point which is above El Valle and San Juan, thence lowering a little for a distance of one and one half kilometers, and then dropping abruptly

down to the plain near Asuncion. Each of the successively higher hills of the western end swerve to the south in the form of ridges sloping gradually to the open plain at San Antonio. From the highest point, however, there proceeds a very distinctive ridge between San Antonio and El Valle. This South Hill, as named for the collector's convenience, together with a similar hill to the north of El Valle, called North Hill, curves so as partially to enclose El Valle, the most characteristic valley of the island. Farther around the mountain to the northeast of it, is the large valley of Asuncion, and northwest of this is Tacarigua and at the western end again, on the north side, and opposite El Valle, is the valley of San Juan.

With this system of narrow valleys surrounding the mountain, it may be expected that there are mountain torrents in the time of heavy rains, and such is the case. The valleys of San Antonio and of San Juan, however, have only the dry river beds in ordinary weather, while the three other valleys alone have permanent streams.

The above-mentioned springs are the source of one river in El Valle which has been directed into a reservoir at the head of the valley at an altitude of fifty meters, whence it is piped to the villages of El Valle and Porlamar. There are ten public and a few private drinking fountains or "pelas" on the way, a distance of eight kilometers. The valley forks at its head so that to the northeast occurs a narrow ravine in which flows a small stream. This is used for laundry purposes, and is lost in the soil before it reaches the lower valley. There is also a short distance to the east of this another stream which is confined to private grounds on which are three concrete reservoirs provided for it.

The region between El Valle and Asuncion valley has no distinctive features, nor is there any stream. Although down in the valley of Asuncion proper there is only one stream bed and not much water, one and one half kilometers or more above the village at an altitude of 450 meters there are no less than eight stream beds of which six always contain running water. A trail passing through the forest at the above altitude from one side of the valley around the end to the other, furnishes an excellent opportunity to study these streams. The valley is most curved toward the southeast and gradually straightens out to the northwest. Beginning from the southeast the streams or stream beds were numbered in collecting merely for convenience, but the numbers may well serve here.

The first stream has a very shallow and rather indistinct bed. The land is wet and muddy on both sides of it. The second stream is a little larger and forms distinct pools at intervals. Below the trail this river has a very steep bed and appears on the surface only occasionally from underneath the rocks. Intervening between this and the next river is a slight elevation which extends as a small ridge into the valley. On the northwest side of this ridge is a ravine about twenty meters deep, at the bottom of which runs the third river. The southeast slope is very steep, the northwest is a gradual rise. A little farther on is another ravine of similar depth and its southeast side is almost perpendicular. The northwest slope is gradual. A short way from this is the third and deepest ravine containing the fifth river. Another and shallower ravine is near by containing the sixth river. These four ravines are similar in having a steep slope on the southeast side and a gradual rise on the opposite side. The unimportant dry river beds of the seventh and eighth streams are but a short way farther, very near to the ridge separating the large Asuncion valley from that of Tacarigua.

The valley of Tacarigua, the next in the series around the mountain, is very long and has steep sides. The one river, the Rio Blanco, flows down to the bottom of the valley where it is lost eleven or twelve kilometers from the sea. The water is very impure though from what source I do not know. It is slightly muddy in color and tastes similar to a sulphur spring. Adjoining the valley of Tacarigua is that of San Juan, the last of the series surrounding the mountain. As this has nothing but a dry river bed it is of little importance.

As has been said, the mountain as a whole is covered by dense woods. The summit of San Juan Mountain is the only exposed part. The highest part of all the ridges is covered with shrubs which lower down gradually give place to small trees and still lower to the very tall trees. In all parts rocks are projecting in an irregular fashion. Not even in the densest part of the woods is there a soil of any considerable depth, and of course the river beds are extremely rocky. Where the mountain slope is interrupted by some hill, there the woods stop, but where the slope is continuous with a valley the woods extend to a much lower level. This latter condition occurs characteristically in El Valle and in the valley of Asuncion which are the only two worthy of detailed consideration.

The woods of El Valle are heavy as low as fifty meters, the height

of the reservoir, although they are rapidly being cleared off in all directions. Immediately below this is the extensive coconut grove reaching down into Porlamar. The configuration of the land about the village of El Valle makes it an ideal place for botanical study. North and South Hills as before mentioned leave the mountain in a southerly direction and both give off short ridges running toward each other and also away from each other on the other side.

About a kilometer and a half from the mountain, South Hill turns to the southeast, and North Hill turns to the southwest, the two stopping but a short way from each other, thus leaving a narrow entrance into a nearly enclosed valley. In this small area there are exposures to all points of the compass. There is one dry river bed extending from the foot of the mountain to the sea, that is important in the rainy season. It is here that the heavy vegetation of the valley grows.

Asuncion is the only other valley of importance. The head of it has been described in the discussion of the mountain rivers. The lower part is quite open and is continuous with the plains to the sea. This valley faces to the northeast so that it gets the wind and moisture. The clouds, however, are usually at an altitude of from 400 to 600 meters so that it is only the upper part of the valley that is extremely moist, the richest part of the island. Otherwise the valley is similar to any of the lowlands.

Intervening between the valleys, partially surrounding them, and also standing as outlying features are the hills and small mountains conspicuous by their red soil and by their desolation. In the case of the hills attaining the height of 300 meters the summit has a few scattered trees. Other vegetation is either lacking or restricted to small patches of dry bushes. The soil is very conspicuously red, or on a few hills made gray by the preponderance of limestone. It is loose and easily weathered into small slabs or into a crumbling mass, which rapidly washes or rolls down the steep hills. At the time of the heavy showers the hills are gullied everywhere. As a consequence of their condition the soil is thin and can maintain only shallow-rooted vegetation.

From the very nature of the rock it is to be expected that caverns of some size are to be found. Within twenty meters of the summit of Bat Cave Peak is a large cave which opens above near the summit, and also at the side. About one hundred meters from the foot of the hill there is a hole in the rocks through which I could with diffi-

culty lower myself. Below was a cave about three meters deep and large enough to hold several men. Both of these caves are inhabited by bats, and the lower one contains numerous lizards.

The barrenness of the hills is increased several fold in the plains excepting at the mouth of a valley. The surface of the plain is undulating only slightly and in few places. It is for the most part sandy, reddish near the hills and white toward the sea. In places, notably between San Antonio and the sea, the surface is covered with irregular broken rock, small fragments, angular, and very little weathered. By the sea the plains contain several lagoons as may be noted on the map.

On the plain a mile inland from Juan Griego is a small pond of brackish water always turbid and used merely for laundry purposes. At Punta Moreno is a small lagoon connected by a narrow outlet to the bay of Porlamar. At Punta Mosquito is Laguna Chica surrounded by mangroves. This is about six kilometers long and navigable by sloops. At Punta Mangles and at Punta Piedras are also small lagoons and mangrove swamps. The lagoon at Punta Piedras is open to the sea by an inlet about one meter deep and six meters wide. Inside the mangrove border is a clear circular body of water about one-half kilometer across.

From the above description of the eastern end, it is hoped that a good idea of the physical features may be derived. When the distribution of the plants is discussed the picture of the district will be more complete. Then one may see along the shore at intervals the mangrove-bordered lagoons, then stretching inland the sandy plain dotted with the cactus and low shrubs exposed to the burning sun; the brown hills with small dead bushes, the valleys with the waving coconut palms and higher up the green-clad mountain side with the top reaching into the clouds.

The land intervening between the two ends is for the most part a large mangrove swamp, open to the sea on the north side and a short distance on the south side. Although the lagoon is about eleven kilometers long, it has very little clear water.

The western end of the island is of much less importance than the eastern. The conditions recorded here are taken from the meager encyclopedic references and from the observations which I made from the distant San Juan Mountain and on the Coche-Punta Piedras voyage and on board the steamship from Porlamar to La Guaira and also from reports of the natives.

According to encyclopedias, the mountain peak of this end is 60 meters higher than that of the eastern end. Though in the distance that looks very probable, it makes little difference in the character of the vegetation. Little of the mountain range anywhere approaches the height of the peak. Most of the ridges are very steep and apparently have no forest growth, whatever. Cliffs are exposed in numberless places. Under such conditions, although the peaks are often hidden in the clouds there can be little moisture retained and consequently no springs nor rivers, a condition which agrees with the reports of the natives. The single town of Macanao on the west coast is supplied with "posa" water (rainwater and seepage collected in clay pits) and with imported water. One large ridge with short spurs runs east and west along the south shore, and to the northeast is a series of high hills. The only plain is on the northwest side. The character of the western end as a whole then is similar to that of the hills and plains of the eastern end.

The above paragraphs give some idea of the topography of Margarita. It seems advisable also to discuss so far as possible the temperature and moisture as they affect the conditions of vegetation.

The above description distinctly suggests that Margarita is a very dry island. During the time from July 3 to August 22, in 1901, there were only two heavy rains in El Valle each lasting much less than an hour, and I did not observe any light showers. This it must be remembered was during the rainy season on the mainland only twenty-seven kilometers distant. At this time conditions seemed to be quite normal. Orange trees and the coconut palms were bearing fairly well, and the valley bottoms were filled with thriving weeds.

Observations made from June 29 to September 4, in 1903, were very different. At this time the coconut trees were dying, the oranges had turned color on the tree when less than half grown, and scarcely a weed could be found. The island and especially El Valle was in a bad drought. According to the natives there had been no rain for two or three and some said even five years. This latter time is shown to be incorrect by my own observations in 1901, but at any rate it is suggestive of very little rain for several years past. Records for 1903 are as follows:—

July 14. Heavy rain in Porlamar; very light at El Valle.

July 17. Light showers at El Valle.

August 14. Very heavy rains on the mountain and down through

El Valle. Trails on the hillside were in many places washed away. Gullies were deepened considerably. Rained from about midnight till 10 A. M. of August 15.

August 16. Light showers.

August 21. Very heavy rain in El Valle. The heavy sheets of rain seemed to ascend one valley to the mountain top and retreat to ascend the other valley. The rain was very light on the surrounding hills. During the storm and immediately after it a continuous roaring sound arose from the valley. On investigation this proved to be the rapid falling of the water down the steep gulches. Farther down the small streams united and flowed into the "dry river bed." The two trails running for a distance of a mile from the foot of the mountain into the plaza at El Valle proved themselves to be veritable rivers. They were loosely paved with stones and were walled on each side so that they held in the water well. A half hour after this rain the trails were still submerged, and uniting with the river near the plaza they formed a perfect torrent at least until 7.25 P. M.

A very different factor from the rain is the heavy mist which almost constantly hangs above the mountain. About one third of the time the mountains above 600 meters are in the clouds. Very often from night until 6 or 7 A. M. the hills over 300 meters are in the clouds but they are never cloudy in the daytime except in case of storms. The clearing of the woods which everywhere seems to be inevitable, is going on here slowly. Where previously all the vegetation was dripping with moisture now for the most part conditions are much drier because trees have been cut down thus allowing the sunlight to enter.

In the preceding paragraphs it is seen that compared with other tropical districts, Margarita has almost no rainfall. The mainland in the summer season has a shower nearly every day. So has Trinidad off the northeast coast of Venezuela. While my records are mostly from the south side of the island, yet excursions made to Juan Griego and that vicinity indicate that it is but slightly better off.

Although the island is desert-like in character yet from the fact that it gets the northeast trades, a comfortable temperature may be expected. My records average as follows: at 6 A. M., 29 degrees C.; at 1 P. M., the hottest, 32.4 degrees C. These records are from El Valle. Porlamar always seemed hotter than this. The coolest is of course on the mountain top at San Juan Mountain. The average coolest is 25 degrees C., the single coldest record was 24.5 C. This

is the most delightful temperature condition imaginable, often cloudy and always breezy. El Valle is comfortable, but the villages on the plains are in the daytime very warm. At night it is comfortable everywhere.

Catalogue of the Plants of Margarita.

Dr. Ernst in his visit to Margarita, in 1873, spent the month of May collecting at Juan Griego, Santa Ana, and Asuncion. His collection amounting to 242 different species are the first plants reported from that island but unfortunately they do not seem to be available for reference today. Their location is unknown to me; certainly they are not accessible in any place in Venezuela.

The only other collections from Margarita and the only ones readily available for reference today are those made by our parties in 1901 and 1903. In 1901, we collected over 300 different species spending most of the time from July 4 to August 22 in El Valle and the plains toward Porlamar, with only occasional trips to Juan Griego, Asuncion, and Punta Moreno. In 1903, from June 28 to September 4, we found the region about El Valle in such a drought that for our collections we had to resort to the mountains for the most of our work. One trip was made to Juan Griego, Tacarigua, and Asuncion, one to Peilar and several to Punta Moreno and Punta Mosquito. We also made one excursion to the island of Coche and to Punta Piedras on Margarita. In each of these trips, that of 1901 and that of 1903, between 3000 and 4000 specimens were secured, all of which have been distributed among the leading herbariums in this country and abroad, the most nearly complete set being at the Gray herbarium of Harvard university. It is unfortunate that the first collection was distributed in an incomplete and poorly identified condition but it is hoped that the present listing of the species together with the citation of the collection numbers and dates may tend to correct any previous errors. In the main the identifications have been carried on at the Gray herbarium. Mr. O. O. Miller of the party of 1901 assisted in the identifications of the collection of that year. The rest of the work, in which I have been generously assisted by the staff of the Gray herbarium, has devolved upon me. Mr. Oakes Ames identified part of the Orchidaceae; Dr. Carl Mez, part of the Bromeliaceae; Dr. Casimir de Candolle, the Piperaceae; Professor Radlkofer, one of the Sapin-

aceae; and Mr. W. R. Maxon has revised the list of ferns. Professor I. Urban has made some corrections in my identifications and has published several new species based upon my plants. The collection of fungi and of algae made by Dr. A. F. Blakeslee has been identified by Professor W. G. Farlow and is deposited in the Cryptogamic herbarium of Harvard university. This collection is not included in the following list of Margaritan plants.

To all these who have so generously assisted me and especially to Professor B. L. Robinson under whose supervision this work has been done and to Miss M. A. Day, librarian of the Gray herbarium, who has verified the references and otherwise assisted in the bibliographical work, many thanks are due.

In working out the identifications of the plants listed in the following catalogue many difficulties were encountered, chief among them being the great lack of South American plants for comparison, and the uncertain condition of many South American genera and species. These difficulties have been overcome to some extent by the assistance, already referred to, of specialists on certain groups. The bulk of the plants, however, remained in groups which have not been revised for some time.

The citations to be found in the catalogue, consist of the original references to the names which are used, a reference to the earliest use of the specific name, and in addition reference to either or both Grisebach's *Flora of the British West Indies* and Martius' *Flora Brasiliensis*, as well as a reference to some published illustration, and when possible a citation of monographs of the various groups. These are the works which have been used in conjunction with herbarium specimens to make the identifications, to determine the character of the species. From these my idea of the species was obtained and for that reason it seems desirable to cite them in this list. In addition to these references I have also given the occurrence of the species in Venezuela as a whole, this being ascertained by reference both to publications and to specimens. All specimens here reported and collected by Fendler, by Rusby and Squire, by Robinson and Lyon, by Birschel, and by A. H. Moore have been personally examined by me and compared with my own material. Other references than those of species to Venezuela are taken from publications and are given for only what they may be worth under such circumstances. The reference to Ernst with some page number is to Ernst's *Estudios sobre la flora y fauna*.

After the citation of Venezuelan plants, I have given reference to the occurrence of the species in Porto Rico as found in Urban's *Flora portoricensis*. These citations are based upon Professor Urban's comparison of my plants with his so that the distribution of the plants in these two localities is made certain. The last note after a species is in regard to its general distribution.

The arrangement of the families is as in Engler and Prantl's *Pflanzenfamilien*, and the genera and species are alphabetically arranged in their respective groups.

While it is to be regretted that each species could not be subjected to the critical examination of a specialist it is to be hoped that this list in connection with the distributed plants may be of value in future work upon the flora of Venezuela.

PTERIDOPHYTA.¹

GLEICHENIACEAE.

DICRANOPTERIS Bernh.

D. FLEXUOSA (Schrad.) Underw., Bull. Torr. bot. club, vol. 34, p. 254 (1907). *Mertensia flexuosa* Schrad., Goett. Anz., p. 863 (1824). *M. rigida* Kunze, Linnaea, vol. 9, p. 16 (1834). *Gleichenia flexuosa* Mett., Ann. Lug. Bat., vol. 1, p. 50 (1863). *G. rigida* Bommer & Christ, Bull. soc. bot. Belg., vol. 35, p. 174 (1896).—San Juan Mt., alt. 700 m., July 16, *Johnston*, no. 180. Tropical America.

CYATHEACEAE.

CYATHEA Sm.

C. TENERA (J. Sm.) Hook. ex Moore, Ind. Fil., p. 274 (1861). *Alsophila tenera* J. Sm., Lond. Journ. bot., vol. 1, p. 666 (1842), nomen nudum. *A. tenera* J. Sm. ex Hook., Sp. Fil., vol. 1, p. 49 (1846).—Rio Asuncion, alt. 450 m., *Johnston*, no. 143, July 29. Also on Trinidad and several of the West Indies.

HEMITELIA R. Br.

H. GRANDIFOLIA (Willd.) Spreng. Syst., vol. 4, p. 125 (1827). *Cyathea grandifolia* Willd., Sp. pl., vol. 5, p. 490 (1810).—El Valle,

¹ The identifications in this group are as revised by Mr. W. R. Maxon, who has also added the synonymy and the notes in regard to the species.

Miller & Johnston, no. 164, in part, Aug. 16; San Juan Mt., alt. 500 m., *Johnston*, no. 191, July 16. Porto Rico: Urban, *Symb. Ant.*, vol. 4, p. 10 (1903). Tropical America.

POLYPODIACEAE.

ELAPHOGLOSSUM Schott.

E. TOVARENSE (Mett.) Moore, *Ind. Fil.*, p. 369 (1862), name only. *Achrostichum tovarense* Moritz ex Eaton, *Mem. Amer. acad. arts and sci.*, (new series) vol. 8, pt. 2, p. 194 (1860), name only; Kuhn, *Linnaea*, vol. 36, p. 60 (1869).— Juan Griego trail, alt. 450 m., *Johnston*, no. 146. Known also from Mexico and Central America.

MONOGRAMMA Commerson.

M. LINEARIFOLIA Desv. *Mag., Gesellsch. nat. Fr. Berlin*, vol. 5, p. 302, pl. 7, fig. 5 (1811). *Pleurogramme immersa* Fée, *3me Mém.*, p. 37, pl. 4, fig. 5 (1851–52). *Monogramme immersa* Hook., *Sp. Fil.*, vol. 5, p. 125 (1864).— San Juan Mt., alt. 600 m., *Johnston*, no. 186, July 2. West Indies and northern South America.

CAMPYLONEURUM Presl.

C. PHYLLITIDIS (L.) Presl, *Tent. Pterid.*, p. 190, pl. 7, fig. 18 (1836). *Polypodium phyllitidis* L., *Sp. pl.*, vol. 2, p. 1083 (1753); Urb., *Symb. Ant.*, vol. 4, p. 57 (1903), where reported as occurring on Margarita Island.— El Valle, *Miller & Johnston*, no. 165, July 30; San Juan Mt., alt. 400 m., *Johnston*, no. 151, July 27. Generally distributed throughout tropical America.

GONIOPHLEBIUM Presl.

G. CHNOODES (Spreng.) Fée, *Gen. Fil.*, p. 255 (1850–52). *Polypodium chnoodes* Spreng., *Neue Entdeck.*, vol. 2, p. 6 (1822).— San Juan Mt., alt. 600 m., *Johnston*, no. 193, July 2. Tropical America, commonest in the West Indies.

G. LORICEUM (L.) J. Sm. ex Hook., *Gen. Fil.*, under pl. 51 (1840). *Polypodium loriceum* L., *Sp. pl.*, vol. 2, p. 1086 (1753).— Rio Asuncion, alt. 500 m., *Johnston*, no. 169, Aug. 12–15. Tropical America generally. Variable.

G. PILOSELLOIDES (L.) J. Sm. ex Hook., *Gen. Fil.*, under pl. 51

(1840). *Polypodium piloselloides* L., Sp. pl., vol. 2, p. 1083 (1753). *Lopholepis piloselloides* J. Sm. in Seem., Bot. voy. Herald, p. 229 (1854).— Juan Griego trail, alt. 500 m., *Johnston*, no. 150, July 31. Tropical America.

G. NERIIFOLIUM (Schkuhr) Hook., Gen. Fil., pl. 70 B (1841). *Polypodium neriifolium* Schkuhr, Krypt. Gewächse, vol. 1, p. 14, pl. 15 (1806).— San Juan Mt., alt. 700 m., *Johnston*, no. 176, Aug. 28. Tropical America.

G. VACCINIIFOLIUM (Langsd. & Fisch.) J. Sm. ex Hook., Gen. Fil., under pl. 51 (1840). *Polypodium vacciniifolium* Langsd. & Fisch., Ic. Fil., vol. 8, pl. 7 (1810).— El Valle, *Miller & Johnston*, no. 159, July 31. Tropical America.

PHLEBODIUM J. Sm.

P. AUREUM (L.) J. Sm., Journ. bot., vol. 4, p. 59 (1841). *Polypodium aureum* L., Sp. pl., vol. 2, p. 1087 (1753).— Rio Asuncion, alt. 500 m., *Johnston*, no. 170, Aug. 12–15. Widely distributed in tropical America.

PHYMATODES Presl.

P. NEMATORHIZON (D. C. Eaton) Underw. ex Maxon, Contrib. U. S. nat. herb., vol. 10, p. 493 (1908). *Polypodium nematorhizon* D. C. Eaton, Bot. gaz., vol. 3, p. 90 (1878).— Juan Griego trail, alt. 500 m., *Johnston*, no. 147, Aug. 12–15. Known hitherto only from Trinidad.

P. PROMINULA Maxon, Contrib. U. S. nat. herb., vol. 10, p. 501 (1908). ? *Polypodium salicifolium* Willd., Sp. pl., vol. 5, p. 149 (1810), not Vahl (1807).— San Juan Mt., alt. 500 m., *Johnston*, no. 155 (type). Tropical America.

POLYPODIUM L.

P. JUBAEFORME Kaulf., Flora, vol. 6, pt. 1, p. 364 (1823). *Polypodium saccatum* Fée, Gen. Fil., p. 239 (1850–52).— San Juan Mt., alt. 600 m., *Johnston*, no. 164, July 2. The West Indies and Panama to Brazil.

P. PECTINATUM L., Sp. pl., vol. 2, p. 1085 (1753).— El Valle, *Miller & Johnston*, no. 163; Juan Griego trail, alt. 450 m., *Johnston*, no. 167, July 19. Tropical America generally.

P. POLYPODIOIDES (L.) A. S. Hitchcock, Rep. Mo. bot. garden, vol. 4, p. 156 (1893). *Acrostichum polypodioides* L., Sp. pl., vol. 2, p. 1068 (1753). *Polypodium incanum* Sw., Prod. veg. Ind. Occ., p. 131 (1788).—San Juan Mt., alt. 450 m., *Johnston*, no. 157, July 6. Southern and central United States to Argentina.

XIPHOPTERIS Kaulf.

X. SERRULATA (Sw.) Kaulf., Enum. Fil., pp. 85, 300 (1824). *Acrostichum serrulatum* Sw., Prod. veg. Ind. Occ., p. 128 (1788). *Polypodium serrulatum* Mett., Fil. hort. Lips., p. 30 (1856), not Sw. (1800). *Xiphopteris extensa* Fée, 11me Mém., p. 14, pl. 19, fig. 3 (1866), not *Polypodium extensum* Forst. (1786), Presl (1825), nor Fée (1869).—Juan Griego trail, alt. 450 m., *Johnston*, no. 144, Aug. 12–15. Tropical America generally. Also occurs in Africa.

ADIANTOPSIS Fée.

A. RADIATA (L.) Fée, Gen. Fil., p. 145 (1850–52). *Adiantum radiatum* L., Sp. pl., vol. 2, p. 1094 (1753).—San Juan Mt., alt. 400 m., *Johnston*, no. 184, July 6. Not uncommon in the American tropics.

ADIANTUM L.

A. TETRAPHYLLUM H. & B. ex Willd., Sp. pl., vol. 5, 441 (1810); Urb., Symb. Ant., vol. 4, p. 45 (1803), where reported as occurring on Margarita Island.—El Valle, *Miller & Johnston*, no. 166, July 25; Juan Griego trail, alt. 300 m., *Johnston*, no. 162. Tropical America.

CEROPTERIS Link.

C. CALOMELAENA (L.) Link, Fil. sp. hort. bot. Berol., p. 141 (1841). *Acrostichum calomelanos* L., Sp. pl., vol. 2, p. 1072 (1753). *Gymnogramma calomelanos* Kaulf., Enum. Fil., p. 76 (1824).—San Juan Mt., alt. 550 m., *Johnston*, no. 182, July 19. Tropical America. Africa. Escaped from cultivation in Luzon.

C. TARTAREA (Cav.) Link, Fil. sp. hort. bot. Berol., p. 142 (1841). *Acrostichum tartareum* Cav., Descr. pl., p. 242 (1802). *Gymnogramma tartarea* Desv., Mag., Gesellsch. nat. Fr. Berlin, vol. 5, p. 305 (1811).—San Juan Mt., alt. 795 m., *Johnston*, no. 181, Aug. 28. Tropical America; uniformly at a higher elevation than the preceding.

PTERIDIUM Scop.

P. CAUDATUM (L.) Maxon, Proc. U. S. nat. mus., vol. 23, p. 631 (1901). *Pteris caudata* L., Sp. pl., vol. 2, p. 1075 (1753). *Pteris aquilina*, var. *caudata* Hook., Sp. Fil., vol. 2, p. 196 (1858).—San Juan Mt., alt. 790 m., *Johnston*, no. 177, Aug. 28. Tropics.

ASPLENIUM L.

A. ABSCISSUM Willd., Sp. pl., vol. 5, p. 321 (1810). *Asplenium laetum* Schkuhr, Krypt. Gewächse, vol. 1, p. 65, pl. 70 (1809), not Sw. (1806). *A. Schkuhrianum* Presl, Tent. Pterid., p. 107 (1836). *A. firmum* Kunze, Bot. Zeit., vol. 3, p. 283 (1845).—Juan Griego trail, alt. 450 m., *Johnston*, no. 154, July 29. Tropical America generally.

A. CIRRHATUM Rich. ex Willd., Sp. pl., vol. 5, p. 321 (1810). *Asplenium rhizophorum* (simple-pinnate form) of most authors.—Juan Griego trail, alt. 450 m., *Johnston*, no. 142, July 31. Tropical America; commonest in the West Indies.

A. CRISTATUM Lam., Encyc., vol. 2, p. 310 (1786). *Asplenium cicutarium* Sw., Prod. veg. Ind. Occ., p. 130 (1788); Urb., Symb. Ant., vol. 4, pp. 38, 39 (1903), where reported as occurring on Margarita Island.—El Valle, *Miller & Johnston*, no. 162, Aug. 2; Juan Griego trail, alt. 450 m., *Johnston*, no. 161, July 22. American tropics; reaching its best development in the West Indies.

A. CUNEATUM Lam., Encyc., vol. 2, p. 309 (1786).—Juan Griego trail, alt. 450 m., *Johnston*, no. 172, July 31. Tropical America, the typical form being West Indian. Ascribed also to the tropics of the Old World.

A. SALICIFOLIUM L., Sp. pl., vol. 2, p. 1080 (1753). *Asplenium auriculatum* and *A. semicordatum* of authors, as to West Indian specimens (see Maxon, Contrib. U. S. nat. herb., vol. 10, p. 476 (1908) for synonymy).—Juan Griego trail, alt. 450 m., *Johnston*, no. 168, July 31. Tropical America.

A. SERRATUM L., Sp. pl., vol. 2, p. 1079 (1753).—San Juan Mt., alt. 400 m., *Johnston*, no. 141, July 6. American tropics. Common.

BLECHNUM L.

B. OCCIDENTALE L., Sp. pl., vol. 2, p. 1077 (1753); Urb., Symb. Ant., vol. 4, p. 39 (1903), where reported from Margarita Island.—

El Valle, *Miller & Johnston*, no. 155, Aug. 2; San Juan Mt., alt. 400 m., *Johnston*, no. 160, July 16. American tropics; ubiquitous.

DIPLAZIUM Sw.

D. ARBOREUM (Willd.) Presl, Tent. Pterid., p. 114 (1836), not of most authors. *Asplenium arboreum* Willd., Sp. pl., vol. 5, p. 320 (1810). *A. Shepherdi* Spreng., Nov. act. acad. Caes. Leop., vol. 10, p. 231, pl. 17, figs. 5 and 6 (1821). *Diplazium Shepherdi* Link, Hort. Berol., vol. 2, p. 70 (1833).—Juan Griego trail, alt. 450 m., *Johnston*, no. 158, July 29. Tropical America.

D. CRENULATUM Liebm. Vid. selsk. skr., ser. 5, vol. 1, p. 254 (1849). Earlier synonymy much confused: the Linnaean name not available. Referred under *D. striatum* (L.) Presl by Urban (Symb. Ant., vol. 4, p. 33 (1903) as occurring on Margarita Island.—El Valle, *Miller & Johnston*, no. 161, Aug. 16; Juan Griego trail, alt. 450 m., *Johnston*, no. 153, July 29. Tropical America.

D. GRANDIFOLIUM Sw. in Schrad., Journ. bot., 1800, pt. 2, p. 62 (1801). *Asplenium grandifolium* Sw., Prod. veg. Ind. Occ., p. 130 (1788).—Juan Griego trail, alt. 450 m., *Johnston*, no. 159, July 29. Tropical America.

DRYOPTERIS Adans.

D. AMPLA (H. & B.) Ktze., Rev. gen., vol. 2, p. 812 (1891). *Polypodium amplum* H. & B. ex Willd., Sp. pl., vol. 5, p. 207 (1810).—El Valle, *Miller & Johnston*, no. 169, Aug. 2; Juan Griego trail, alt. 450 m., *Johnston*, no. 187 in part, July 29. Tropical America. Florida.

D. JOHNSTONI Maxon, Contrib. U. S. nat. herb., vol. 10, p. 498 (1908).—Juan Griego trail, alt. 450 m., *Johnston*, no. 192, July 22 (type). Known also from Trinidad, *Jenman*; *Fendler*, no. 54.

D. MEGALODUS (Schkuhr) Urb., Symb. Ant., vol. 4, p. 21 (1903). *Polypodium megalodus* Schkuhr, Krypt. Gewächse, vol. 1, p. 24, pl. 19b (1806).—El Valle, *Miller & Johnston*, no. 164 in part. Tropical America.

D. PARASITICA (L.) Ktze., Rev. gen., vol. 2, p. 811 (1891). *Polypodium parasiticum* L., Sp. pl., vol. 2, p. 1090 (1753). *Nephrodium parasiticum* Desv., Mém. soc. Linn. Paris, vol. 6, p. 260 (1827). *Polypodium molle* Jacq., Coll. bot., vol. 3, p. 188 (1789), not Schreb. (1771), nor All. (1785). *Nephrodium molle* R. Br., Prod. fl. Nov.

Holl., p. 149 (1810).— Juan Griego trail, alt. 450 m., *Johnston*, no. 194, July 19. Tropical and subtropical regions of both hemispheres. Rare in the southern United States.

D. PUBESCENS (L.) Ktze., *Rev. gen.*, vol. 2, p. 813 (1891). *Polypodium pubescens* L., *Syst. nat.*, ed. 10, vol. 2, p. 1327 (1759).— Juan Griego trail, alt. 450 m., *Johnston*, no. 195, Aug. 12–15. The specimens are broader and less produced than the typical Jamaican form. West Indies.

D. MERCURII (A. Br.) Hieron., *Hedwigia*, vol. 46, p. 335, pl. 5, fig. 9 (1907). *Aspidium Mercurii* A. Br. ex Christ., *Bull. herb. Boiss.*, ser. 2, vol. 6, p. 58 (1906), name only.— Juan Griego trail, alt. 450 m., *Johnston*, no. 190, July 29. Determined by Christensen, who attributes the species also to Mexico, Costa Rica, Colombia, and Ecuador.

[*D. TETRAGONA* (Sw.) Urb., *Symb. Ant.*, vol. 4, p. 20 (1903). *Polypodium tetragonum* Sw., *Prod. veg. Ind. Occ.*, p. 132 (1788).— Stated by Urb., *l. c.*, to grow on Margarita Island, a report based upon material collected by Miller & Johnston in 1901.]

D. VILLOSA (L.) Ktze., *Rev. gen.*, vol. 2, p. 314 (1891). *Polypodium villosum* L., *Sp. pl.*, vol. 2, p. 1093 (1753). *Nephrodium villosum* Presl, *Rel. Haenk.*, vol. 1, p. 38 (1825). Juan Griego trail, alt. 450 m., *Johnston*, no. 187 in part, July 29. Tropical America.

MENISCIUM Schreb.

M. RETICULATUM (L.) Sw. in Schrad., *Journ. bot.*, 1801, pt. 1, p. 274 (1803). *Polypodium reticulatum* L., *Syst. nat.*, ed. 10, vol. 2, p. 1325 (1759). *Nephrodium reticulatum* Keyserling, *Pol. Cyath. herb. Bung.*, p. 49 (1873). *Dryopteris reticulata* Urb., *Symb. Ant.*, vol. 4, p. 22 (1903).— El Valle, *Miller & Johnston*, no. 156, Aug. 16; Juan Griego trail, alt. 450 m., *Johnston*, no. 166, July 22. Tropical America.

OLFERSIA Raddi.

O. CERVINA (L.) Kunze, *Flora*, vol. 7, pt. 1, p. 312 (1824). *Osmunda cervina* L., *Sp. pl.*, vol. 2, p. 1065 (1753). *Polybotrya cervina* Kaulf., *Enum. Fil.*, p. 55 (1824).— Juan Griego trail, alt. 450 m., *Johnston*, no. 152, July 31. Tropical America.

TECTARIA Cav.

T. HERACLEIFOLIA (Willd.) Underw., *Bull. Torr. bot. club*, vol. 33, p. 200 (1906). *Aspidium heracleifolium* Willd., *Sp. pl.*, vol. 5, p. 217

(1810). *Aspidium trifoliatum* of authors, in part, not *Polypodium trifoliatum* L., based on Plumier's plate 148, see Underw., *l. c.*, p. 199-200.—El Valle, *Miller & Johnston*, no. 168, Aug. 2. Reported by Urb. (*Symb. Ant.*, vol. 4, p. 23), under the name of *Aspidium trifoliatum*, as occurring upon Margarita Island, his determination being based upon some of Miller & Johnston's material of 1901. Tropical America generally.

T. PLANTAGINEA (Jacq.) Maxon, *Contrib. U. S. nat. herb.*, vol. 10, p. 494 (1908). *Polypodium plantagineum* Jacq., *Coll. bot.*, vol. 2, p. 104, pl. 3, fig. 1 (1788). *Aspidium plantagineum* Griseb., *Abh. kön. Gesellsch. Wiss. Göttingen*, vol. 7, p. 286 (1857).—Juan Griego trail, alt. 500 m., *Johnston*, no. 148, July 31. Tropical America. Variable.

T. PURDIAEI (Jenman) Maxon, *Contrib. U. S. nat. herb.*, vol. 10, p. 494 (1908). *Aspidium Purdiaei* Jenman, *Gard. chron.*, ser. 3, vol. 22, p. 282 (1897). *Nephrodium Sherringiae* Jenman, *Journ. bot.*, vol. 25, p. 99 (1887), not *N. Sherringii* Jenman (1879). *Aspidium psammisorum* C. Chr., *Ind. Fil.*, p. 89 (1905).—El Valle, *Miller & Johnston*, no. 158, Aug. 10; Juan Griego trail, alt. 450 m., *Johnston*, no. 173, July 31. Known also from Trinidad.

OLEANDRA Cav.

O. NODOSA (Willd.) Presl, *Tent. Pterid.*, p. 78 (1836). *Aspidium nodosum* Willd., *Sp. pl.*, vol. 5, p. 211 (1810).—Juan Griego trail, alt. 300 m., *Johnston*, no. 189, July 29. American tropics. Ascribed also to Africa.

DENNSTAEDTIA Bernh.

D. ORDINATA (Kaulf.) Moore, *Ind. Fil.*, p. 306 (1861). *Dicksonia ordinata* Kaulf., *Enum. Fil.*, p. 226 (1824).—El Valle, *Miller & Johnston*, no. 160, Aug. 16; Juan Griego trail, alt. 450 m., *Johnston*, no. 185, July 29. Widely distributed in tropical America.

NEPHROLEPIS Schott.

[N. EXALTATA (L.) Schott, *Gen. Fil.*, pl. 3 (1834). *Polypodium exaltatum* L., *Syst. nat.*, ed. 10, vol. 2, p. 1326 (1759).—Referred by Urban, *Symb. Ant.*, vol. 4, p. 27, to Margarita.]

N. PECTINATA (Willd.) Schott, *Gen. Fil.*, under pl. 3 (1854). *Aspidium pectinatum* Willd., *Sp. pl.*, vol. 5, p. 223 (1810).—San Juan Mt., alt. 790 m., *Johnston*, no. 149, July 16. Tropics.

N. RIVULARIS (Vahl) Mett. ex Krug in Engl., Bot. jahrb., vol. 24, p. 122 (1897). *Polypodium rivulare* Vahl, Ecl. Am., vol. 3, p. 51 (1807). *Aspidium sesquipedale* Willd., Sp. pl., vol. 5, p. 230 (1810). *Nephrolepis sesquipedalis* Presl, Tent. Pterid., p. 79 (1836).—El Valle, Miller & Johnston, no. 167, Aug. 2; Juan Griego trail, alt. 450 m., Johnston, no. 163, July 22. Tropical America.

HYMENOPHYLLACEAE.

HYMENOPHYLLUM J. E. Sm.

H. POLYANTHOS Sw. in Schrad., Journ. 1800, pt. 2, p. 102 (1801). *Trichomanes polyanthos* Sw., Prod. veg. Ind. Occ., p. 137 (1788).—El Valle, Miller & Johnston, no. 157, July 31; Juan Griego trail, alt. 500 m., Johnston, no. 165, July 2. Porto Rico: Urban, Symb. Ant., vol. 4, p. 8. Widespread in the tropics, the typical form being West Indian.

H. CILIATUM Sw. in Schrad., Journ. bot., 1800, pt. 2, p. 100 (1801) et Fl. Ind. Occ., vol. 3, p. 1753 (1806).—This species is reported by Urban (Symb. Ant., vol. 4, p. 9) as occurring on Margarita, this being his determination of Miller & Johnston's material of 1901. The specimen in question may possibly be referable, however, to *Trichomanes*.

H. KOHAUTIANUM Presl, Hymenoph., p. 32 and p. 56 (1843). Referred by Urban to Margarita. See note on preceding species.

TRICHOMANES L.

T. ALATUM Sw. in Schrad., Journ. bot., 1800, pt. 2, p. 97 (1801).—Rio Asuncion, alt. 450 m., Johnston, no. 145, July 29. Tropical America: the type from Jamaica. Variable.

T. CRISPUM L., Sp. pl., vol. 2, p. 1097 (1753).—San Juan Mt., alt. 600 m., Johnston, no. 171, July 2. Tropical America.

T. MEMBRANACEUM L., Sp. pl., vol. 2, p. 1097 (1753).—Juan Griego trail, alt. 450 m., Johnston, no. 15, Aug. 12–15. Tropical America.

T. POLYPODIOIDES L., Sp. pl., vol. 2, p. 1098 (1753). *T. sinuosum* Rich. ex Willd., Sp. pl., vol. 5, p. 502 (1810); Hook. & Grev., Ic. Fil., vol. 1, pl. 13 (1831).—Rio Asuncion, alt. 450 m., Johnston, no. 175, Aug. 12–15. Tropical America.

LYCOPODIACEAE.

LYCOPODIUM L.

L. FUNIFORME Bory in Brongn., Vég. foss., vol. 2, p. 10 (1837); Spring, Mém. acad. Brux., vol. 15, pt. 6, p. 50 (1842), vol. 24, p. 22 (1849).—San Juan Mt., alt. 600 m., July 2, *Johnston*, no. 179. Tropical America; commonest in the West Indies.

L. TAXIFOLIUM Sw., Prod. veg. Ind. Occ., p. 138 (1788).—San Juan Mt., alt. 600 m., *Johnston*, no. 156, July 2. Tropical America.

SPERMATOPHYTA.

HYDROCHARITACEAE.

THALASSIA Banks.

T. TESTUDINUM Kon. in Kon. & Sims, Ann. bot., vol. 2, p. 96 (1806); Griseb., Fl. Brit. W. Ind., p. 507.—Juan Griego, *Ernst*. Jamaica and Caribbean Is.

GRAMINEAE.

ANTHEPHORA Schreb.

A. HERMAPHRODITA (L.) Ktze., Rev. gen., vol. 2, p. 759 (1891); Urb., Symb. Ant., vol. 4, p. 80. *Tripsacum hermaphroditum* L., Syst. nat., ed. 10, vol. 2, p. 1261 (1759). *A. elegans* Schreb., Besch. Gräs., vol. 2, p. 105, pl. 44 (1810).—El Valle, *Miller & Johnston*, no. 173, July 18. Venezuela: near Villa del Pao, HBK. Nov. gen. et sp. vol. 1, p. 116; Porto Rico: Urban, *l. c.* Widely distributed in tropical America.

CENCHRUS L.

C. ECHINATUS L., Sp. pl., vol. 2, p. 1050 (1753); Griseb., Fl. Brit. W. Ind., p. 556; Mart., Fl. Bras., vol. 2, pt. 2, pl. 43; Cav., Ic. pl., p. 462.—Santa Ana, *Ernst*. Venezuela: near Cumaná, HBK. Nov. gen. et sp., vol. 1, p. 114; Loeffling, Reise nach den spanischen Ländern, 152–153. Widely distributed in tropical countries.

C. VIRIDIS Spreng., Syst., vol. 1, p. 301 (1825); Doell in Mart. Fl. Bras., vol. 2, pt. 2, p. 309; Urb., Symb. Ant., vol. 4, p. 97.—El Valle, *Miller & Johnston*, no. 186 and 179. Tropical America.

DACTYLOCTENIUM Willd.

D. AEGYPTIUM (L.) Richter, Pl. Eu., vol. 1, p. 68 (1890); Urb., Symb. Ant., vol. 4, p. 104. *Cynosurus aegyptius* L., Sp. pl., p. 72 (1753). *Eleusine aegyptia* Desf., Fl. Atl., vol. 1, p. 85 (1798). *D. aegyptiacum* Willd., Enum hort. Berol., p. 1029 (1809).—El Valle, *Miller & Johnston*, no. 174, July 8. Widely distributed in tropical countries.

ERAGROSTIS Host.

E. CILIARIS (L.) Link, Hort. Berol., vol. 1, p. 192 (1827); Griseb., Fl. Brit. W. Ind., p. 532; Doell in Mart., Fl. Bras., vol. 2, pt. 3, p. 155; Urb., Symb. Ant., vol. 4, p. 108. *Poa ciliaris* L., Syst. nat., ed. 10, vol. 2, p. 875 (1759).—El Valle, *Miller & Johnston*, no. 175, Aug. 15. Venezuela: Ernst in Seem., Journ. bot., vol. 5, p. 295 (1867). Widely distributed in tropical countries.

GYNERIUM H. & B.

G. SAGITTATUM (Aubl.) Beauv., Agrost., p. 138 (1812); Urb., Symb. Ant., vol. 4, p. 105. *Saccharum sagittatum* Aubl., Pl. Guian., vol. 1, p. 50 (1775). *G. saccharoides* H. & B., Pl. Aequin., vol. 2, p. 112, pl. 115 (1809).—El Valle, *Miller & Johnston*, no. 193, July 30. Venezuela: near Cumaná, HBK. Nov. gen. et sp., vol. 1, p. 149. Widely distributed from Mexico and Cuba to Brazil.

ICHNANTHUS Beauv.

I. PALLENS (Sw.) Munro ex Benth., Fl. Hongk., p. 414 (1861); Doell in Mart., Fl. Bras., vol. 2, pt. 2, p. 290; Urb., Symb. Ant., vol. 4, p. 94. *Panicum pallens* Sw., Prod. veg. Ind. Occ., p. 23 (1788); Steud., Gram., p. 93.—San Juan Mt., alt. 600 m., *Johnston*, no. 208, July 16. Venezuela: Ernst, Sobre la flora y fauna, p. 223. American tropics and East Indies.

LEPTOCHLOA Beauv.

L. FILIFORMIS (Lam.) Beauv., Agrost., p. 71 (1812); Doell in Mart., Fl. Bras., vol. 2, pt. 3, p. 93; Urb., Symb. Ant., vol. 4, p. 104. *Festuca filiformis* Lam., Ill., vol. 1, p. 191 (1791). *L. mucronata* Kth., Rev. Gram., vol. 1, p. 91 (1829).—El Valle, *Miller & Johnston*, no. 16, July 30. Venezuela: Ernst in Seem., Journ. bot., vol. 5, p. 295 (1867) as *L. mucronata*. Distributed generally in tropical countries.

L. VIRGATA (L.) Beauv., *Agrost.*, p. 71 (1812); Griseb., *Fl. Brit. W. Ind.*, p. 538; Urb., *Symb. Ant.*, vol. 4, p. 105. *Cynosurus virgatus* L., *Syst. nat.*, ed. 10, vol. 2, p. 876 (1759).—El Valle, *Miller & Johnston*, no. 197, July 26. Widely distributed in tropical America.

OLYRA L.

O. LATIFOLIA L., *Syst. nat.*, ed. 10, vol. 2, p. 1261 (1759); Griseb., *Fl. Brit. W. Ind.*, p. 535.—Juan Griego trail, alt. 450 m., *Johnston*, no. 314, July 29. Distributed generally in tropical America.

PANICUM L.

P. DIVARICATUM L., *Syst. nat.*, ed. 10, vol. 2, p. 871 (1759); Griseb., *Fl. Brit. W. Ind.*, p. 551.—El Valle, *Miller & Johnston*, no. 184, July 30. Venezuela: near Maypurea, HBK., *Nov. gen. et sp.*, vol. 1, p. 101. Porto Rico: Urb., *Symb. Ant.*, vol. 4, p. 91. American tropics.

P. INSULARE (L.) G. F. W. Mey., *Prim. Esseq.*, p. 60 (1818); Urb., *Symb. Ant.*, vol. 4, p. 86. *Andropogon insulare* L., *Syst. nat.*, ed. 10, vol. 2, p. 1304 (1759).—El Valle, *Miller & Johnston*, no. 183, July 20. American tropics and subtropics.

P. LATIFOLIUM L., *Sp. pl.*, vol. 1, p. 58 (1753).—Juan Griego trail, alt. 450 m., *Johnston*, no. 196, Aug. 12–15. Venezuela: Ernst, *Sobre la flora y fauna*, p. 223. Distribution general in North America and West Indies.

P. MAXIMUM Jacq., *Ic. pl. rar.*, vol. 1, pl. 13 (1781); Griseb., *Fl. Brit. W. Ind.*, p. 549; Doell in Mart., *Fl. Bras.*, vol. 2, pt. 3, p. 202.—El Valle, *Miller & Johnston*, no. 177, July 7. Venezuela: Ernst, *Sobre la flora y fauna*, p. 223. Porto Rico: Urb., *Symb. Ant.*, vol. 4, p. 89. Distribution general in tropical America.

P. PANICULATUM (L.) Nash, *Bull. Torr. bot. club*, vol. 30, p. 381 (1903); Urb., *Symb. Ant.*, vol. 4, p. 90. *Paspalum paniculatum* L., *Syst. nat.*, ed. 10, vol. 2, p. 855 (1759).—El Valle, *Miller & Johnston*, no. 180, July 26. Distribution general in tropical America.

P. PROSTRATUM Lam., *Illustr.*, vol. 1, p. 171 (1791); Griseb., *Fl. Brit. W. Ind.*, p. 546.—El Valle, *Miller & Johnston*, no. 171, Aug. 6. Venezuela: Ernst, *Sobre la flora y fauna*, p. 223. Porto Rico: Urb., *Symb. Ant.*, vol. 4, p. 88. Widely distributed in tropical countries.

P. SANGUINALE L., var. *HORIZONTALIS* (Willd.) Schweinf., *Bull.*

herb. Boiss., vol. 2, app. 2, p. 18 (1894); Urb., Symb. Ant., vol. 4, p. 86. *Digitaria horizontalis* Willd., Enum., vol. 1, p. 92 (1809).—El Valle, *Miller & Johnston*, no. 185, July 10. Distribution general in tropics.

PASPALUM L.

P. CONJUGATUM Berg., Act. Helv., vol. 8, p. 129, pl. 8 (1772); Griseb., Fl. Brit. W. Ind., p. 541.—El Valle, *Miller & Johnston*, no. 178, July 26; Juan Griego trail, *Johnston*, no. 198, Aug. 12–15. Venezuela: near San Fernando de Atabapo and near Bordones, Cumaná, etc., HBK., Nov. gen. et sp., vol. 1, p. 91. Porto Rico: Urb., Symb. Ant., vol. 4, p. 81. Common in tropical countries.

P. COMPRESSUM (Sw.) Rasp., Ann. sci. nat., ser. 1, vol. 5, p. 301 (1825); Griseb., Fl. Brit. W. Ind., p. 541; Urb., Symb. Ant., vol. 4, p. 84. *Milium compressum* Sw., Prod. veg. Ind. Occ., p. 24 (1788). *Paspalum platycaulon* Poir., Encyc., vol. 5, p. 34 (1804).—Juan Griego trail, *Johnston*, no. 197, Aug. 12–15. Venezuela: Ernst, Sobre la flora y fauna, p. 223. Distribution general in tropical America.

PHARUS P. Br.

P. LATIFOLIUS L., Syst. nat., ed. 10, vol. 2, p. 1269 (1759); Griseb., Fl. Brit. W. Ind., p. 536; Urb., Symb. Ant., vol. 4, p. 99.—El Valle, *Miller & Johnston*, no. 170, Aug. 2; Juan Griego trail, alt. 400 m., *Johnston*, no. 200, Aug. 12–15. Venezuela: Ernst, Sobre la flora y fauna, p. 223. Distribution general in tropical America.

SACCHARUM L.

S. OFFICINARUM L., Sp. pl., vol. 1, p. 54 (1753); Griseb., Fl. Brit. W. Ind., p. 561.—Cultivated in El Valle and in Asuncion.

SETARIA Beauv.

S. GLAUCA (L.) Beauv., Agrost., p. 51 (1812); Urb., Symb. Ant., vol. 4, p. 95. *Panicum glaucum* L., Sp. pl., vol. 1, p. 56 (1753). *Chaetochloa glauca* Scribn., U. S. dept. agr., div. agrost., bull. no. 4, p. 39 (1897).—El Valle, *Miller & Johnston*, no. 181, July 26. Venezuela: Ernst, Sobre la flora y fauna, p. 223. Tropical countries.

SPOROBOLUS R. Br.

S. DOMINGENSIS (Trin.) Kunth, Enum. pl., vol. 1, p. 214 (1833); Griseb., Fl. Brit. W. Ind., p. 533. *Vilfa domingensis* Trin. in Spreng.,

Neue Entdeck., vol. 2, p. 59 (1821).— Pt. Piedras, *Johnston*, no. 325, Aug. 6, and at Laguna Chica, *Johnston*, no. 327, Aug. 10, a much reduced form. Venezuela: Ernst, *Sobra la flora y fauna*, p. 223. Jamaica and Haiti.

S. VIRGINICUS (L.) Kunth, *Rev. Gram.*, vol. 1, p. 67 (1829); Griseb., *Fl. Brit. W. Ind.*, p. 533. *Agrostis virginica* L., *Sp. pl.*, vol. 1, p. 63 (1753).— Pt. Mosquito, *Johnston*, no. 326, Aug. 10. Venezuela: Tortuga, *Ernst*; Los Roques, *Ernst*. Widely distributed in tropical countries.

TRAGUS Haller.

T. RACEMOSUS (L.) Scop., *Introd.*, p. 73 (1777); Doell in *Mart.*, *Fl. Bras.*, vol. 2, pt. 2, p. 122. *Cenchrus racemosus* L., *Sp. pl.*, vol. 2, p. 1049 (1753).— Reported by Urban (*Symb. Ant.*, vol. 4, p. 80) as occurring on Margarita, a determination based on Miller & Johnston's material of 1901.

ZEA L.

Z. MAYS L., *Sp. pl.*, vol. 2, p. 971 (1753); Griseb., *Fl. Brit. W. Ind.*, p. 561; Doell in *Mart.*, *Fl. Bras.*, vol. 2, pt. 2, p. 31.— Cultivated in El Valle and Asuncion.

CYPERACEAE.

CYPERUS L.

C. DISTANS L. f., *Suppl.*, p. 103 (1781); Griseb., *Fl. Brit. W. Ind.*, p. 565; Jacq., *Ic. rar.*, vol. 2, pl. 299; Nees in *Mart.*, *Fl. Bras.*, vol. 2, pt. 1, p. 40; Urb., *Symb. Ant.*, vol. 4, p. 112.— El Valle, *Miller & Johnston*, no. 182, Aug. 15. Venezuela: Ernst, *Sobre la flora y fauna*, p. 223. Widely distributed in tropical countries.

DICHROMENA Michx.

D. CILIATA Vahl, *Enum.*, vol. 2, p. 240 (1806); Urb., *Symb. Ant.*, vol. 4, p. 121. *Rhynchospora Vahliana* Griseb., *Fl. Brit. W. Ind.*, p. 577 (1864).— El Valle, *Miller & Johnston*, no. 189, July 16; San Juan Mt., alt. 500 m., *Johnston*, no. 201, July 2. Venezuela: Ernst, *Sobre la flora y fauna*, p. 223. Distribution general from the Southern United States to Brazil.

ELEOCHARIS R. Br.

E. CAPITATA (L.) R. Br., Prod., p. 225 (1810); Urb., Symb. Ant., vol. 4, p. 117 (Heleocharis). *Scirpus capitatus* L., Sp. pl., vol. 1, p. 48 (1753); Griseb., Fl. Brit. W. Ind., p. 570.—El Valle, *Miller & Johnston*, no. 191, July 28, and *Johnston*, no. 204, July 21, alt. 300 m., near small stream on the North Hill. Venezuela: Ernst in Seem., Journ. bot., 1867, p. 290–296. Widely distributed in tropical countries.

FIMBRISTYLIS Vahl.

F. AUTUMNALIS (L.) Roem. & Schult., Syst., vol. 2, p. 97 (1817). *Scirpus autumnalis* L., Mant., vol. 2, p. 180 (1771); Griseb., Fl. Brit. W. Ind., p. 571.—San Juan Mt., alt. 650 m., *Johnston*, no. 311, Aug. 28. Venezuela: Ernst, *Sobra la flora y fauna*, p. 226. Widely distributed from the United States to Brazil.

F. FERRUGINEA (L.) Vahl, Enum., vol. 2, p. 291 (1806); Urb., Symb. Ant., vol. 4, p. 118. *Scirpus ferrugineus* L., Sp. pl., ed. 2, vol. 1, p. 74 (1762).—El Valle, *Miller & Johnston*, no. 188, July 28, and *Johnston*, no. 205, July 21. Venezuela: Ernst, *Sobre la flora y fauna*, p. 226. Further distribution, tropical and subtropical countries.

FUIRENA Rottb.

F. UMBELLATA Rottb., Desc. et ic. pl., p. 70, pl. 19, fig. 3 (1773); Griseb., Fl. Brit. W. Ind., p. 573; Nees in Mart., Fl. Bras., vol. 2, pt. 1, p. 107; Urb., Symb. Ant., vol. 4, p. 120.—El Valle, *Miller & Johnston*, no. 172, July 24. Venezuela: Ernst in *Vargasia*, 1868–69, p. 182. Common in all tropical countries.

MARISCUS Gaertn.

M. LIGULARIS (L.) Urb., Symb. Ant., vol. 2, p. 165 (1900). *Cyperus ligularis* L., Amoen. acad., vol. 5, p. 391 (1759) et Sp. pl., ed. 2, vol. 1, p. 70.—El Valle, *Miller & Johnston*, no. 194, July 27. Venezuela: Ernst in Seem., Journ. bot., 1867, p. 290–296. Tropical America and Africa.

PYCREUS Beauv.

P. ODORATUS (L.) Urb., Symb. Ant., vol. 2, p. 164 (1900) et vol. 4, p. 110. *Cyperus odoratus* L., Sp. pl., vol. 1, p. 46 (1753), in part.—El Valle, *Miller & Johnston*, no. 195, Aug. 15. Distribution general in tropical countries.

RYNCHOSPORA Vahl.

R. BARBATA (Vahl) Kunth, Enum. pl., vol. 2, p. 290 (1837); Griseb., Fl. Brit. W. Ind., p. 574. *Schoenus barbatus* Vahl, Ecl., vol. 2, p. 4 (1798).—San Juan Mt., alt. 600 m., *Johnston*, no. 207, Aug. 28. Venezuela: Ernst, Sobre la flora y fauna, p. 226. Distribution general in tropical America.

R. GRACILIS Vahl, Enum., vol. 2, p. 234 (1806); Griseb., Fl. Brit. W. Ind., p. 574.—San Juan Mt., alt. 600 m., *Johnston*, no. 310, July 11. Venezuela: Ernst, Sobre la flora y fauna, p. 226.

HEMICARPHA Nees & Arn.

H. MICRANTHA (Vahl) Britton, Bull. Torr. bot. club, vol. 15, p. 104 (1888). *Scirpus micranthus* Vahl, Enum., vol. 2, p. 254 (1806).—El Valle, *Miller & Johnston*, no. 196, Aug. 10. Venezuela: Ernst, Sobre la flora y fauna, p. 226. Distribution general in tropical America.

SCLERIA Berg.

S. BRACTEATA Cav., Ic., vol. 5, p. 34, pl. 457 (1799); Griseb., Fl. Brit. W. Ind., p. 579. *Macrolomia bracteata* Schrad. ex Nees in Mart., Fl. Bras., vol. 2, pt. 1, p. 182 (1842).—El Valle, *Miller & Johnston*, no. 187, July 28; San Juan Mt., alt. 700 m., *Johnston*, no. 203, July 16. Venezuela: Ernst, Sobre la flora y fauna, p. 226. Distribution general in tropical America.

S. HIRTELLA Sw., Prod. veg. Ind. Occ., p. 19 (1788); Griseb., Fl. Brit. W. Ind., p. 579.—San Juan Mt., alt. 600 m., *Johnston*, no. 312, Aug. 28. Venezuela: in woods of Javite, HBK., Nov. gen. et sp., vol. 1, p. 232. Distribution general in tropical America.

S. LITHOSPERMA (L.) Sw., Prod. veg. Ind. Occ., p. 18 (1788). *Scirpus lithospermus* L., Sp. pl., vol. 1, p. 51 (1753).—San Juan Mt., alt., 600 m., *Johnston*, no. 328, Aug. 28. Venezuela: Ernst, Sobre la flora y fauna, p. 226. Distribution general in tropical countries.

PALMAE.

ACROCOMIA Mart.

A. SCLEROCARPA Mart., Hist. nat. Palm., vol. 2, p. 66, pls. 56, 57, 100, fig. 5 (1823–50); Griseb., Fl. Brit. W. Ind., p. 521.—En route El Valle to Juan Griego, alt. 400 m., *Johnston*, no. 221, July 29. Jamaica, Grenada, Trinidad, Guiana, and Brazil.

BACTRIS Jacq.

B. FALCATA Johnston, Proc. Amer. acad. arts and sci., vol. 40, p. 683 (1905).—Rio Asuncion, in heavy woods near Juan Griego trail, *Johnston*, no. 220, July 16.

Cocos L.

C. NUCIFERA L., Sp. pl., vol. 2, p. 1188 (1753); Griseb., Fl. Brit. W. Ind., p. 522; Desc., Ant., vol. 1, pl. 21.—Observed by Loeffling, 1754, at Cumaná. Widely distributed in tropical countries. There is a coconut grove extending from El Valle to Porlamar, and another large one in the valley of Asuncion.

PHOENIX L.

P. DACTYLIFERA L., Sp. pl., vol. 2, p. 1188 (1753); Mart., Hist. nat. Palm. vol. 3, p. 257, pl. 120; Cook, Bull. Torr. bot. club, vol. 28, p. 528.—Cultivated in El Valle. Widely grown in tropical countries.

OREODOXA Willd.

O. OLERACEA Mart., Hist. nat. Palm., vol. 3, p. 166, pl. 156, figs. 1, 2 (1836–1850); Griseb., Fl. Brit. W. Ind., p. 517.—San Juan Mt., alt. 600 m., *Johnston*, no. 222, July 11. Widely distributed in West Indies.

Palma Carana: "eine kleine Palme mit fächerförmigen Blättern, zur Zeit meines Besuches der Insel, ohne Blüthen und Früchte. Trotz der Aenlichkeit des Namens glaube ich nicht, dass es *Mauritia Carana* Wall. sein könne" (Ernst). This may well be *Acrocomia sclerocarpa* above mentioned. An unidentified specimen, no. 347 of *Johnston*, July 29, alt. 500 m., on the Juan Griego trail is different from any of the above.

ARACEAE.

ANTHURIUM Schott.

A. HOOKERI Kunth, Enum. pl., vol. 3, p. 74 (1841); Schott, Ic. Aroid., p. 15–17.—San Juan Mt., alt. 400 m., *Johnston*, no. 297, July 11. Venezuela: Ernst, Sobre la flora y fauna, p. 226. Distribution general in the West Indies.

A. SCANDENS (Aubl.) Engl., in Mart., Fl. Bras., vol. 3, pt. 2, p. 78 (1878). *Dracontium scandens* Aubl., Guian., vol. 2, p. 836 (1775).—South Hill, El Valle, *Johnston*, no. 14, July 18. Found on the branches of trees. Venezuela: Ernst, Sobre la flora y fauna, p. 226. Brazil.

DIEFFENBACHIA Schott.

D. SEGUINE (Jacq.) Schott, Melet., vol. 1, p. 20 (1832); Griseb., Fl. Brit. W. Ind., p. 509. *Arum seguine* Jacq., Enum., p. 31 (1760).—Rio Asuncion, alt. 400 m., *Johnston*, no. 214, Aug. 12–15. Venezuela: Ernst, Sobre la flora y fauna, p. 226. Jamaica, French Ids., Guiana.

PHILODENDRON Schott.

P. EXIMIUM Schott, Oestr. bot. Wochenbl., vol. 3, p. 378 (1853).—Juan Griego trail, alt. 450 m., *Johnston*, no. 305, Aug. 12–15. Described from Brazil. Ernst reported an undetermined species of *Philodendron* from Margarita.

BROMELIACEAE.

AECHMEA R. & P.

A. FENDLERI André, Bromel. Andreanae, p. 13 (1890); Mez in DC., Monog. Phanerog., vol. 9, p. 223 (1896).—South Hill, El Valle, alt. 335 m., *Johnston*, no. 335; also on the mountain ridge from San Juan Mt. to Juan Griego trail, alt. 500–700 m., *Johnston*, no. 209, July 2. Venezuela: Ernst, Sobre la flora y fauna, p. 226; between Petaquira and Colonia Tovar, *Fendler*, no. 2454, according to Mez, *l. c.*

ANANAS Adans.

A. SATIVUS (Lindl.) Schult. f., Syst., vol. 8, p. 1283 (1830); Rheede, Hort. Mal., vol. 11, pls. 1, 2. *Ananassa sativa* Lindl. Bot. Reg. vol. 13, under pl. 1068 (1827); Griseb. Fl. Brit. W. Ind., p. 591.—Cultivated at El Valle, Tacarigua. Distribution general in the West Indies and South America.

BROMELIA L.

B. PINGVIN L., Sp. pl., vol. 1, p. 285 (1753); Griseb., Fl. Brit. W. Ind., p. 591; Red., Lil., vol. 7, p. 396.—El Valle, *Miller & Johnston*, no. 247, July 26, and *Johnston*, no. 211, July 6. Venezuela: Ernst, Sobre la flora y fauna, p. 226. Distribution general from Cuba to Guiana and Colombia.

CHEVALIERIA Gaudich.

C. SP.— Juan Griego, *Ernst*.

GLOMEROPITCAIRNIA Mez.

G. ERECTIFLORA Mez, Bull. herb. Boiss., ser. 2, vol. 5, p. 233 (1905).
— San Juan Mt., alt. 750 m., *Johnston*, no. 303. Endemic.

GRAVISIA Mez.

G. AQUILEGA (Salisb.) Mez in Mart., Fl. Bras., vol. 3, pt. 3, p. 300 (1892), nomen, et in DC., Monog. Phanerog., vol. 9, p. 173 (1896). *Bromelia aquilega* Salisb., Parad., pl. 40 (1805). *Aechmea aquilega* Griseb., Fl. Brit. W. Ind., p. 592 (1864).— South Hill, El Valle, alt. 335 m., *Johnston*, no. 302, July 10. Venezuela: Ernst, Sobre la flora y fauna, p. 226; Angostura, *Fendler*, no. 2455. Distribution Tobago, Trinidad, and South America.

GUZMANIA R. & P.

G. LINGULATA (L.) Mez in DC., Monog. Phanerog., vol. 9, p. 899 (1896). *Tillandsia lingulata* L., Sp. pl., vol. 1, p. 286 (1753).— Juan Griego trail, alt. 400–500 m., *Johnston*, no. 301, July 2. Venezuela: Ernst, Sobre la flora y fauna, p. 226. Tropical America.

G. TRICOLOR R. & P., Fl. Per., vol. 3, p. 38, pl. 261 (1802); Griseb., Fl. Brit. W. Ind., p. 598.— South Hill, El Valle, alt. 300 m., *Johnston*, no. 295, Aug. 31. Distribution general from the West Indies to Venezuela and Peru.

THECOPHYLLUM André.

T. JOHNSTONEI Mez, Bull. herb. Boiss., ser. 2, vol. 4, p. 872 (1904).
— San Juan Mt., alt. 500 m., *Johnston*, no. 304, July 6. Endemic.

TILLANDSIA L.

T. LESCAILLEI Wright in Sauv., Fl. Cub., p. 167 (1873).— San Juan Mt., alt. 600 m., *Johnston*, no. 313, July 19. Venezuela: Ernst, Sobre la flora y fauna, p. 226. Cuba.

T. RECURVATA L., Sp. pl., ed. 2, vol. 1, p. 410 (1762); Griseb., Fl. Brit. W. Ind., p. 598. *Renalmia recurvata* L., Sp. pl., vol. 1, p. 287 (1753).— Santa Ana, *Ernst*; El Valle, *Johnston*, no. 219, July 8.

Venezuela: Cumaná, HBK., *Nov. gen. et sp.*, vol. 1, p. 291. Distribution general in tropical America.

T. UTRICULATA L., *Sp. pl.*, vol. 1, p. 286 (1753).—San Juan Mt., alt. 500 m., *Johnston*, no. 296, July 27. Venezuela: San Julian, *Robinson & Lyon*, July, 1900. The spike is much more crowded than in the typical form. Distribution general in the West Indies and Venezuela.

VRIESIA Lindl.

V. LONGEBRACTEATA Mez in DC., *Monog. Phanerog.*, vol. 9, p. 568 (1896).—Juan Griego trail, alt. 450–550 m., *Johnston*, no. 300, July 2. Venezuela: Ernst, *Sobre la flora y fauna*, p. 226; between Petaquirá and the sea, *Fendler*, no. 2449, acc. to Mez, *l. c.*

V. SCALARIS Morr., *Belg. Hort.*, vol. 29, p. 301 (1879), also vol. 30, p. 309, pl. 15 (1880).—San Juan Mt., *Johnston*, no. 294, July 16. Venezuela: Ernst, *Sobre la flora y fauna*, p. 226. Brazil.

WITTMACKIA Mez.

W. LINGULATA (L.) Mez in Mart., *Fl. Bras.*, vol. 3, pt. 3, p. 275 (1892). *Bromelia lingulata* L., *Sp. pl.*, vol. 1, p. 285 (1753).—South Hill, alt. 300 m., *Johnston*, no. 294, July 18. Venezuela: Ernst, *Sobre la flora y fauna*, p. 226. West Indies.

COMMELINACEAE.

ATHYROCARPUS Schlecht.

A. PERSICARIFOLIUS (Delile) Hemsl., *Biol. Cent.-Am. bot.*, vol. 3, p. 386 (1885). *Commelina persicariaefolia* Delile in Red., *Lil.*, vol. 8, pl. 472 (1816).—Rio Asuncion, alt. 400 m., *Johnston*, no. 309, Aug. 12–15. Venezuela: Ernst, *Sobre la flora y fauna*, p. 226. Distribution general in tropical America.

COMMELINA L.

C. ERECTA L., *Sp. pl.*, vol. 1, p. 41 (1753); Dill., *Elth.*, vol. 1, pl. 77.—El Valle, *Miller & Johnston*, no. 40, July 8. Venezuela: Ernst, *Sobre la flora y fauna*, p. 226. Common in the southern U. S.

C. NUDIFLORA L., *Sp. pl.*, vol. 1, p. 41 (1753); Rchb., *Hort. bot.*, vol. 2, pl. 136. *C. cayennensis* Rich., *Act. soc. hist. nat. Par.*, vol. 1, p. 106 (1792).—Santa Ana, *Ernst* (reported as *C. cayennensis* Rich.) Tropical countries.

LILIACEAE.

ALOË L.

A. VERA L., Sp. pl., vol. 1, p. 320 (1753). *A. vulgaris* Lam., Encycl., vol. 1, p. 86 (1783); DC., Pl. grasses, pl. 27; Griseb., Fl. Brit. W. Ind., p. 582.— Juan Griego, *Ernst*. Naturalized and cultivated in the West Indies.

SMILAX L.

S. CUMANENSIS H. & B. ex Willd., Sp. pl., vol. 4, p. 783 (1806).— San Juan Mt., alt. 600 m., *Johnston*, no. 134, July 19. Venezuela: near Cumaná and Bordones, HBK., Nov. gen. et sp., vol. 1, p. 272.

AMARYLLIDACEAE.

AGAVE L.

A. AMERICANA L., Sp. pl., vol. 1, p. 323 (1753); Griseb., Fl. Brit. W. Ind., p. 582; Revue horticole, 1862, p. 291.— Santa Ana, *Ernst*. Distribution general in West Indies and Mexico.

FURCRAEA Vent.

F. FOETIDA (L.) Haw., Syn. pl. succ., p. 73 (1812). *Agave foetida* L., Sp. pl., vol. 1, p. 323 (1753); Jacq., Ic. pl. rar., vol. 2, pl. 379. *F. gigantea* Vent., Bull. soc. philom., vol. 1, p. 65 (1793). *Fourcroya gigantea* Griseb., Fl. Brit. W. Ind., p. 582 (1864).— Santa Ana, *Ernst*. Distribution from the French Ids. to Brazil.

HYMENOCALLIS Salisb.

H. CARIBAEA (L.) Herb., Bot. reg., vol. 7, app., p. 44 (1821). *Pancreatium caribaeum* L., Sp. pl., vol. 1, p. 291 (1753); Griseb., Fl. Brit. W. Ind., p. 583.— Juan Griego trail, alt. 300 m., *Johnston*, no. 268, Aug. 14. Venezuela: Ernst, Sobre la flora y fauna, p. 226. West Indies, Guiana.

ZEPHYRANTHES Herb.

Z. SP.— Bat Cave Peak, El Valle, *Johnston*, no. 260, July 4.

DIOSCOREACEAE.

DIOSCOREA L.

D. ALATA L., Sp. pl., vol. 2, p. 1033 (1753); Griseb., Fl. Brit. W. Ind., p. 587.—Cultivated according to Ernst. Distribution general in the West Indies.

D. POLYGONOIDES H. & B. ex Willd., Sp. pl., vol. 4, p. 795 (1806).—Juan Griego trail, alt. 450 m., *Johnston*, no. 320, Aug. 12–15. Venezuela: between Carichana and Rio Meta, HBK., Nov. gen. et sp., vol. 1, p. 274.

IRIDACEAE.

TRIMEZA Salisb.

T. SP.—San Juan Mt., alt. 600 m., *Johnston*, no. 138, July 11.

MUSACEAE.

HELICONIA L.

H. BIHAI L., Mant., vol. 2, p. 211 (1771); Griggs, Bull. Torr. bot. club, vol. 30, p. 656. *Musa Bihai* L., Sp. pl., vol. 2, p. 1043 (1753).—San Juan Mt., alt. 400 m. Venezuela: San Julian, *Robinson & Lyon*, July 20, 1900. Common in tropical America.

H. PSITTACORUM L. f., Suppl., p. 158 (1781); Griseb., Fl. Brit. W. Ind., p. 600.—El Valle, *Miller & Johnston*, no. 3, July 25; Rio Asuncion, alt. 450 m., *Johnston*, no. 210, Aug. 12–15. Venezuela: in Valle Caripe, HBK., Nov. gen. et sp., vol. 1, p. 326. West Indies, Venezuela to Brazil.

MUSA L.

M. PARADISIACA L., Sp. pl., vol. 2, p. 1043 (1753), subsp. *NORMALIS* (O. Ktze.) Urb., Symb. Ant., vol. 4, p. 156 (1903). *M. sapientum* Griseb. Fl. Brit. W. Ind., p. 599. Subsp. *SAPIENTUM* (L.) Urb., Symb. Ant., vol. 4, p. 156 (1903). *M. paradisiaca* Griseb., Fl. Brit. W. Ind., p. 599.—Cultivated. Common in tropical countries.

ZINGIBERACEAE.

COSTUS L.

C. GLABRATUS Sw., Prod. veg. Ind. Occ., p. 11 (1788); Griseb., Fl. Brit. W. Ind., p. 602.—Juan Griego trail, alt. 450 m., *Miller &*

Johnston, no. 213, Aug. 12-15. Venezuela: Ernst, *Sobre la flora y fauna*, p. 226. Further distribution St. Lucia, Haiti, Guiana.

RENEALMIA L.

R. LUTEA Johnston, *Proc. Amer. acad. arts and sci.*, vol. 40, p. 683 (1905).—Rio Asuncion, in damp woods along the Juan Griego trail. *Johnston*, no. 298, Aug. 12-15. Endemic. PLATE 26, fig. 1.

MARANTACEAE.

CALATHEA G. F. W. Mey.

C. LUTEA (Aubl.) G. F. W. Mey., *Prim. Fl. Esseq.*, p. 10 (1818). *Maranta lutea* Aubl., *Guian.*, vol. 1, p. 4 (1775). *C. discolor* G. F. W. Mey., *l. c.*, p. 7 (1818); Griseb., *Fl. Brit. W. Ind.*, p. 604.—Juan Griego trail, alt. 450 m., *Johnston*, no. 212, July 29. Venezuela: Ernst, *Sobre la flora y fauna*, p. 226. Further distribution, Dominica, Trinidad, Guiana, Colombia.

MARANTA L.

M. ARUNDINACEA L., *Sp. pl.*, vol. 1, p. 2 (1753); Griseb., *Fl. Brit. W. Ind.*, p. 605.—Rio Asuncion, alt. 400 m., *Johnston*, no. 206 Aug. 12-15. Distribution general in tropical America.

STROMANTHE Sond.

S. TONCKAT Eichl., *Berl. phys. Abh.*, p. 80 (1884). *Maranta tonckat* Griseb., *Fl. Brit. W. Ind.*, p. 605 (1864).—San Juan Mt., alt. 400 m., *Johnston*, no. 202, July 16. Venezuela: Ernst, *Sobre la flora y fauna*, p. 226. Further distribution, Trinidad, tropical South America.

ORCHIDACEAE.

DICHAEA Lindl.

D. GRAMINOIDES (Sw.) Lindl., *Gen. et sp. Orch.*, p. 209 (1833). *Epidendrum graminoides* Sw., *Prod. veg. Ind. Occ.*, p. 125 (1788). *D. graminea* Griseb., *Fl. Brit. W. Ind.*, p. 625 (1864).—San Juan Mt., alt. 600 m., *Johnston*, no. 242, July 16. Venezuela: Caracas, Lindl., *l. c.*, also *Bonpl.*, vol. 2, p. 15, and *Ann. bot.*, vol. 6, p. 823. Distribution general in tropical America.

D. MURICATA (Sw.) Lindl., Gen. et sp. Orch., p. 209 (1833); Griseb., Fl. Brit. W. Ind., p. 624. *Cymbidium muricatum* Sw., Act. Ups., vol. 6, p. 71 (1799).—El Valle to Juan Griego, alt. 450 m., *Johnston*, no. 224, Aug. 12–15. Venezuela: according to Lindl., *l. c.* Distribution general in the West Indies.

ELLEANTHUS Presl.

E. ATTENUATUS Johnston, Proc. Amer. acad. arts and sci., vol. 40, p. 684 (1905).—San Juan Mt., in wet woods at the summit, alt. 640 m., *Miller & Johnston*, no. 270, July 30, and *Johnston*, no. 233, July 6. Endemic. PLATE 26, fig. 2.

EPIDENDRUM L.

E. ANCEPS Jacq., Hist. Stirp. Am., p. 224, pl. 138 (1763). *E. fuscatum* Sm., Spic. bot., p. 21, pl. 23 (1791); Griseb., Fl. Brit. W. Ind., p. 617.—El Valle, on rocks of a dry river bed on the mountain side, *Miller & Johnston*, no. 269, July 29; Juan Griego trail, alt. 450 m., *Johnston*, no. 232, Aug. 12–15. Venezuela: Ernst, Sobre la flora y fauna, p. 226. Distribution general from Cuba to Guiana.

E. ATROPURPUREUM Willd., Sp. pl., vol. 4, p. 115 (1805).—El Valle, *Miller & Johnston*, no. 212, July 5; Bat Cave Peak, *Johnston*, no. 226, July 4. Found both in flower and in fruit. In 1901, this species was found only on North Hill growing on the tree-like cactus *Cereus eburneus*. In 1903, there was none in blossom in this place but on the cliffs above the entrance to Bat Cave, alt. about 300 m., the species was growing in abundance. West Indies.

E. COCHLEATUM L., Sp. pl., ed. 2, vol. 2, p. 1351 (1763); Griseb., Fl. Brit. W. Ind., p. 616.—San Juan Mt., alt. 400 m., *Johnston*, no. 229, July 3. Venezuela: Caracas, see Ann. bot., vol. 6, p. 359. Distribution general from Mexico to Venezuela.

E. GLOBOSUM Jacq. Enum. pl. Carib., p. 29 (1760); Griseb., Fl. Brit. W. Ind., p. 619.—San Juan Mt., alt. 400 m., *Johnston*, no. 230, July 11. Further distribution, Cuba to the French Ids.

E. JOHNSTONI Ames, Proc. Amer. acad. arts and sci., vol. 40, p. 684 (1905).—San Juan Mt., alt. 600 m., *Johnston*, no. 236, July 2. Endemic.

E. NOCTURNUM Jacq., Enum. pl. Carib., p. 29 (1760); Griseb., Fl. Brit. W. Ind., p. 619.—San Juan Mt., alt. 650 m., *Johnston*, no.

228, July 6. Venezuela: Caracas, see Ann. bot., vol. 6, p. 404. Distribution general from Cuba to Guiana and Peru.

E. RIGIDUM Jacq., Enum. pl. Carib., p. 29 (1760); Griseb., Fl. Brit. W. Ind., p. 618.— Juan Griego trail, alt. 450 m., *Johnston*, no. 231, Aug. 12–15. Very few specimens found. Venezuela: Caracas, see Ann. bot., vol. 4, p. 400. Distribution general in tropical America.

E. SECUNDUM Jacq., Enum. pl. Carib., p. 29 (1760). *E. elongatum* Jacq., Ic. pl. rar., vol. 3, p. 17, pl. 604 (1786–1793); Griseb., Fl. Brit. W. Ind., p. 617.— San Juan Mt., alt. 700 m., *Johnston*, no. 227, July 6. Reclining on low shrubs of the mountain top, abundant; flowers pink. Distribution general from the French Ids. to Venezuela.

HUNTLEYA Batem.

H. SP.— San Juan Mt., alt. 500 m., *Johnston*, no. 239, July 2. Only three specimens found.

MAXILLARIA R. & P.

M. VIRGUNCULA Rchb. f., Bonplandia, vol. 2, p. 16 (1854).— San Juan Mt., alt. 500 m., *Johnston*, no. 240, July 2. Venezuela: Caracas, see Ann. bot., vol. 6, p. 522, and Xenia Orchid., vol. 1, p. 24, pl. 10.

ONCIDIUM Sw.

O. LURIDUM Lindl., Bot. Reg., pl. 727 (1823); Griseb., Fl. Brit. W. Ind., p. 632.— South Hill, El Valle, *Miller & Johnston*, no. 37, July 10; Tacarigua, alt. 300 m., *Johnston*, no. 306, Aug. 14. Very few flowering specimens. Venezuela: see Ann. bot., vol. 6, p. 781, and Bonpl., vol. 2, p. 13. Widely distributed from Cuba to Venezuela.

PELEXIA Poit.

P. ADNATA (Sw.) Spreng., Syst., vol. 3, p. 704 (1826); Urb., Symb. Ant., vol. 4, p. 164. *Satyrium adnatum* Sw., Prod. veg. Ind. Occ., p. 118 (1788).— El Valle, *Miller & Johnston*, no. 116, July 25; San Juan Mt. and Juan Griego trail, alt. 400–500 m., *Johnston*, no. 243, July 27. Common but very scattered in the damp woods of the mountain top. Further distribution, West Indies.

PLEUROTHALLIS R. Br.

P. RUSCIFOLIA (Jacq.) R. Br. in Ait., Hort. Kew., ed. 2, vol. 5, p. 211 (1813); Griseb., Fl. Brit. W. Ind., p. 608. *Epidendrum rusci-*

folium Jacq., Enum. pl. Carib., p. 29 (1760).— Juan Griego trail, alt. 450 m., *Johnston*, no. 225, Aug. 12–15. Very abundant, growing in clusters. Venezuela: Caracas, Ernst, Sobre la flora y fauna, p. 268. Distribution general from Cuba to Guiana and Peru.

P. sp. affinis P. platycauli Rehb. f.— Juan Griego trail, alt. 600 m., *Johnston*, no. 241, July 31.

P. JOHNSTONII Ames, Orchidaceae, vol. 2, p. 271 (1908).— San Juan Mt., alt. 600 m., *Johnston*, no. 238, July 16. Endemic.

P. sp. San Juan Mt., *Johnston*, no. 237, July 16.

P. sp. San Juan Mt., *Johnston*, no. 235, July 11.

P. sp. San Juan Mt., *Johnston*, no. 234, July 11.

PIPERACEAE.

PEPEROMIA R. & P.

P. GLABELLA (Sw.) A. Dietr., Sp. pl., vol. 1, p. 156 (1831); Griseb., Fl. Brit. W. Ind., p. 165. *Piper glabellum* Sw., Prod. veg. Ind. Occ., p. 16 (1788).— Bat Cave Peak, El Valle, alt. 300 m., *Johnston*, no. 12, July 4. Further distribution, Trinidad, Antigua, and Jamaica.

P. SCANDENS R. & P., Fl. Per., vol. 1, p. 32, pl. 51, fig. b (1798). *P. repens* HBK., Nov. gen. et sp., vol. 1, p. 65 (1815); Griseb., Fl. Brit. W. Ind., p. 165.— Santa Ana, Ernst (reported under the name *P. repens* HBK.); Rio Asuncion, *Johnston*, no. 13, Aug. 12–15. Abundant on the rocks of the rivulet. Widely distributed in tropical America.

P. VICTORIANA C. DC., var. *MARGARITANA* C. DC., Proc. Amer. acad. arts and sci., vol. 40, p. 685 (1905).— Bat Cave Peak, on the cliffs, alt. 300 m., *Johnston*, no. 18, July 4. Endemic.

PIPER L.

P. JOHNSTONI C. DC., Proc. Amer. acad. arts and sci., vol. 40, p. 685 (1905).— Juan Griego trail, alt. 500 m., *Johnston*, no. 19, July 22. Endemic.

P. MARGARITANUM C. DC., Proc. Amer. acad. arts and sci., vol. 40, p. 685 (1905).— El Valle, *Miller & Johnston*, no. 216, Aug. 5; San Juan Mt., alt. 700 m., *Johnston*, no. 20, July 11. Endemic.

P. PSEUDO-MOLLIKOMUM C. DC. in DC., Prod., vol. 17, pt. 1, p. 278 (1869).— Juan Griego trail, alt. 450 m., *Johnston*, no. 17, July 22. Further distribution, Peru.

ULMACEAE.

CELTIS L.

C. IGUANAEA (Jacq.) Sarg., *Silva*, vol. 7, p. 64 (1895); *Urb.*, *Symb. Ant.*, vol. 4, p. 194. *Rhamnus iguanaeus* Jacq., *Enum.*, p. 16 (1760). *Celtis aculeata* Sw., *Prod. veg. Ind. Occ.*, p. 53 (1788).—Santa Ana, *Ernst* (reported under the name *C. aculeata* Sw.); El Valle, *Miller & Johnston*, no. 116, Aug. 14, along the trail up the mountain. Venezuela: Colonia Tovar, *Fendler*, no. 220, 1854–55. Further distribution, tropical America. Shrub, 2–3 m. high.

TREMA Lour.

T. MICRANTHA (L.) Blume, *Mus. bot. Lugd. Bat.*, vol. 2, p. 58 (1853?). *Rhamnus micranthus* L., *Syst. nat.*, ed. 10, vol. 2, p. 937 (1759). *Sponia micrantha* Dene., *Nouv. ann. mus. Par.*, vol. 3, p. 498 (1834); Griseb., *Fl. Brit. W. Ind.*, p. 150 (1864).—Santa Ana, *Ernst*; San Juan Mt., *Johnston*, no. 245, July 19. Tropical America.

MORACEAE.

ARTOCARPUS Forst.

A. INCISA L. f., *Suppl.*, p. 411 (1781); Griseb., *Fl. Brit. W. Ind.*, p. 152; Desc., *Ant.*, vol. 8, pl. 539.—Asuncion, *Ernst*. Further distribution, tropical countries.

CECROPIA L.

C. PELTATA L., *Syst. nat.*, ed. 10, vol. 2, p. 1286 (1759); Griseb., *Fl. Brit. W. Ind.*, p. 153; Desc., *Ant.*, vol. 2, pl. 75.—Santa Ana, *Ernst*; San Juan Mt., *Johnston*, no. 132. Common in the woods of the mountain above the Juan Griego trail. Venezuela: Cumaná, HBK., *Nov. gen. et sp.*, vol. 2, p. 43. Further distribution, Jamaica and the Caribbean Ids.

FICUS L.

F. sp.—Santa Ana, *Ernst*.

PROTEACEAE.

ROUPALA Aubl.

R. sp. affinis R. ovali.—Juan Griego trail, alt. 450 m., *Johnston* no. 330, Aug. 12–15.

OLACACEAE.

XIMENIA L.

X. AMERICANA L., Sp. pl., vol. 2, p. 1193 (1753); Griseb., Fl. Brit. W. Ind., p. 310.—El Valle, *Johnston*, no. 40, Aug. 31. Further distribution, tropical countries.

LORANTHACEAE.

LORANTHUS L.

L. AVICULARIS Mart. ex Schult. f., Syst., vol. 7, p. 132 (1829); Griseb., Fl. Brit. W. Ind., p. 312.—Santa Ana, *Ernst*. Further distribution, tropical America.

L. EMARGINATUS Sw., Prod. veg. Ind. Occ., p. 58 (1788); Griseb., Fl. Brit. W. Ind., p. 312.—South Hill, El Valle, alt. 300 m., *Johnston*, no. 127, July 10. Further distribution, San Domingo.

L. ORINOCENSIS Spreng., Syst., vol. 2, p. 129 (1825); Griseb., Fl. Brit. W. Ind., p. 311.—El Valle, *Miller & Johnston*, no. 250, Aug. 1; North Hill, El Valle, *Johnston*, no. 264, July 15, parasitic on *Bourreria exsucca* Jacq.; also common on the trees in the plain between San Antonio and Punta Mosquito. Further distribution, Trinidad and Venezuela.

ARISTOLOCHIACEAE.

ARISTOLOCHIA L.

A. RINGENS Vahl, Symb. bot., vol. 3, p. 99 (1794); Griseb., Fl. Brit. W. Ind., p. 299; Bot. mag., vol. 94, pl. 5700.—Juan Griego trail, alt. 450 m., *Johnston*, no. 131, July 29. Venezuela: near Buenavista and Los Teques, HBK., Nov. gen. et sp., vol. 2, p. 147; Colonia Tovar, *Fendler*, no. 1063, 1856–57. Jamaica and Colombia.

POLYGONACEAE.

ANTIGONON Endl.

A. LEPTOPUS Hook. & Arn., Bot. Beech. voy., p. 308, pl. 69 (1840); Griseb., Fl. Brit. W. Ind., p. 164.—El Valle, *Miller & Johnston*, no. 53, Aug. 1. Venezuela: Sacupana, *Rusby & Squires*, no. 35.

1896. Abundant on fences near dwellings. A garden plant in the West Indies.

COCOLOBA L.

C. EXCORIATA L., Syst. nat., ed. 10, vol. 2, p. 1007 (1759). *C. nivea* Jacq., Enum. pl. Carib., p. 19 (1760), and Hist. Stirp. Amer., p. 115, pl. 78; Griseb., Fl. Brit. W. Ind., p. 163.—South Hill, El Valle, *Johnston*, no. 274, Aug. 31. Further distribution, West Indies.

C. ERNSTII Johnston, Proc. Amer. acad., arts and sci., vol. 40, p. 685 (1905).—South Hill, El Valle, *Johnston*, no. 250, Aug. 31. PLATE 27, fig. 2

CHENOPODIACEAE.

ATRIPLEX L.

A. CRISTATA H. & B. ex Willd., Sp. pl., vol. 4, p. 959 (1806). *Obione cristata* Moq., Chenop. Enum., p. 73 (1840).—Juan Griego, *Ernst*; Pt. Moreno, *Johnston*, no. 316, July 17. Venezuela: at promontory of Araya, HBK., Nov. gen. et sp., vol. 2, p. 192.

CHENOPODIUM L.

C. AMBROSIOIDES L., Sp. pl., vol. 1, p. 219 (1753); Griseb., Fl. Brit. W. Ind., p. 60; Fenzl in Mart., Fl. Bras., vol. 5, pt. 1, p. 145; Desc., Ant., vol. 1, pl. 58.—Santa Ana, *Ernst*. Venezuela: near Cumaná and Cocollar, HBK., Nov. gen. et sp., vol. 7, p. 191. Further distribution, tropical countries.

SALICORNIA L.

S. FRUTICOSA L., Sp. pl., ed 2, vol. 1, p. 5 (1762). *S. ambigua* Michx., Fl., vol. 1, p. 2 (1803); Griseb., Fl. Brit. W. Ind., p. 60.—Juan Griego, *Ernst*; Pt. Moreno, *Johnston*, no. 109, July 8. Further distribution, from United States to Peru.

AMARANTHACEAE.

ACHYRANTHES L.

A. ASPERA L., Sp. pl., vol. 1, p. 204 (1753); Griseb., Fl. Brit. W. Ind., p. 62; Wight, Ic. Ind. Or., vol. 5, p. 1777.—Juan Griego, *Ernst*. Venezuela: Cumaná, Loeffling, Reise nach den spanischen Ländern, p. 152–153. Further distribution, tropical countries.

ALTERNANTHERA Forsk.

A. CANESCENS HBK., Nov. gen. et sp., vol. 2, p. 204 (1817).—Pt. Moreno, *Johnston*, no. 317, July 8. Venezuela: Cumaná and Bordonos, HBK., Nov. gen. et sp., vol. 2, p. 204. Coche, see page 291. Abundant about the lagoon at Pt. Moreno.

A. MUSCOIDES (Sw.) Benth. & Hook. f., Gen., vol. 3, p. 39 (1880), by implication, though without the exact combination. *Lithophila muscoides* Sw., Prod. veg. Ind. Occ., p. 14 (1788); Griseb., Fl. Brit. W. Ind., p. 66.—Juan Griego, *Ernst*. Further distribution, the Lesser Antilles.

AMARANTHUS L.

A. CRASSIPES Schlecht., Linnaea, vol. 6, p. 757 (1831); Urb., Symb. Ant., vol. 4, p. 219.—El Valle, *Miller & Johnston*, no. 29, July 26. Further distribution, tropical America.

A. PANICULATUS L., Sp. pl., ed. 2, vol. 2, p. 1406 (1763); Griseb., Fl. Brit. W. Ind., p. 69; Seubert in Mart., Fl. Bras., vol. 5, pt. 1, p. 238; Willd., Hist. Am., pl. 2.—Santa Ana, *Ernst*. Further distribution, tropical countries.

A. SPINOSUS L., Sp. pl., vol. 2, p. 991 (1753); Griseb., Fl. Brit. W. Ind., p. 68; Seubert in Mart., Fl. Bras., vol. 5, pt. 1, p. 239; Desc., Ant., vol. 5, p. 314.—Santa Ana, *Ernst*. Further distribution general, especially in tropical countries.

A. TRISTIS L., Sp. pl., vol. 2, p. 989 (1753); Griseb., Fl. Brit. W. Ind., p. 69; Seubert in Mart., Fl. Bras., vol. 5, pt. 1, p. 237; Wight, Ic. Ind. Or., vol. 2, p. 713.—El Valle, *Miller & Johnston*, nos. 149 and 30, Aug. 21. Further distribution, Jamaica to Trinidad, also in Chili.

CYATHULA LOUF.

C. PROSTRATA (L.) Bl., Bijdr., p. 549 (1825); Griseb., Fl. Brit. W. Ind., p. 63; Seubert in Mart., Fl. Bras., vol. 5, pt. 1, p. 230. *Achyranthes prostrata* L., Sp. pl., ed. 2, vol. 1, p. 296 (1762).—Juan Griego and Santa Ana, *Ernst*.

GOMPHRENA L.

G. PILOSA (Mart. & Gal.) Moq. in DC., Prod., vol. 13, pt. 2, p. 395 (1849). *Mogiphanes pilosa* Mart. & Gal., Bull. acad. Brux., vol. 10, p. 348 (1843).—El Valle, *Miller & Johnston*, no. 260, July 28; and *Johnston*, no. 106, July 14.

IRESINE P. Br.

I. ELATIOR Rich. ex Willd., Sp. pl., vol. 4, p. 766 (1806); Griseb., Fl. Brit. W. Ind., p. 64; Seubert in Mart., Fl. Bras., vol. 5, pt. 1, p. 226.— Santa Ana, *Ernst*.

I. LATIFOLIA (Mart. & Gal.) Benth. & Hook. f., Gen., vol. 3, p. 42 (1880). *Gomphrena latifolia* Mart. & Gal., Bull. acad. Brux., vol. 10, p. 349 (1843).— El Valle, *Miller & Johnston*, no. 67, July 8; Juan Griego trail, *Johnston*, no. 107, July 2. Shrub, 1–2 m. high; stem often 2.5 cm. in diameter near base.

PHILOXERUS R. Br.

P. VERMICULARIS (L.) R. Br., Prod., vol. 1, p. 416 (1810), as *vermiculata*; Krug, Ic. pl., p. 202; Urb., Symb. Ant., vol. 4, p. 223. *Gomphrena vermicularis* L., Sp. pl., vol. 1, p. 224 (1753).— Porlamar, *Miller & Johnston*, no. 4, July 31, abundant on the low plains near the sea; Pt. Moreno, *Johnston*, no. 111, July 8.

TELANTHERA R. Br.

T. FICOIDEA (L.) Moq. in DC., Prod., vol. 13, pt. 2, p. 363 (1849); Seubert in Mart., Fl. Bras., vol. 5, pt. 1, p. 171. *Gomphrena ficoidea* L., Sp. pl., vol. 1, p. 225 (1753). *Alternanthera ficoidea* R. Br., Prod., p. 417 (1810); Griseb., Fl. Brit. W. Ind., p. 67.— Juan Griego, *Ernst*. Further distribution, tropical America and tropical Africa.

NYCTAGINACEAE.

BOERHAAVIA L.

B. ERECTA L., Sp. pl., vol. 1, p. 3 (1753); Griseb., Fl. Brit. W. Ind., p. 69; Schmidt in Mart., Fl. Bras., vol. 14, pt. 2, p. 370; Jacq., Vind., vol. 1, p. 2, pls. 5, 6; Urb., Symb. Ant., vol. 4, p. 224.— El Valle, *Miller & Johnston*, no. 204, July 20. Further distribution, Georgia, Florida, tropical America to the Galapagos Ids.

B. PANICULATA Rich., Act. soc. hist. nat. Par., vol. 1, p. 105 (1792); Griseb., Fl. Brit. W. Ind., p. 69; Schmidt in Mart., Fl. Bras., vol. 14, pt. 2, p. 369, pl. 86; Urb., Symb. Ant., vol. 4, p. 224.— El Valle, *Miller & Johnston*, no. 203, July 10. Venezuela: Colonia Tovar, *Fendler*, no. 1083, 1854–55. Further distribution, tropical America and the Cape Verde Ids.

BUGINVILLAEA Commerson.

B. SPECTABILIS Willd., Sp. pl., vol. 2, p. 348 (1799). *Bougainvillea spectabilis* Schmidt in Mart., Fl. Bras., vol. 14, pt. 2, p. 350, pl. 82 (1872).— El Valle, *Miller & Johnston*, no. 99, July 31, in a yard. Further distribution, tropical America. This specimen is almost as glabrous as *B. glabra* Choisy.

MIRABILIS L.

M. JALAPA L., Sp. pl., vol. 1, p. 177 (1753); Griseb., Fl. Brit. W. Ind., p. 69; Schmidt in Mart., Fl. Bras., vol. 14, pt. 2, p. 349.— Santa Ana, *Ernst*. Further distribution, tropical America.

PISONIA L.

P. ACULEATA L., Sp. pl., vol. 2, p. 1026 (1753); Griseb., Fl. Brit. W. Ind., p. 70; Schmidt in Mart., Fl. Bras., vol. 14, pt. 2, p. 354.— Juan Griego, *Ernst*. Further distribution, tropics.

P. INERMIS Jacq., Select. Am., p. 275 (1763); Griseb., Fl. Brit. W. Ind., p. 71.— Juan Griego, *Ernst*; El Valle, *Miller & Johnston*, no. 231, July 8; Juan Griego trail, alt. 400 m., *Johnston*, no. 335, Aug. 12–15, also San Juan Mt., alt. 600 m., *Johnston*, no. 121, Aug. 28. Venezuela: Colonia Tovar, *Fendler*, no. 1126, June 20, 1855. Further distribution, tropical America.

BATIDACEAE.

BATIS L.

B. MARITIMA L., Syst. nat., ed. 10, vol. 2, p. 1289 (1759); Griseb., Fl. Brit. W. Ind., p. 61; Jacq., Hist. stirp. Am., p. 260.— Juan Griego, *Ernst*; Pt. Moreno, *Johnston*, no. 108, July 13. Further distribution, from Florida to Venezuela.

PHYTOLACCACEAE.

PETIVERIA L.

P. ALLIACEA L., Sp. pl., vol. 1, p. 342 (1753); Griseb., Fl. Brit. W. Ind., p. 59; Schmidt in Mart., Fl. Bras., vol. 14, pt. 2, p. 332; Urb., Symb. Ant., vol. 4, p. 229.— Santa Ana, *Ernst*; El Valle, *Miller &*

Johnston, no. 13, July 15. Venezuela: near Bordones, HBK., *Nov. gen. et sp.*, vol. 2, p. 188; Caracas, *Birschel*; Colonia Tovar, *Fendler*, nos. 865 and 1805, 1854-57. Further distribution, temperate and tropical America.

RIVINA L.

R. HUMILIS L., *Sp. pl.*, vol. 1, p. 121 (1753); Schmidt in *Mart.*, *Fl. Bras.*, vol. 14, pt. 2, p. 336; *Urb.*, *Symb. Ant.*, vol. 4, p. 228. *R. laevis* L., *Mant.*, vol. 1, p. 41 (1767); Griseb., *Fl. Brit. W. Ind.*, p. 59.—Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 263, July 8. Venezuela: Cumaná, *Loefling*, *Reise nach den spanischen Ländern*, p. 152-153; Colonia Tovar, *Fendler*, no. 1088, 1854-55; Sacupana, *Rusby & Squires*, no. 80, 1896. Further distribution, tropical America.

AIZOACEAE.

CYPSELEA Turp.

C. HUMIFUSA Turp., *Ann. mus. Par.*, vol. 7, p. 219, pl. 121, fig. 5 (1806); Griseb., *Fl. Brit. W. Ind.*, p. 56.—Shores of Juan Griego pond, *Johnston*, no. 252, Aug. 14. Further distribution, Caribbean Ids., Haiti to Guadeloupe.

MOLLUGO L.

M. VERTICILLATA L., *Sp. pl.*, vol. 1, p. 89 (1753); Griseb., *Fl. Brit. W. Ind.*, p. 56; *Rohrbach* in *Mart.*, *Fl. Bras.*, vol. 14, pt. 2, p. 240; *Urb.*, *Symb. Ant.*, vol. 4, p. 230.—Juan Griego, *Ernst*; El Valle, *Miller & Johnston*, no. 21, Aug. 10; Juan Griego, *Johnston*, no. 126, Aug. 14. This species was seen as a much-branched specimen on the dry roadside and as few-branched specimens on the shores of the Juan Griego pond. Venezuela: Cumaná, HBK., *Nov. gen. et sp.*, vol. 6, p. 20; *Loefling*, *Reise nach den spanischen Ländern*, p. 152-153. Common in tropical America.

SESUVIUM L.

S. PORTULACASTRUM L., *Syst. nat.*, ed. 10, vol. 2, p. 1058 (1759); Griseb., *Fl. Brit. W. Ind.*, p. 57; *Rohrbach* in *Mart.*, *Fl. Bras.*, vol. 14, pt. 2, p. 310.—Juan Griego, *Ernst*. Venezuela: near Camaná, HBK., *Nov. gen. et sp.*, vol. 6, p. 86; Tortuga and Los Roques, *Ernst*; near La Guaira, *Fendler*, no. 62, Aug. 16, 1855.

TRIANTHEMA L.

T. PORTULACASTRUM L., Sp. pl., vol. 1, p. 223 (1753); Moench, Meth., p. 700; Urb., Symb. Ant., vol. 4, p. 231. *T. monogynum* L., Mant., vol. 1, p. 69 (1767); Griseb., Fl. Brit. W. Ind., p. 58.— Juan Griego, *Ernst*; El Valle, *Miller & Johnston*, no. 12, July 12; Pt. Moreno, *Johnston*, no. 110, July 8. Very abundant near the lagoon at Pt. Moreno. Venezuela: La Guaira, *Fendler*, no. 64, Aug. 1855. Further distribution, tropical America.

PORTULACACEAE.

PORTULACA L.

P. HALIMOIDES L., Sp. pl., ed. 2, vol. 1, p. 639 (1762); Griseb., Fl. Brit. W. Ind., p. 57. *P. pilosa* a Rohrbach in Mart., Fl. Bras., vol. 14, pt. 2, p. 304.— *Ernst*. Found in the West Indies.

P. MILLERI Urb., Symb. Ant., vol. 5, p. 344 (1907).— Porlamar, *Miller & Johnston*, no. 11 (in part), July 31. Endemic.

P. OLERACEA L., Sp. pl., vol. 1, p. 445 (1753); Griseb., Fl. Brit. W. Ind., p. 57.— Common on Margarita, *Miller & Johnston*. Venezuela: Colonia Tovar, *Fendler*, no. 61, 1854–55. Widely distributed.

P. PILOSA L., Sp. pl., vol. 1, p. 445 (1753); Griseb., Fl. Brit. W. Ind., p. 57; Rohrbach in Mart., Fl. Bras., vol. 14, pt. 2, p. 303.— Santa Ana, *Ernst*.

P. VENEZUELENSIS Urb., Symb. Ant., vol. 5, p. 344 (1907).— Porlamar, *Miller & Johnston*, no. 11 (in part), July 31. Found also on the mainland by Gollmer, according to Urban.

TALINUM Adans.

T. PANICULATUM (Jacq.) Gaertn., Fruct., vol. 2, p. 219, pl. 128 (1791); Urb., Symb. Ant., vol. 4, p. 231. *Portulaca paniculata* Jacq., Enum., p. 22 (1760). *T. patens* Willd., Sp. pl., vol. 2, p. 863 (1800); *Ernst*, Bot. excurs. Margarita, p. 2.— Juan Griego, *Ernst*; El Valle, *Miller & Johnston*, no. 28, Aug. 1. Venezuela: La Guaira, *Fendler*, no. 66, Aug. 16, 1855. Common in tropical America.

✓ T. TRIANGULARE (Jacq.) Willd., Sp. pl., vol. 2, p. 862 (1800); Griseb., Fl. Brit. W. Ind., p. 56; Urb., Symb. Ant., vol. 4, p. 231. *Portulaca triangularis* Jacq., Enum., p. 22 (1760).— *T. racemosum* Rohrbach in Mart., Fl. Bras., vol. 14, pt. 2, p. 297 (1872).— El Valle, *Miller & Johnston*, no. 262, July 20. Common in tropical America.

MENISPERMACEAE.

CISSAMPELOS L.

C. PAREIRA L., Sp. pl., vol. 2, p. 1031 (1753); Griseb., Fl. Brit. W. Ind., p. 10; Desc., Ant., vol. 3, p. 231, pl. 201; Urb., Symb. Ant., vol. 4, p. 237.—El Valle, *Miller & Johnston*, no. 151, Aug. 2. Venezuela: near Caripe, HBK., Nov. gen. et sp., vol. 5, p. 66; Santa Catalina, *Rusby & Squires*, no. 138, 1896. Common to all tropical countries.

ANNONACEAE.

ANNONA L.

A. RETICULATA L., Sp. pl., vol. 1, p. 537 (1753); Griseb., Fl. Brit. W. Ind., p. 5; Mart., Fl. Bras., vol. 13, pt. 1, p. 15; Jacq., Obs., p. 13, pl. 6.—Asuncion, *Ernst*. Found also in Jamaica, St. Vincent, and Guadeloupe.

A. SQUAMOSA L., Sp. pl., vol. 1, p. 537 (1753); Griseb., Fl. Brit. W. Ind., p. 5; Mart., Fl. Bras., vol. 13, pt. 1, p. 14; Jacq., Hist. Stirp. Am., p. 162; Urb., Symb. Ant., vol. 4, p. 242.—El Valle, *Miller & Johnston*, no. 51, July 22. Further distribution, tropical America.

LAURACEAE.

NECTANDRA Roland.

N. CORIACEA (Sw.) Griseb., Fl. Brit. W. Ind., p. 281 (1860); Urb., Symb. Ant., vol. 4, p. 249. *Laurus coriacea* Sw., Prod. veg. Ind. Occ., p. 65 (1788). *N. Willdenoviana* Nees, Syst. Laurin., p. 321 (1836).—San Juan Mt., alt. 600 m., *Johnston*, no. 258, July 11. Further distribution, West Indies.

N. SP.—San Juan Mt., alt. 600 m., *Johnston*, no. 336, July 20, and no. 334, Aug. 28. No. 334 has leaves smooth and the cupule truncate. It is possibly only *N. coriacea* in fruit.

PHOEBE Nees.

P. CINNAMOMIFOLIA (HBK.) Nees, Linnaea, vol. 21, p. 488 (1848). *Persea cinnamomifolia* HBK., Nov. gen. et sp., vol. 2, p. 160 (1817).—San Juan Mt., alt. 600 m., *Johnston*, no. 267, July 11; also no. 258, July 11, and no. 336, July 20, at 600 m. alt. Distribution general in American Tropics.

PAPAVERACEAE.

ARGEMONE L.

A. MEXICANA L., Sp. pl., vol. 1, p. 508 (1753); Lam., Encycl., pl. 452; Griseb., Fl. Brit. W. Ind., p. 13; Eichler in Mart., Fl. Bras., vol. 13, pt. 1, p. 316; Urb., Symb. Ant., vol. 4, p. 250.— Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 245, July 25. Venezuela: near Caracas, *Fendler*, no. 19, Jan. 14, 1854. Further distribution, Caribbean Ids.

CAPPARIDACEAE.

CAPPARIS L.

C. BREYNIA L., Syst. nat., ed. 10, vol. 2, p. 1071 (1759); Jacq., Hist. Stirp. Am., p. 161, pl. 103; Eichler in Mart., Fl. Bras., vol. 13, pt. 1, p. 271. *C. amygdalina* Lam., Encycl., vol. 1, p. 608 (1783); Griseb., Fl. Brit. W. Ind., p. 17.— Juan Griego, *Ernst*. Venezuela: Cumaná, HBK., Nov. gen. et sp., vol. 5, p. 97; Loeffling, Reise nach den spanischen Ländern, p. 152–153; Valencia, *Fendler*, no. 2273, Mar. 5, 1857. Further distribution, tropical America.

C. COCCOLOBIFOLIA Mart. ex Eichler in Mart., Fl. Bras., vol. 13, pt. 1, p. 284 (1865). *C. collina* Johnston, Proc. Amer. acad. arts and sci., vol. 40, p. 686 (1905).— Tree, 5 m. high, on hillside north of El Valle, *Johnston*, no. 10, July 15. Further distribution, tropical America.

C. CYNOPHALLOPHORA L., Sp. pl., ed. 2, vol. 1, p. 721 (1762); Jacq., Hist. Stirp. Am., p. 158; Griseb., Fl. Brit. W. Ind., p. 18; Eichler in Mart., Fl. Bras., vol. 13, pt. 1, p. 282.— El Valle, *Miller & Johnston*, no. 111, July 12; North Hill, El Valle, alt. 200 m., *Johnston*, no. 5, July 3. A tree, about 5 m. high. Further distribution, tropical America.

C. JAMAICENSIS Jacq., Enum. pl. Carib., p. 23 (1760), and Hist. Stirp. Am., p. 160; Griseb., Fl. Brit. W. Ind., p. 18; Eichler in Mart., Fl. Bras., vol. 13, pt. 1, p. 270.— El Valle, *Miller & Johnston*, no. 106, July 18. Venezuela: Victoria, *Fendler*, no. 2274, Mar. 4, 1857. Further distribution, West Indies and Venezuela. The Margaritan specimen is very closely allied to *C. linearis*.

C. LINEARIS Jacq., Enum. pl. Carib., p. 24 (1760), and Hist. Stirp. Am., p. 161.— El Valle, alt. 150 m., *Johnston*, no. 4, July 3. Tree, about 3 m. high; the wood brittle. Venezuela: Golfo de Cariaco,

Punta Araya, and Laguna Chica, HBK., *Nov. gen. et sp.*, vol. 5, p. 87. Further distribution, northern South America.

C. PACHACA HBK., *Nov. gen. et ps.*, vol. 5, p. 93 (1821); Eichler in Mart., *Fl. Bras.*, vol. 13, pt. 1, p. 281.—Santa Ana, *Ernst*; El Valle, *Johnston*, no. 9, July 3. Venezuela: Cumaná, HBK., *Nov. gen. et sp.*, vol. 5, p. 93. Tree, about 5 m. in height.

C. STENOSEPALA Urb., *Symb. Ant.*, vol. 5, p. 529 (1908).—El Valle, alt. 200 m., *Johnston*, no. 8, July 27. Tree, about 7 m. high; flowers yellowish outside, purple within. Endemic. Occurs in Coche.

C. TENUISILIQUA Jacq., *Enum. pl. Carib.*, p. 24 (1760); Eichler in Mart., *Fl. Bras.*, vol. 13, pt. 1, p. 278.—El Valle, *Miller & Johnston*, no. 9, July 13; also *Johnston*, no. 6, July 21, and in fruit Aug. 8, alt. 150 m. Venezuela: Colonia Tovar, *Fendler*, no. 30, Aug. 16, 1855. Further distribution, Colombia.

C. VERRUCOSA Jacq., *Enum. pl. Carib.*, p. 23 (1760), and *Hist. Stirp. Am.*, p. 159; Griseb., *Fl. Brit. W. Ind.*, p. 19.—North and South Hills, alt. 60–300 m., El Valle, *Johnston*, no. 1, July 26. Shrub, 2–3 m. high. Venezuela: Cumaná, HBK., *Nov. gen. et sp.*, vol. 5, p. 90; Colonia Tovar, *Fendler*, no. 34 B, Aug. 16, 1855. Further distribution, tropical America.

CRATEVA L.

C. GYNANDRA L., *Sp. pl.*, ed. 2, vol. 1, p. 636 (1762); Griseb., *Fl. Brit. W. Ind.*, p. 17.—Santa Ana, *Ernst*; El Valle, *Johnston*, no. 2, July 1. Venezuela: Cumaná, HBK., *Nov. gen. et sp.*, vol. 5, p. 86; Turmera, *Fendler*, no. 1893, Mar. 14, 1857. Common in tropical America. Tree, about 20 m. high, with a trunk 7 dm. in diameter at base.

GYNANDROPSIS DC.

G. PENTAPHYLLA DC., *Prod.*, vol. 1, p. 238 (1824); Eichler in Mart., *Fl. Bras.*, vol. 13, pt. 1, p. 261, pl. 58, fig. 3; Urb., *Symb. Ant.*, vol. 4, p. 252.—El Valle, *Miller & Johnston*, no. 73, July 29. Distribution general in tropical countries.

MORISONIA L.

M. AMERICANA L., *Sp. pl.*, vol. 1, p. 503 (1753); Griseb., *Fl. Brit. W. Ind.*, p. 19.—Santa Ana, *Ernst*. Venezuela: Colonia Tovar, *Fendler*, no. 2472, Jan. 6, 1855. West Indies.

M. JOHNSTONII Urb., Symb. Ant., vol. 5, p. 348 (1907).— El Valle, alt. 300 m., *Johnston*, no. 7, July 10. A tree, about 7 m. high; trunk 6 dm. in diameter at base; wood of strong odor, brittle. Endemic.

STERIPHOMA Spreng.

S. ELLIPTICA Spreng., Syst., vol. 4, pt. 2, p. 139 (1827); Griseb., Fl. Brit. W. Ind., p. 20.— El Valle, *Miller & Johnston*, no. 267, July 30, and *Johnston*, no. 3, July 15, alt. 60–300 m. Small tree, 5 m. high. Further distribution, Trinidad and Cumaná.

CRUCIFERAE.

CAKILE Juss.

C. AEQUALIS L'Hér. ex DC., Syst., vol. 2, p. 430 (1821); Griseb., Fl. Brit. W. Ind., p. 14; Deless., Ic., vol. 2, p. 17, pl. 57.— Juan Griego, *Ernst*. Venezuela: *Ernst*, Sobre la flora y fauna, p. 223. Further distribution, West Indies.

LEPIDIUM L.

L. VIRGINICUM L., Sp. pl., vol. 2, p. 645 (1753); Griseb., Fl. Brit. W. Ind., p. 14.— Santa Ana, *Ernst*. Common to the West Indies and eastern United States.

LEGUMINOSAE.

ABRUS L.

A. PRECATORIUS L., Syst. nat., ed. 12, vol. 2, p. 472 (1767); Griseb., Fl. Brit. W. Ind., p. 190; Desc., Ant., vol. 4, p. 194, pl. 275.— Juan Griego and Santa Ana, *Ernst*. Common in tropics.

ACACIA Mill.

A. MACRACANTHA H. & B. ex Willd., Sp. pl., vol. 4, p. 1080 (1806); Griseb., Fl. Brit. W. Ind., p. 221; Kunth, Mim., p. 90, pl. 28.— El Valle, *Miller & Johnston*, no. 114, Aug. 2, and River trail, El Valle, *Johnston*, no. 28, July 15. Venezuela: Colonia Tovar, *Fendler*, no. 362, 1854–55. Slender shrub, 5 m. high; flowers yellow. Further distribution, tropical America.

A. PANICULATA Willd., Sp. pl., vol. 4, p. 1074 (1806); Griseb.,

Fl. Brit. W. Ind., p. 221; Mart., Fl. Bras., vol. 15, pt. 2, pl. 102.— Santa Ana, *Ernst*. Venezuela: Colonia Tovar, *Fendler*, no. 351, 1854–55. Further distribution, St. Lucia, Cuba, Guiana, and Brazil.

A. TAMARINDIFOLIA (L.) Willd., Sp. pl., vol. 4, p. 1092 (1806); Griseb., Fl. Brit. W. Ind., p. 221. *Mimosa tamarindifolia* L., Sp. pl., vol. 1, p. 523 (1753).— El Valle, *Miller & Johnston*, no. 113, July 15; en route Peilar to Pt. Moreno, *Johnston*, no. 37, July 8. Venezuela: Bordones, HBK., Nov. gen. et sp., vol. 6, p. 277; La Guaira, *Robinson & Lyon*, July 12, 1900. Slender shrub, 5 m. high. Tropical America.

BAUHINIA L.

B. CUMANENSIS HBK., Nov. gen. et sp., vol. 6, p. 321 (1823); Bot. reg., vol. 14, pl. 1133.— South Hill, El Valle, *Miller & Johnston*, no. 70, July 27. Observed on North Hill, Aug. 15, 1903, not in flower. Venezuela: Bordones, HBK., Nov. gen. et sp., vol. 6, p. 277. Further distribution, northern South America.

CAESALPINIA L.

C. CORIARIA (Jacq.) Willd., Sp. pl., vol. 2, p. 532 (1799). *Libidibia coriaria* Schlecht., Linnaea, vol. 5, p. 193 (1830); Griseb., Fl. Brit. W. Ind., p. 206. *Poinciana coriaria* Jacq., Hist. Stirp. Am., p. 123, pl. 175 (1763).— Santa Ana, *Ernst*; El Valle, *Johnston*, no. 29. Further distribution, tropical America.

C. PULCHERRIMA (L.) Sw., Obs., p. 166 (1791); Griseb., Fl. Brit. W. Ind., p. 205.— Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 64, July 22. Common in tropical countries.

CAJANUS DC.

C. INDICUS Spreng., Syst., vol. 3, p. 248 (1826); Griseb., Fl. Brit. W. Ind., p. 191; Urb., Symb. Ant., vol. 4, p. 306. *Poinciana pulcherrima* L., Sp. pl., vol. 1, p. 380 (1753).— El Valle, *Miller & Johnston*, no. 139, Aug. 6. Venezuela: Caracas, *Birschel*; Santa Catalina, *Rusby & Squires*, no. 191, 1896; Colonia Tovar, *Fendler*, no. 303, 1854–55. Common in tropical countries.

CALLIANDRA Benth.

C. PORTORICENSIS Benth. in Hook., Lond. journ. bot., vol. 3, p. 99 (1844); Griseb., Fl. Brit. W. Ind., p. 224. *Mimosa portoricensis*

Jacq., Ic. pl. rar., vol. 3, p. 20, pl. 633 (1793).— El Valle, *Miller & Johnston*, no. 264, July 29. Tropical America.

C. PANLOSIA Johnston, Proc. Amer. acad. arts and sci., vol. 40, p. 686 (1905).— Abundant on hills at alt. 300–600 m., El Valle to Juan Griego, *Miller & Johnston*, no. 58, July 22, and *Johnston*, no. 27, July 2. Endemic.

CANAVALLIA DC.

C. OBTUSIFOLIA (Lam.) DC., Prod., vol. 2, p. 404 (1825); Griseb., Fl. Brit. W. Ind., p. 197; Rheede, Hort. Mal., vol. 8, pl. 43. *Dolichos obtusifolius* Lam., Encycl., vol. 2, p. 295 (1786).— Juan Griego, *Ernst*. Common in tropical countries.

CASSIA L.

C. BIFLORA L., Sp. pl., vol. 1, p. 378 (1753); Griseb., Fl. Brit. W. Ind., p. 208; Bot. reg., vol. 16, pl. 1310.— Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 61, July 22. Further distribution, tropical America.

C. EMARGINATA L., Sp. pl., vol. 1, p. 376 (1753); Griseb., Fl. Brit. W. Ind., p. 207; Urb., Symb. Ant., vol. 4, p. 274.— El Valle, *Miller & Johnston*, no. 201, July 6, and also *Johnston*, no. 24, July 15. Growing in the River trail in El Valle and also on the hillside. Venezuela: Cumaná, Loeffling, Reise nach den spanischen Ländern, p. 152–153. Found also in Jamaica, St. Vincent, and Haiti.

C. FISTULA L., Sp. pl., vol. 1, p. 377 (1753); Griseb., Fl. Brit. W. Ind., p. 206; Desc., Ant., vol. 2, p. 231, pl. 125; Urb., Symb. Ant., vol. 4, p. 272.— El Valle, *Miller & Johnston*, no. 69, July 15. Venezuela: *Ernst*, Sobre la flora y fauna, p. 226. Further distribution, tropical countries.

C. NICTITANS L., Sp. pl., vol. 1, p. 380 (1753); Griseb., Fl. Brit. W. Ind., p. 211; Urb., Symb. Ant., vol. 4, p. 276.— Margarita, according to Urb., *l. c.*, p. 276; Santa Ana, *Ernst*. Distribution general in American Tropics and Sub-tropics.

C. OBOVATA Collad., Hist. Cas., p. 92, pl. 15 (1816); Griseb., Fl. Brit. W. Ind., p. 209.— El Valle, *Miller & Johnston*, no. 228, July 26. Also in Jamaica, according to Griseb., introduced from tropical Africa.

C. OCCIDENTALIS L., Sp. pl., vol. 1, p. 377 (1753); Griseb., Fl. Brit. W. Ind., p. 209; Desc., Ant., vol. 2, p. 277, pl. 135; Urb., Symb. Ant., vol. 4, p. 273.— Santa Ana and Asuncion, *Ernst*; El Valle, *Miller*

& *Johnston*, no. 60, July 11. Venezuela: Cumaná, Loeffling, *Reise nach den spanischen Ländern*, p. 152–153. Common in tropical countries.

C. OXYPHYLLA Kunth, *Mimos.*, p. 129, pl. 39 (1819–24).— El Valle, *Miller & Johnston*, no. 62, Aug. 5. Venezuela: on Mt. Cocolar, HBK., *Nov. gen. et sp.*, vol. 6, p. 342; La Guaira, *Robinson & Lyon*, July 6, 1900. Further distribution, Mexico to Ecuador.

C. SERICEA Sw., *Prod. veg. Ind. Occ.*, p. 66 (1788), and *Fl. Ind. Occ.*, vol. 2, p. 724; Griseb., *Fl. Brit. W. Ind.*, p. 209; Mart., *Fl. Bras.*, vol. 15, pt. 2, p. 116, pl. 35.— El Valle, *Miller & Johnston*, no. 56, July 5. Further distribution, Cuba to Panama and Brazil.

C. STENOCARPA Vog., *Syn. Cass.*, p. 68 (1837).— El Valle, *Miller & Johnston*, no. 210, July 14. Venezuela: Colonia Tovar, *Fendler*, no. 321, 1854–55. Very closely allied to *C. nictitans* L., if not identical with it. Found also in Brazil.

C. TORA L., *Sp. pl.*, vol. 1, p. 376 (1753). *C. obtusifolia* L., *Sp. pl.*, vol. 1, p. 377 (1753); Griseb., *Fl. Brit. W. Ind.*, p. 209.— Santa Ana, *Ernst*. Further distribution, tropical countries.

CENTROSEMA Benth.

C. BRASILIANUM Benth., *Ann. Wien. Mus.*, vol. 2, p. 118 (1837); Mart., *Fl. Bras.*, vol. 15, pt. 1, p. 128, pl. 34. *Bradburya brasiliana* Ktze., *Rev. gen.*, vol. 1, p. 164 (1891).— Asuncion, *Miller & Johnston*, no. 54, Aug. 9. Venezuela: Colonia Tovar, *Fendler*, no. 1778, 1856–57. Found also in Brazil.

C. VIRGINIANUM (L.) Benth., *Ann. Wien. Mus.*, vol. 2, p. 120 (1837), *Urb.*, *Symb. Ant.*, vol. 4, p. 300. *Clitoria virginiana* L., *Sp. pl.*, vol. 2, p. 753 (1753); *Bot. reg.*, vol. 13, p. 1047. *Bradburya virginiana* Ktze., *Rev. gen.*, vol. 1, p. 164 (1891).— El Valle, *Miller & Johnston*, no. 256, Aug. 15. Further distribution, tropical America and Nigeria.

CERCIDIUM Tulasne.

C. SPINOSUM Tulasne, *Arch. mus. Par.*, vol. 4, p. 134 (1844).— El Valle, alt. 200 m., *Johnston*, no. 31, July 3. Shrub, 3 m. high; trunk 2 dm. in diameter at base; bark green; stem thorny; flowers yellow. Further distribution, Brazil.

C. VIRIDE (Karst.) Taub. in Engl. & Prantl, *Natürl. Pflanzenfam.*, vol. 3, pt. 3, p. 172 (1892). *Rhetinophloeum viride* Karst., *Fl. Columb.*, vol. 2, p. 25, pl. 113 (1862).— Santa Ana, *Ernst*. Found in northern South America.

CLITORIA L.

C. TERNATEA L., Sp. pl., vol. 2, p. 753 (1753); Griseb., Fl. Brit. W. Ind., p. 192; Garden, vol. 38, p. 132, pl. 765; Urb., Symb. Ant., vol. 4, p. 299.—El Valle, *Miller & Johnston*, no. 55, July 15, and *Johnston*, no. 36, July 15. Tropical countries.

CRACCA Benth.

C. CARIBAEA Benth. ex Oerst. in Kjoeb. Vidensk. meddel., p. 9, (1853); Griseb., Fl. Brit. W. Ind., p. 183.—El Valle, *Miller & Johnston*, nos. 135 & 141, July 27 and Aug. 2, respectively. Further distribution, tropical America.

CROTALARIA L.

C. INCANA L., Sp. pl., vol. 2, p. 716 (1753); Griseb., Fl. Brit. W. Ind., p. 180; Cav., Ic., pl. 322; Urb., Symb. Ant., vol. 4, p. 281.—Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 50, July 8. Further distribution, tropical America and tropical Africa.

DESMANTHUS Willd.

D. VIRGATUS Willd., Sp. pl., vol. 4, p. 1047 (1806); Griseb., Fl. Brit. W. Ind., p. 218.—Santa Ana, *Ernst*. Further distribution, temperate and tropical America and East Indies.

DESMODIUM Desv.

D. SCORPIURUS (Sw.) Desv., Journ. bot., vol. 1, p. 122 (1813); Griseb., Fl. Brit. W. Ind., p. 187; Urb., Symb. Ant., vol. 4, p. 293. *Hedysarum Scorpiurus* Sw., Prod. veg. Ind. Occ., p. 107 (1788).—El Valle, *Miller & Johnston*, no. 214, July 12. Further distribution, tropical America and Society Ids.

D. SPIRALE (Sw.) DC., Prod., vol. 2, p. 332 (1825); Griseb., Fl. Brit. W. Ind., p. 188. *Hedysarum spirale* Sw., Prod. veg. Ind. Occ., p. 107 (1788).—Santa Ana, *Ernst*. Further distribution, tropical countries.

D. SUPINUM (Sw.) DC., Prod., vol. 2, p. 332 (1825); Urb., Symb. Ant., vol. 4, p. 290. *Hedysarum supinum* Sw., Prod. veg. Ind. Occ., p. 106 (1788). *D. incanum* DC., Prod., vol. 2, p. 332 (1825).—El Valle, *Miller & Johnston*, no. 123, July 14. Further distribution, tropical countries.

DOLICHOS L.

D. SP.—*Ernst*.

ENTEROLOBIUM Mart.

E. CYCLOCARPUM (Jacq.) Griseb., Fl. Brit. W. Ind., p. 226 (1860). *Mimosa cyclocarpa* Jacq., Frag., p. 30, pl. 34, fig. 1 (1809).— Santa Ana, *Ernst*. Occurs also in Jamaica and Venezuela.

ERIOSEMA Desv.

E. CRINITUM (HBK.) G. Don, Syst., vol. 2, p. 348 (1832). *Glycine crinita* HBK., Nov. gen. et sp., vol. 6, p. 421 (1823).— Santa Ana, *Ernst*. Further distribution, tropical America.

ERYTHRINA L.

E. CORALLODENDRUM L., Sp. pl., vol. 2, p. 706 (1753); Griseb., Fl. Brit. W. Ind., p. 199.— El Valle, *Johnston*, no. 259, July 16. Venezuela, according to *Ernst* in World's Columbian exposition at Chicago. Further distribution, from Mexico to Brazil.

GLIRICIDIA HBK.

G. LUTEA *Johnston*, Proc. Amer. acad. arts and sci., vol. 40, p. 687 (1905).— On dry hillside, El Valle, *Miller & Johnston*, no. 246, and *Johnston*, no. 34, Aug. 15. Endemic. PLATE 30, fig. 1, 1a-d.

HYMENEAE L.

H. COURBARIL L., Sp. pl., vol. 2, p. 1192 (1753); Griseb., Fl. Brit. W. Ind., p. 213.— El Valle, *Johnston*, no. 290, Aug. Venezuela: near Carichana, HBK., Nov. gen. et sp., vol. 6, p. 322. Further distribution, Cuba, Panama, Guiana.

INDIGOFERA L.

I. SUBULATA Vahl ex Poir., Suppl., vol. 3, p. 150 (1813); Griseb., Fl. Brit. W. Ind., p. 181.— El Valle, *Miller & Johnston*, no. 142, July 26. Further distribution, Mexico to Venezuela and in East Indies.

I. SUFFRUTICOSA Mill., Gard. dict., ed. 8, no. 2 (1768). *I. Anil* L., Mant., vol. 2, p. 272 (1771); Urb., Symb. Ant., vol. 4, p. 181.— Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 52, July 26, and *Johnston*, no. 35, July 24. Further distribution, temperate and tropical countries.

INGA Scop.

I. INGOIDES (Rich.) Willd., Sp. pl., vol. 4, p. 1012 (1806); Griseb., Fl. Brit. W. Ind., p. 228. *Mimosa ingoides* Rich., Act. soc. hist. nat. Par., vol. 1, p. 113 (1792).— Juan Griego trail, alt. 400 m., *Johnston*, no. 26, Aug. 12–15. Tree, about 20 m. high. Further distribution, West Indies and Guiana.

I. MACRANTHA *Johnston*, Proc. Amer. acad. arts and sci., vol. 40, p. 687 (1905).— On Juan Griego trail, alt. 400 m., *Johnston*, no. 25, July 11. Endemic. PLATE 28, fig. 1.

LONCHOCARPUS HBK.

L. LATIFOLIUS (Willd.) HBK., Nov. gen. et sp., vol. 6, p. 383 (1823); Griseb., Fl. Brit. W. Ind., p. 199. *Amerimnum latifolium* Willd., Sp. pl., vol. 3, p. 909 (1803).— Santa Ana, *Ernst*. Further distribution, tropical America.

L. VELUTINUS Benth. in Seem., Bot. voy. Herald., p. 111 (1853).— El Valle, *Johnston*, no. 23, July 7. Further distribution, Central America.

L. VIOLACEUS (Jacq.) HBK., Nov. gen. et sp., vol. 6, p. 383 (1823), in note; Griseb., Fl. Brit. W. Ind., p. 200. *Robinia violacea* Jacq., Enum. pl. Carib., p. 28 (1760).— El Valle, *Miller & Johnston*, no. 257, July 21; and *Johnston*, no. 22, Aug. Further distribution, tropical America. Tree, about 15 m. high.

MACHAERIUM Pers.

M. STRIATUM *Johnston*, Proc. Amer. acad. arts and sci., vol. 40, p. 688 (1905).— North Hill, El Valle, *Johnston*, no. 124. Aug. 8. Endemic. PLATE 28, fig. 2.

MIMOSA L.

“M. FASTIGIATA W.” acc. to Ernst (a combination wholly obscure and probably due to some clerical error).— Santa Ana, *Ernst*.

MYROSPERMUM Jacq.

M. FRUTESCENS Jacq., Enum. pl. Carib., p. 20 (1760); Griseb., Fl. Brit. W. Ind., p. 204.— Juan Griego, *Ernst*. Venezuela: near Parapara and on the banks of the Rio Guarico, HBK., Nov. gen. et sp., vol. 6, p. 372. Further distribution, Trinidad and Colombia.

NISSOLIA Jacq.

N. WISLIZENI Gray, Journ. Linn. soc., vol. 5, p. 25 (1861). *Chaetocalyx Wislizeni* Gray, Pl. Wright., vol. 1, p. 51 (1852).— El Valle, *Miller & Johnston*, no. 259, Aug. 4. Further distribution, Mexico.

PARKINSONIA L.

P. ACULEATA L., Sp. pl., p. 375 (1753); Griseb., Fl. Brit. W. Ind., p. 204; Urb., Symb. Ant., vol. 4, p. 277.— Asuncion, *Ernst*; El Valle, *Miller & Johnston*, no. 63, July 20. Venezuela: Cumaná, Loeffling, Reise nach den spanischen Ländern, p. 152–153. Found in all tropical countries.

PELTOPHORUM Walp.

P. acutifolium, n. comb. *Caesalpinia acutifolia* Johnston, Proc. Amer. acad. arts and sci., vol. 40, p. 686 (1905). *Peltophorum Suringari* Urb., Symb. Ant., vol. 5, p. 363 (1908).— On the hillside, El Valle, *Miller & Johnston*, no. 200, Aug. 15, and *Johnston*, no. 33, Aug. 3. Found also on Aruba and Curaçoa.

PHASEOLUS L.

P. LUNATUS L., Sp. pl., vol. 2, p. 724 (1753); DC., Prod., vol. 2, p. 393; Benth. in Mart., Fl. Bras., vol. 15, pt. 1, p. 181; Urb., Symb. Ant., vol. 4, p. 308.— Margarita according to Urban, *l. c.* Distribution general in tropical and temperate countries; cultivated.

P. SP.— *Ernst*.

P. SP.— El Valle, *Miller & Johnston*, no. 57, July 26. Possibly this is a specimen of the above *P. lunatus*.

PITHECOLOBIUM Mart.

P. LIGUSTRINUM (Jacq.) Klotzsch ex Benth., Trans. Linn. soc., vol. 30, p. 571 (1875). *Mimosa ligustrina* Jacq., Fragm., p. 29, pl. 32, fig. 6, not Vahl.— El Valle, *Miller & Johnston*, no. 242, July 30, and no. 121; *Johnston*, no. 38, July 1. Tree, about 8 m. high, and 1.2 dm. in diameter at its base. Further distribution, American tropics.

P. UNGUIS-CATI (L.) Benth. in Hook., Lond. journ. bot., vol. 3, p. 200 (1844); Griseb., Fl. Brit. W. Ind., p. 226. *Mimosa unguis cati* L., Sp. pl., vol. 1, p. 517 (1753).— Santa Ana, *Ernst*; El Valle,

Johnston, no. 43, July 14. Venezuela: Cumaná, Loeffling, *Reise nach den spanischen Ländern*, p. 152–153. A slender tree, about 5 m. high, branching copiously and growing in clumps. Common in tropical America.

PLATYMISCIUM Vog.

P. POLYSTACHYUM Benth. in Seem., *Bot. voy. Herald.*, p. 111, pl. 21 (1853). *P. platystachyum* Griseb., *Fl. Brit. W. Ind.*, p. 200 (1860).—Santa Ana, *Ernst*. Further distribution, St. Vincent, Trinidad, Panama, and Venezuela.

POINCIANA L.

P. REGIA Boj. ex Hook., *Bot. mag.*, pl. 2884 (1829); *Urb., Symb. Ant.*, vol. 4, p. 278.—El Valle, *Miller & Johnston*, no. 59, July 29. Common in tropical countries.

PROSOPIS L.

P. JULIFLORA (Sw.) DC., *Prod.*, vol. 2, p. 447 (1825); Griseb., *Fl. Brit. W. Ind.*, p. 217. *Mimosa juliflora* Sw., *Prod. veg. Ind. Occ.*, p. 85 (1788). *P. cumanensis* HBK., *Nov. gen. et sp.*, vol. 6, p. 310 (1823).—Santa Ana, *Ernst*; El Valle, *Johnston*, no. 42, July 15. A tree, about 5 m. high, with wide-spreading top. Further distribution, Mexico to Guayaquil, also Jamaica.

RHYNCHOSIA Lour.

R. MINIMA (L.) DC., *Prod.*, vol. 2, p. 385 (1825); Griseb., *Fl. Brit. W. Ind.*, p. 190; *Urb., Symb. Ant.*, vol. 4, p. 307. *Dolichos minimus* L., *Sp. pl.*, vol. 2, p. 726 (1753).—El Valle, *Miller & Johnston*, no. 118, July 19. Common in tropical countries.

STYLOSANTHES Sw.

S. HUMILIS HBK., *Nov. gen. et sp.*, vol. 6, p. 506, pl. 594 (1823).—Asuncion, *Miller & Johnston*, no. 68, Aug. 9. Venezuela: near Carichana, HBK., *l. c.*

S. VISCOSA Sw., *Prod. veg. Ind. Occ.*, p. 108 (1788); Griseb., *Fl. Brit. W. Ind.*, p. 188.—El Valle, *Miller & Johnston*, no. 268, July 30; Pt. Mosquito, *Johnston*, no. 249, Aug. 10. Further distribution, tropical America.

TAMARINDUS L.

T. INDICA L., *Sp. pl.*, vol. 1, p. 34 (1753); Griseb., *Fl. Brit. W. Ind.*, p. 213; *Urb., Symb. Ant.*, vol. 4, p. 270.—El Valle, *Miller & Johnston*,

no. 65, July 21. Venezuela: Cumaná, Loeffling, *Reise nach den spanischen Ländern*, p. 152-153. Common to all tropical countries.

TEPHROSIA Pers.

T. CINEREA (L.) Pers., *Syn.*, vol. 2, p. 328 (1807); Griseb., *Fl. Brit. W. Ind.*, p. 182; Urb., *Symb. Ant.*, vol. 4, p. 283. *Galega cinerea* L., *Syst. nat.*, ed. 10, vol. 2, p. 1172 (1759).—Santa Ana, Juan Griego, *Ernst*; El Valle, *Miller & Johnston*, no. 136, July 20. Further distribution, tropical America.

TERAMNUS Sw.

T. UNCINATUS (L.) Sw., *Prod. veg. Ind. Occ.*, p. 105 (1788); Griseb., *Fl. Brit. W. Ind.*, p. 193. *Dolichos uncinatus* L., *Sp. pl.*, ed. 2, vol. 2, p. 1019 (1763).—Juan Griego, Santa Ana, *Ernst*. Further distribution, tropical America.

VIGNA Savi.

V. VEXILLATA (L.) A. Rich. in *Sagra, Cub.*, vol. 10, p. 191 (1845); Griseb., *Fl. Brit. W. Ind.*, p. 195. *Phaseolus vexillatus* L., *Sp. pl.*, vol. 2, p. 724 (1753).—Santa Ana, *Ernst*. Distributed generally in tropical countries.

ZORNIA Gmel.

Z. DIPHYLLA (L.) Pers., *Syn.*, vol. 2, p. 318 (1807); Griseb., *Fl. Brit. W. Ind.*, p. 185. *Hedysarum diphyllum* L., *Sp. pl.*, vol. 2, p. 747 (1753).—Santa Ana, *Ernst*. Further distribution, general in tropical countries.

OXALIDACEAE.

OXALIS L.

O. BARRELIERI Jacq., *Oxal.*, p. 24, pl. 3 (1794); Griseb., *Fl. Brit. W. Ind.*, p. 133.—El Valle, *Miller & Johnston*, no. 122, July 30. Further distribution, tropical America.

O. PLUMIERI Jacq., *Oxal.*, p. 23 (1794). *O. frutescens* Griseb., *Fl. Brit. W. Ind.*, p. 133 (1859), not L.—San Juan Mt., alt. 795 m., *Johnston*, no. 128, July 6. Further distribution, Dominica, St. Vincent, and Martinique.

ERYTHROXYLACEAE.

ERYTHROXYLUM P. Br.

E. HAVANENSE Jacq., Stirp. Am., p. 135, pl. 87, fig. 2 (1763). *E. ovatum* Cav., Diss., p. 404, pl. 233 (1789); Griseb., Fl. Brit. W. Ind., p. 113.—Santa Ana, *Ernst*; El Valle, River trail, *Johnston*, no. 72, Aug. 20. Slender tree, 5 m. high; flowers small, white. Further distribution, Dominica, Trinidad, Guiana, and Bahia.

STIGMATOPHYLLUM Juss.

S. SP.—Santa Ana, *Ernst*.

ZYGOPHYLLACEAE.

GUAJACUM L.

G. ARBOREUM (Jacq.) DC., Prod., vol. 1, p. 707 (1824). *Zygo-phyllum arboreum* Jacq., Stirp. Am., p. 130, pl. 83 (1763).—Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 20, July 6; *Johnston*, no. 30, Aug. 8. Common on the road between Porlamar and Juan Griego by way of Asuncion. Further distribution, tropical America.

G. OFFICINALE L., Sp. pl., vol. 1, p. 381 (1753); Griseb., Fl. Brit. W. Ind., p. 134.—Pt. Mosquito, *Johnston*, no. 117, Aug. 10. Venezuela: *Ernst*, Sobre la flora y fauna, p. 226. Distribution general from Cuba to Venezuela.

KALLSTROEMIA Scop.

K. MAXIMA (L.) Wight & Arn., Prod., vol. 1, p. 145 (1834); Torr. & Gray, Fl. N. Amer., vol. 1, p. 213; Engl. in Mart., Fl. Bras., vol. 12, pt. 2, p. 71; Urb., Symb. Ant., vol. 4, p. 315. *Tribulus maximus* L., Sp. pl., vol. 1, p. 386 (1753).—El Valle, *Miller & Johnston*, no. 7, July 12; Juan Griego pond, *Johnston*, no. 292, Aug. 14. Venezuela: near Cumaná, HBK., Nov. gen. et sp., vol. 6, p. 11. Further distribution, tropical America.

TRIBULUS L.

T. TERRESTRIS L., Sp. pl., vol. 1, p. 387 (1753), var. *CISTOIDES* (L.) Oliv., Fl. trop. Afr., vol. 1, p. 284 (1868); Urb., Symb. Ant., vol. 4, p. 315. *T. cistoides* L., Sp. pl., vol. 1, p. 387 (1753).—Santa Ana,

Ernst; El Valle, *Miller & Johnston*, no. 98, July 20; *Johnston*, no. 32, Aug. 3. Distribution general in tropics.

RUTACEAE.

AMYRIS P. Br.

A. MARITIMA Jacq., Enum. pl. Carib., p. 19 (1760); Griseb., Fl. Brit. W. Ind., p. 174; Sargent, Silva N. Amer., vol. 1, p. 85, pl. 36.—San Juan Mt., alt. 500 m., *Johnston*, no. 277, Aug. 28. Further distribution, tropical America.

CITRUS L.

C. AURANTIUM L., Sp. pl., vol. 2, p. 782 (1753); Desc., Ant., vol. 1, p. 181, pl. 38.—El Valle, *Miller & Johnston*, no. 39, July 11. Cultivation general in tropical and sub-tropical countries.

ESENBECKIA HBK.

E. PILOCARPOIDES HBK., Nov. gen. et sp., vol. 7, p. 248, pl. 655 (1825).—El Valle, *Miller & Johnston*, no. 226, July 25. Venezuela: near Quetepe, HBK., *l. c.* Distribution general in tropical America.

ZANTHOXYLUM L.

Z. PTEROTA (L.) HBK., Nov. gen. et sp., vol. 6, p. 3 (1823). *Fagara Pterota* L., Syst. nat., ed. 10, vol. 2, p. 897 (1759). *F. lentiscifolia* Griseb., Fl. Brit. W. Ind., p. 137 (1859), not Willd.—Santa Ana, *Ernst*. Further distribution, southern United States, West Indies to Trinidad.

SIMARUBACEAE.

CASTELA Turp.

C. DEPRESSA Turp., Ann. mus. Par., vol. 7, p. 79, pl. 5 (1806).—Juan Griego, *Ernst*. Further distribution, San Domingo.

C. NICHOLSONI Hook., Bot. misc., vol. 1, p. 271, pl. 55 (1830). *C. erecta* Griseb., Fl. Brit. W. Ind., p. 140 (1859), not Turp.—El Valle, *Miller & Johnston*, no. 236, July 18; Pt. Moreno, *Johnston*, no. 118, July 8. Further distribution, Texas, Antigua.

SURIANA L.

S. MARITIMA L., Sp. pl., vol. 1, p. 284 (1753); Griseb., Fl. Brit. W. Ind., p. 58.—Juan Griego, *Ernst*; Pt. Mosquito, *Johnston*, no. 284, Aug. 10. Distribution general in tropics.

BURSERACEAE.

BURSERIA Jacq.

B. SIMARUBA (L.) Sarg., Gard. and for., vol. 3, p. 260 (1890) and Silva N. Amer., vol. 1, p. 97, pls. 41, 42; Urb., Symb. Ant., vol. 4, p. 324.—South Hill, El Valle, alt. 270 m., *Johnston*, no. 270, July 3. Venezuela: Ernst, Sobre la flora y fauna, p. 226. Further distribution, West Indies, Panama. Tree, about 7 m. high; wood odorous and bitter.

MELIACEAE.

MELIA L.

M. AZEDARACH L., Sp. pl., vol. 1, p. 384 (1753); Urb., Symb. Ant., vol. 4, p. 325.—Cultivated, El Valle, *Miller & Johnston*, no. 112, July 18. Venezuela: valley of Aragua, HBK., Nov. gen. et sp., vol. 5, p. 218. Distribution general in tropical countries.

TRICHILIA P. Br.

T. HIRTA L., Syst. nat., ed. 10, vol. 2, p. 1020 (1759); Griseb., Fl. Brit. W. Ind., p. 129. *T. spondiodes* Jacq., Enum. pl. Carib., p. 20 (1760).—Santa Ana, *Ernst*. Further distribution, Jamaica, Cuba.

MALPIGHIACEAE.

HETEROPTERIS HBK.

H. LAURIFOLIA (L.) Juss., Ann. sci. nat., bot., ser. 2, vol. 13, p. 276 (1840); Griseb., Fl. Brit. W. Ind., p. 119. *Banisteria laurifolia* L., Sp. pl., ed. 2, vol. 2, p. 611 (1762).—South Hill, El Valle, alt. 300 m., *Miller & Johnston*, no. 46, Aug. 1; Juan Griego trail, alt. 300 m., *Johnston*, no. 54, Aug. 14. Further distribution, Jamaica, Cuba, and Porto Rico.

H. PURPUREA (L.) HBK., Nov. gen. et sp., vol. 5, p. 164 (1821),

in obs.; Griseb., Fl. Brit. W. Ind., p. 119. *Banisteria purpurea* L., Sp. pl., vol. 1, p. 427 (1753).— El Valle, climbing over a hedge of *Clerodendron molle*, Johnston, no. 55, July 9. Flowers light purple or pink. Venezuela: near Cumaná, HBK., Nov. gen. et sp., vol. 5, p. 164. Further distribution, West Indies and Venezuela.

MALPIGHIA L.

M. GLABRA L., Sp. pl., vol. 1, p. 425 (1753); Griseb., Fl. Brit. W. Ind., p. 116.— Juan Griego and Santa Ana, Ernst. Further distribution, tropical America.

M. PUNICIFOLIA L., Sp. pl., ed. 2, vol. 1, p. 609 (1762), var. *VULGARIS* Ndz., Gen. Malpigh., p. 8 (1899).— El Valle, Miller & Johnston, no. 253, Aug. 11; Johnston, no. 130, Aug. 30. Distribution general in tropical America.

POLYGALACEAE.

SECURIDACA L.

S. CORDATA Johnston, Proc. Amer. acad. arts and sci., vol. 40, p. 688 (1905).— North Hill, El Valle, alt. 250 m., Johnston, no. 60, Aug. 8. Endemic.

EUPHORBIACEAE.

ACALYPHA L.

A. MACROSTACHYA Jacq., Hort. Schoenb., vol. 2, p. 63, pl. 245 (1797); Griseb., Fl. Brit. W. Ind., p. 47.— San Juan Mt., alt. 400 m.; Johnston, no. 122, July 6. A single group of this species was found growing among *Heliconia Bihai*. Distribution general in northern South America.

ADELIA L.

A. RICINELLA L., Syst. nat., ed. 10, vol. 2, p. 1298 (1759), and Pl. Jam. Pugill., p. 29; Browne, Jam., pl. 36, fig. 3.— Santa Ana, Ernst. Further distribution, Jamaica, Cuba.

ARGITHAMNIA Sw.

A. CANDICANS Sw., Prod. veg. Ind. Occ., p. 39 (1788); Griseb., Fl. Brit. W. Ind., p. 44; Juss., Euph., pl. 7.— Juan Griego and Santa Ana, Ernst. Further distribution, West Indies and Caribbean Ids.

A. ERUBESCENS Johnston, Proc. Amer. acad. arts and sci., vol. 40, p. 689 (1905).— El Valle, *Miller & Johnston*, no. 213, July 22; *Johnston*, no. 58, Aug. 21. Endemic. PLATE 30, figs. 4, 4a-c, 5, 5a-c.

CROTON L.

C. CHAMAEDRIFOLIUS Lam., Encycl., vol. 2, p. 215 (1786); Griseb., Fl. Brit. W. Ind., p. 41; Muell. Arg. in Mart., Fl. Bras., vol. 11, pt. 2, p. 271; Desc., Ant., vol. 7, p. 491.— Santa Ana, *Ernst*. Further distribution, West Indies, Panama, Guiana.

C. FLAVENS L., Syst. nat., ed. 10, vol. 2, p. 1276 (1759), and Pl. Jam. Pugill., p. 28; Griseb., Fl. Brit. W. Ind., p. 38.— El Valle, *Miller & Johnston*, no. 38, July 15; *Johnston*, no. 45, Aug. 8. Further distribution, Jamaica, Trinidad, St. Thomas.

C. GLANDULOSUS L., Syst. nat., ed. 10, vol. 2, p. 1275 (1759); Griseb., Fl. Brit. W. Ind., p. 41; Muell. Arg. in Mart., Fl. Bras., vol. 11, pt. 2, p. 267; Jacq., Ic., vol. 1, p. 104; Urb., Symb. Ant., vol. 4, p. 343.— Hillside, El Valle, *Miller & Johnston*, no. 5, July 11. Further distribution, temperate and tropical America.

C. HELICOIDEUS Muell. Arg., Linnaea, vol. 34, p. 97 (1865-66).— El Valle, *Miller & Johnston*, no. 232, July 30; *Johnston*, no. 339, Aug. 8. Found also in St. Vincent.

C. LOBATUS L., Sp. pl., vol. 2, p. 1005 (1753); Griseb., Fl. Brit. W. Ind., p. 42; Muell. Arg. in Mart., Fl. Bras., vol. 11, pt. 2, p. 237; Urb., Symb. Ant., vol. 4, p. 343.— Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 120, July 16. Venezuela: near Bordones, HBK., Nov. gen. et sp., vol. 2, p. 90. Distribution general in tropical America.

C. MARGARITENSIS Johnston, Proc. Amer. acad. arts and sci., vol. 40, p. 689 (1905).— Among shrubs near summit of San Juan Mt., alt. 700 m., *Johnston*, no. 50, Aug. 28. Endemic. PLATE 30, figs. 3 and 3a.

C. MILLERI Johnston, Proc. Amer. acad. arts and sci., vol. 40, p. 690 (1905).— El Valle, *Miller & Johnston*, no. 229, July 18; *Johnston*, no. 48, Aug. 10. Common on the plains between El Valle and Pt. Mosquito. Endemic. PLATE 30, figs. 2, 2a-d.

C. NIVEUS Jacq., Enum. pl. Carib., p. 32 (1760); Griseb., Fl. Brit. W. Ind., p. 40.— Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 107, July 20. Further distribution, Jamaica, Dominica, Colombia.

C. OVALIFOLIUS Vahl in West, Bidr. Ste. Croix, p. 307 (1793);

Griseb., Fl. Brit. W. Ind., p. 41.—Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 199, July 14; *Johnston*, no. 46, Aug. 31. Further distribution, West Indies and Venezuela.

C. POPULIFOLIUS Mill., Gard. dict., ed. 8, no. 7 (1768), as *Populi folia*; Griseb., Fl. Brit. W. Ind., p. 41.—San Juan Mt., alt. 500 m., *Johnston*, no. 47, Aug. 28. Further distribution, West Indies.

C. PSEUDOCHINA Schlecht., Linnaea, vol. 5, p. 84 (1830), as *Pseudo-China*; Griseb., Fl. Brit. W. Ind., p. 39.—Santa Ana, *Ernst*. Further distribution, tropical America.

EUPHORBIA L.

E. BUXIFOLIA Lam., Encycl., vol. 2, p. 421 (1786); Griseb., Fl. Brit. W. Ind., p. 53; Muell. Arg. in Mart., Fl. Bras., vol. 11, pt. 2, p. 681.—Juan Griego, *Ernst*; Pt. Mosquito, *Johnston*, no. 44, Aug. 10. Found growing on the dunes of shifting sands. Further distribution, tropical America.

E. HYPERICIFOLIA L., Sp. pl., vol. 1, p. 454 (1753); Griseb., Fl. Brit. W. Ind., p. 54; Muell. Arg. in Mart., Fl. Bras., vol. 11, pt. 2, p. 677.—El Valle, *Miller & Johnston*, no. 109, July. Var. *LASIOCARPA* Griseb., *l. c.*, p. 54 (1859). *E. lasiocarpa* Klotzsch, Nov. act. nat. cur., vol. 19, suppl. 1, p. 414 (1843).—Santa Ana, *Ernst*. Venezuela: near Cumaná, HBK., Nov. gen. et sp., vol. 2, p. 56 (typical form); Loeffling, Reise nach den spanischen Ländern, p. 152–153. Common in tropical countries.

✓ *E. PETIOLARIS* Sims, Bot. mag., vol. 23, pl. 883 (1806).—El Valle, *Miller & Johnston*, no. 235, July 18. Also from Island of St. Thomas.

E. PILULIFERA L., Sp. pl., vol. 1, p. 454 (1753); Griseb., Fl. Brit. W. Ind., p. 54; Muell. Arg. in Mart., Fl. Bras., vol. 11, pt. 2, p. 684.—El Valle, *Miller & Johnston*, no. 108, July. Common in tropical countries.

E. THYMIFOLIA L., Sp. pl., vol. 1, p. 454 (1753); Burm. f., Fl. Ind., p. 112; Muell. Arg. in Mart., Fl. Bras., vol. 11, pt. 2, p. 684. *E. maculata* Griseb., Fl. Brit. W. Ind., p. 53, not L.—El Valle, *Miller & Johnston*, no. 150, Aug. 9; Juan Griego, at the pond and on the seashore, *Johnston*, no. 251, Aug. 14. Widespread in tropical countries.

HIPPOMANE L.

H. MANCINELLA L., Sp. pl., vol. 2, p. 1191 (1753); Griseb., Fl. Brit. W. Ind., p. 50.—Juan Griego, *Ernst*; Pt. Moreno, *Johnston*, no. 261,

July 13. Venezuela: Cumaná, Loeffling, *Reise nach den spanischen Ländern*, p. 152-153. Further distribution, Cuba to Venezuela and Panama.

HURA L.

H. CREPITANS L., *Sp. pl.*, vol. 2, p. 1006 (1753); Griseb., *Fl. Brit. W. Ind.*, p. 50; Muell. Arg. in Mart., *Fl. Bras.*, vol. 11, pt. 2, p. 632.—Asuncion, *Ernst*. Further distribution, Cuba, Brazil.

JATROPHA L.

J. CURCAS L., *Sp. pl.*, vol. 2, p. 1006 (1753); Griseb., *Fl. Brit. W. Ind.*, p. 36; Muell. Arg. in Mart., *Fl. Bras.*, vol. 11, pt. 2, p. 487.—Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 237, July 24. Venezuela: Nova Andalusia, HBK., *Nov. gen. et sp.*, vol. 2, p. 104. Distribution general in tropics.

J. GOSSYPIFOLIA L., *Sp. pl.*, vol. 2, p. 1006 (1753); Griseb., *Fl. Brit. W. Ind.*, p. 36; Muell. Arg. in Mart., *Fl. Bras.*, vol. 11, pt. 2, p. 491; Urb., *Symb. Ant.*, vol. 4, p. 350.—Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 27, July 11. Venezuela: near Cumaná and La Guaira, HBK., *Nov. gen. et sp.*, vol. 2, p. 104. Distribution general in tropical America.

J. URENS L., *Sp. pl.*, vol. 2, p. 1007 (1753), var. *STIMULOSA* (Michx.) Muell. Arg. in DC., *Prod.*, vol. 15, pt. 2, p. 1101 (1862). *J. stimulosa* Michx., *Fl.*, vol. 2, p. 216 (1803).—Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 48, July 8; *Johnston*, no. 57, Aug. 3. Venezuela: near Cumaná, HBK., *Nov. gen. et sp.*, vol. 2, p. 106. La Guaira, *Robinson & Lyon*, July 12, 1900. Common in American tropics.

MANIHOT Adans.

M. UTILISSIMA Pohl, *Pl. Bras. Ic.*, vol. 1, p. 32, pl. 24 (1827); Muell. Arg. in Mart., *Fl. Bras.*, vol. 11, pt. 2, pp. 457, 707; Urb., *Symb. Ant.*, vol. 4, p. 350. *Janipha Manihot* HBK., *Nov. gen. et sp.*, vol. 2, p. 108 (1817); Griseb., *Fl. Brit. W. Ind.*, p. 37.—El Valle, *Miller & Johnston*, no. 102, July 24. Widely cultivated in the hills and on the plain by Asuncion. Commonly cultivated in American tropics and subtropics.

PEDILANTHUS L.

P. TITHYMALOIDES (L.) Poit., *Ann. mus. Par.*, vol. 19, p. 390, pl. 19 (1812); Griseb., *Fl. Brit. W. Ind.*, p. 52. *Euphorbia tithymaloidea*

L., Sp. pl., vol. 1, p. 453 (1753).— Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 31, July 10; *Johnston*, no. 59, July 27. Slender shrub, about 1 m. high, with red flowers. Venezuela: *Ernst*, Sobre la flora y fauna, p. 226; between Bordones and Cumaná, HBK., Nov. gen. et sp., vol. 2, p. 63; La Guaira, *Robinson & Lyon*, July 6, 1900. Further distribution, West Indies.

PHYLLANTHUS L.

P. NIRURI L., Sp. pl., vol. 2, p. 981 (1753); Griseb., Fl. Brit. W. Ind., p. 34; Muell. Arg. in Mart., Fl. Bras., vol. 11, pt. 2, p. 53, 705.— Santa Ana, *Ernst*; Juan Griego trail, alt. 400 m., *Johnston*, no. 140, Aug. 14. Further distribution, tropical countries.

RICINUS L.

R. COMMUNIS L., Sp. pl., vol. 2, p. 1007 (1753); Griseb., Fl. Brit. W. Ind., p. 37; Muell. Arg. in Mart., Fl. Bras., vol. 11, pt. 2, p. 420.— Santa Ana, *Ernst*. Venezuela: Cumaná, Loeffling, Reise nach den spanischen Ländern, p. 152–153. Further distribution, tropics.

SEBASTIANIA Spreng.

S. CORNICULATA (Juss.) Muell. Arg. in DC., Prod., vol. 15, pt. 2, p. 1168 (1862) and in Mart., Fl. Bras., vol. 11, pt. 2, p. 551. *Microstachys corniculata* Juss., Euphorb. Tent., p. 49 (1824); Griseb., Fl. Brit. W. Ind., p. 49.— Margarita according to *Ernst*. Further distribution, Trinidad and northern South America.

TRAGIA L.

T. VOLUBILIS L., Sp. pl., vol. 2, p. 980 (1753); Griseb., Fl. Brit. W. Ind., p. 48; Muell. Arg. in Mart., Fl. Bras., vol. 11, pt. 2, p. 412.— Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 15, July 24; Juan Griego trail, *Johnston*, no. 253, July 31. Further distribution, West Indies and tropical South America.

GENERA EUPHORBIACEARUM ADHUC INDETERMINATA.

EUPHORBIACEA *Actinostemoni* affinis.— *Johnston*, no. 332 and 333, alt. 400 m., July 29.

EUPHORBIACEA *Argithamniae* affinis.— *Miller & Johnston*, no. 251, Aug. 3.

ANACARDIACEAE.

ANACARDIUM L.

A. OCCIDENTALE L., Sp. pl., vol. 1, p. 383 (1753); Jacq., Hist. Stirp. Am., p. 124; Griseb., Fl. Brit. W. Ind., p. 176.— Reported by Ernst. Cultivated in the Asuncion valley. Distribution general in tropical countries.

MANGIFERA L.

M. INDICA L., Sp. pl., vol. 1, p. 200 (1753); Griseb., Fl. Brit. W. Ind., p. 176.— Cultivated extensively. Common to all tropical countries.

MAURIA Kunth.

M. HETEROPHYLLA HBK., Nov. gen. et sp., vol. 7, p. 13, pl. 606 (1825).— Juan Griego and Santa Ana, *Ernst. Venezuela: Colonia Tovar, Fendler*, no. 174, 1856–57. Further distribution, Colombia and Peru.

SPONDIAS L.

S. LUTEA L., Sp. pl., ed. 2, vol. 1, p. 613 (1762); Griseb., Fl. Brit. W. Ind., p. 175.— Cultivated according to Ernst. In the market place of El Valle also. Venezuela: Cumaná, Loeffling (1754), *Reise nach den spanischen Ländern*, p. 152–153. Common to all tropical countries.

CELASTRACEAE.

ELAEODENDRON Jacq.

E. SP. *Johnston*, no. 307. Related to *E. xylocarpum* DC., *Prod.*, vol. 2, p. 11, from St. Thomas. Similar to no. 926 of P. Sintenis's *Plantae Portoricenses* (1885) determined by I. Urban. Differs in having broader leaves, which are often orbicular and very broad at the base. In general the leaves are larger than in *E. xylocarpum*.

MYGINDA Jacq.

M. RHACOMA Sw., *Prod. veg. Ind. Occ.*, p. 39 (1788); Griseb., *Fl. Brit. W. Ind.*, p. 146.— Juan Griego, *Ernst. Venezuela: near Laguna Chica, HBK.*, *Nov. gen. et sp.*, vol. 7, p. 67. Florida, Jamaica, Cuba.

M. SP. San Juan Mt., alt. 600 m., *Johnston*, no. 282, Aug. 28. Allied to *M. latifolia* Sw. and *M. Grisebachii* Sarg. Leaves in this form larger than those of the others, obovate, entire, sometimes 5 cm. long and 3 cm. wide, the base often obtuse, decurrent into a short petiole, the apex rounded, obtuse or minutely retuse; flowers on the plan of four.

SAPINDACEAE.

CARDIOSPERMUM L.

C. HALICACABUM L., Sp. pl., vol. 1, p. 366 (1753); Griseb., Fl. Brit. W. Ind., p. 122; Desc., Ant., vol. 4, pl. 241.— Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 208, July 20, Venezuela: *Ernst*. Sobre la flora y fauna, p. 226. Common in tropical countries.

MELICOCCA L.

M. BIJUGA L., Sp. pl., ed. 2, vol. 1, p. 495 (1762); Griseb., Fl. Brit. W. Ind., p. 127.— El Valle, *Miller & Johnston*, no. 128, July 18. Further distribution, tropical America.

PAULLINIA L.

P. CURURU L., Sp. pl., vol. 1, p. 365 (1753); Desc., Ant., vol. 3, pl. 181.— El Valle, *Miller & Johnston*, no. 239, July 30; Tacarigua, *Johnston*, no. 66, Aug. 14. Distribution general in West Indies. Not the same as *Serjania nodosa* as claimed by some authors, for the fruit is pyriform and not at all alate.

SAPINDUS L.

S. SAPONARIA L., Sp. pl., vol. 1, p. 367 (1753); Griseb., Fl. Brit. W. Ind., p. 126.— Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 127, July 18. Further distribution, Jamaica, and Venezuela.

TALISIA Aubl.

T. OLIVAEFORMIS (HBK.) Radlk., Sitzb. math.-phys. Akad., Muench., vol. 8, p. 342 (1878). *Melicocca olivaeformis* HBK., Nov. gen. et sp., vol. 5, p. 130 (1821).— Santa Ana, *Ernst*; El Valle, alt. 300 m., *Johnston*, no. 299, July 4. Further distribution, Colombia.

URVILLEA HBK.

U. ULMACEA HBK., Nov. gen. et sp., vol. 5, p. 106, pl. 440 (1821).— El Valle, *Miller & Johnston*, no. 23, July 31. Venezuela: near Caracas, HBK, *l. c.* Further distribution, tropical America.

RHAMNACEAE.

ZIZIPHUS Juss.

Z. sp.— El Valle, River trail, *Johnston*, no. 269, July 15. A tree, about 7 m. high, with wide-spreading top. Related to *Z. mexicana* Rose, *Contrib. U. S. nat. herb.*, vol. 1, p. 315. Differs in having leaves more broadly oval, more rounded at base, and distinctly three-nerved. The margin is almost the same in each.

VITACEAE.

CISSUS L.

C. SICYOIDES L., *Syst. nat.*, ed. 10, vol. 2, p. 897 (1759); Griseb., *Fl. Brit. W. Ind.*, p. 102; *Desc., Ant.*, vol. 7, pl. 481.— Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 244, Aug. 1. Further distribution, tropical America.

TILIACEAE.

CORCHORUS L.

C. ACUTANGULUS Lam., *Encycl.*, vol. 2, p. 104 (1786); Wight, *Ic. pl. Ind. Or.*, vol. 3, p. 739; Griseb., *Fl. Brit. W. Ind.*, p. 97.— El Valle, *Miller & Johnston*, no. 97, July 11. Common to all tropical countries.

C. HIRSUTUS L., *Sp. pl.*, vol. 1, p. 530 (1753); Jacq., *Hort. Vind.*, vol. 3, pl. 57; Griseb., *Fl. Brit. W. Ind.*, p. 97.— Juan Griego, *Ernst*. Further distribution, Antigua, Guadeloupe, Venezuela.

C. SILIQUOSUS L., *Sp. pl.*, vol. 1, p. 529 (1753); Jacq., *Hort. Vind.*, vol. 3, pl. 59; Griseb., *Fl. Brit. W. Ind.*, p. 97.— Santa Ana, *Ernst*. Further distribution, southern United States and tropical America.

TRIUMFETTA L.

T. LAPPULA L., *Sp. pl.*, vol. 1, p. 444 (1753); Griseb., *Fl. Brit. W. Ind.*, p. 95.— Santa Ana, *Ernst*. Venezuela: Colonia Tovar, *Fendler*, no. 1918, 1856–57. Further distribution, Mexico, West Indies Panama, and Cape Verde Ids.

MALVACEAE.

ABUTILON Hill.

A. CRISPUM (L.) G. Don, Gen. syst., vol. 1, p. 502 (1831); Wight, Ic. pl. Ind. Or., vol. 1, pl. 68; Griseb., Fl. Brit. W. Ind., p. 79; Schumann in Mart., Fl. Bras., vol. 12, pt. 3, p. 382. *Sida crispa* L. Sp. pl., vol. 2, p. 685 (1753).—El Valle, *Miller & Johnston*, no. 71; Juan Griego, *Johnston*, no. 271, Aug. 14. Venezuela: Colonia Tovar, *Fendler*, no. 97, 1854–55. Common in tropics.

A. UMBELLATUM (L.) Sweet, Hort. Brit., ed. 1, p. 53 (1827); Griseb., Fl. Brit. W. Ind., p. 78. *Sida umbellata* L., Syst. nat., ed. 10, vol. 2, 1145 (1759); Jacq., Hort. Vind., vol. 1, pl. 56.—El Valle, *Miller & Johnston*, no. 152, July 7. Further distribution, Jamaica, St. Thomas.

BASTARDIA HBK.

B. VISCOSA HBK., Nov. gen. et sp., vol. 5, p. 256 (1821); Griseb., Fl. Brit. W. Ind., p. 80; Schumann in Mart., Fl. Bras., vol. 12, pt. 3, p. 360.—Asuncion, *Ernst*. Venezuela: near Cumaná, HBK., *l. c.*; Colonia Tovar, *Fendler*, no. 2543, 1856–57. Distribution, Cuba to Brazil and Peru.

CIENFUEGOSIA Cav.

C. HETEROPHYLLA (Vent.) Garcke in Bonplandia, vol. 8, p. 150 (1860). *Redutea heterophylla* Vent., Descr. pl. jard. Cels, pl. 11 (1800).—El Valle, *Miller & Johnston*, no. 66, July 5. Further distribution, tropical America.

GOSSYPIUM L.

G. BARBADENSE L., Sp. pl., vol. 2, p. 693 (1753); Griseb., Fl. Brit. W. Ind., p. 86; Gürke in Mart., Fl. Bras., vol. 12, pt. 3, p. 582.—El Valle, *Miller & Johnston*, no. 207, July 31. Venezuela: Cumaná, *Loefling*, 1754. Common in tropical America.

MALVASTRUM Gray.

M. SPICATUM Gray, Mem. Amer. acad. arts and sci., n. s., vol. 4, p. 22 (1849); Griseb., Fl. Brit. W. Ind., p. 72; Schumann in Mart., Fl. Bras., vol. 12, pt. 3, p. 271.—Santa Ana, *Ernst*. Venezuela: Colonia Tovar, *Fendler*, no. 118, 1854–55. Further distribution, tropical countries.

PAVONIA Cav.

P. SPINIFEX Cav., Diss., vol. 3, p. 133, pl. 45 (1787); Griseb., Fl. Brit. W. Ind., p. 82; Gürke in Mart., Fl. Bras., vol. 12, pt. 3, p. 480.— Juan Griego, *Ernst.* Venezuela: near Caripe, HBK., Nov. gen. et sp., vol. 5, p. 280. Further distribution, tropical America.

SIDA L.

S. ACUTA Burm. f., Fl. Ind., p. 147 (1768); Schumann in Mart., Fl. Bras., vol. 12, pt. 3, p. 325. *S. carpinifolia* L. f., Suppl., p. 307 (1781); Griseb., Fl. Brit. W. Ind., p. 73.— Santa Ana, *Ernst.* Distribution general in tropical countries.

S. CILIARIS L., Syst. nat., ed. 10, vol. 2, p. 1145 (1759); Griseb., Fl. Brit. W. Ind., p. 73; Schumann in Mart., Fl. Bras., vol. 12, pt. 3, p. 283.— Santa Ana, *Ernst.*; El Valle, *Miller & Johnston*, no. 209, Aug. 9. Distribution general in tropical America.

S. RHOMBIFOLIA L., Sp. pl., vol. 2, p. 684 (1753); Griseb., Fl. Brit. W. Ind., p. 74; Schumann in Mart., Fl. Bras., vol. 12, pt. 3, p. 337.— Santa Ana, *Ernst.* Venezuela: near Cumaná, *Loefling*, 1754; HBK., Nov. gen. et sp., vol. 5, p. 261. Found in tropical countries.

S. SPINOSA L., Sp. pl. 5, p. 261, vol. 2, p. 683 (1753), var. *ANGUSTIFOLIA* (Lam.) Griseb., Fl. Brit. W. Ind., p. 74 (1859); Schumann in Mart., Fl. Bras., vol. 12, pt. 3, p. 298. *S. angustifolia* Lam., Encycl., vol. 1, p. 4 (1783).— Asuncion, *Miller & Johnston*, no. 6, July 30. Found in tropical countries.

THESPESIA Soland.

T. POPULNEA (L.) Soland. ex Correa in Ann. mus. Par., vol. 9, p. 290, pl. 8, fig. 2 (1807); Griseb., Fl. Brit. W. Ind., p. 87. *Hibiscus populneus* L., Sp. pl., vol. 2, p. 694 (1753).— Juan Griego, *Ernst.* Further distribution, tropical countries.

WISSADULA Medic.

W. PERIPLOCIFOLIA (L.) Griseb., Cat. pl. Cuba, p. 25 (1866). *Sida periplocifolia* L., Sp. pl., vol. 2, p. 684 (1753).— El Valle, *Miller & Johnston*, no. 126, Aug. 31. Further distribution, Jamaica.

BOMBACACEAE.

BOMBAX L.

B. CUMANENSE HBK., Nov. gen. et sp., vol. 5, p. 300 (1821).— Santa Ana, *Ernst*. Venezuela: near Cumaná, HBK., *l. c.* There are several Bombax trees occurring in El Valle, but no specimens were collected.

STERCULIACEAE.

GUAZUMA Adans.

G. ULMIFOLIA Lam., Encycl., vol. 3, p. 52 (1789); Griseb., Fl. Brit. W. Ind., p. 91.— Santa Ana, *Ernst*. Distributed from Cuba to Brazil.

HELICTERES L.

H. BARUENSIS Jacq., Enum. pl. Carib., p. 30 (1760), and Hist. Stirp. Am., p. 236; Schumann in Mart., Fl. Bras., vol. 12, pt. 3, p. 20.— Santa Ana, *Ernst*. Venezuela: Vargas, Flora, p. 192. Further distribution, tropical America.

MELOCHIA L.

M. TOMENTOSA L., Syst. nat., ed. 10, vol. 2, p. 1140 (1759); Griseb., Fl. Brit. W. Ind., p. 93.— Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 44, July 5; Juan Griego trail, *Johnston*, no. 56, July 31. Shrub, 1 m. high; flowers pink or purplish. Venezuela: near Cumaná, HBK., Nov. gen. et sp., vol. 5, p. 323; Caracas, *Birschel*; Colonia Tovar, *Fendler*, no. 2289, 1856–57. Further distribution, tropical America.

WALTHERIA L.

W. AMERICANA L., Sp. pl., vol. 2, p. 673 (1753); Griseb., Fl. Brit. W. Ind., p. 95.— El Valle, *Miller & Johnston*, no. 202, July 8. Venezuela: near Bordones and Cumaná, HBK., Nov. gen. et sp., vol. 5, p. 333; Colonia Tovar, *Fendler*, nos. 110 and 112, 1854–55. Widely distributed in tropical countries.

MARCGRAVIACEAE.

CARACASIA Szyszyl.

C. TREMADENA (Ernst) Szyszyl. in Engl. et Prantl, Natürl. Pflanzenfam., vol. 3, pt. 6, p. 164 (1893). *Vargasia tremadena* Ernst, Vár-

gas consid. como bot., p. 23 (1877).—Alt. 700 m., San Juan Mt., *Johnston*, no. 279, Aug. 28. A shrub, 2 m. high. Venezuela: near Caracas, *Ernst*, May, 1876.

GUTTIFERAE.

CLUSIA L.

C. FLAVA Jacq., Enum. pl. Carib., p. 34 (1760), and Hist. Stirp. Am., p. 272; Griseb., Fl. Brit. W. Ind., p. 107.—San Juan Mt., alt. 700 m., *Johnston*, no. 133, July 31. Occurs also in Jamaica.

BIXACEAE.

BIXA L.

B. ORELLANA L., Sp. pl., vol. 1, p. 512 (1753); Griseb., Fl. Brit. W. Ind., p. 20; Eichler in Mart., Fl. Bras., vol. 13, pt. 1, p. 433, pl. 87.—Santa Ana, *Ernst*; Juan Griego trail on open hillside, alt. 300 m., *Johnston*, no. 11, July 2. Shrub, 3–4 m. high.—Venezuela: Cumaná, *Loefling*, 1754. Found in tropical countries.

VIOLACEAE.

HYBANTHUS Jacq.

H. oppositifolius (L.), n. comb. *Viola oppositifolia* L., Sp. pl., ed. 2, vol. 2, p. 1327 (1763). *Ionidium oppositifolium* Roem. & Schult., Syst., vol. 5, p. 395 (1819).—El Valle, *Miller & Johnston*, no. 124, July 6. Venezuela: Colonia Tovar, *Fendler*, no. 2419, 1856–57; Cumaná, *Loefling* according to Roem. & Schult., *l. c.*

RINOREA Aubl.

R. marginata (Tr. & Planch.) Rusby in herb. *Alsodeia marginata* Triana et Planchon, Ann. sci. nat., bot., ser. 4, vol. 17, p. 127 (1862).—El Valle, *Miller & Johnston*, no. 225, July 27; San Juan Mt., alt. 300 m., *Johnston*, no. 120, Aug. 28. Further distribution, Colombia.

SAUVAGESIA L.

S. ERECTA L., Sp. pl., vol. 1, p. 203 (1753); Griseb., Fl. Brit. W. Ind., p. 112.—San Juan Mt., alt. 795 m., *Johnston*, no. 90, Aug. 28.

Venezuela: near Caripe and Cumanacoa, HBK., *Nov. gen. et sp.*, vol. 5, p. 389; Colonia Tovar, *Fendler*, no. 2319, 1856-57. Distribution general in tropics.

FLACOURTIACEAE.

CASEARIA Jacq.

C. PARVIFOLIA Willd., *Sp. pl.*, vol. 2, p. 628 (1799); Jacq., *Hist. Stirp. Am.*, p. 127; Griseb., *Fl. Brit. W. Ind.*, p. 23.—South Hill, El Valle, *Johnston*, no. 129, Aug. 31. Distributed from Cuba to Guiana.

C. guianensis (Aubl.), n. comb. *Iroucana guianensis* Aubl., *Pl. Guian.*, vol. 1, p. 329, pl. 127 (1775). *Casearia ramiflora* Vahl, *Symb.*, vol. 2, p. 50 (1791); Griseb., *Fl. Brit. W. Ind.*, p. 24.—El Valle, *Miller & Johnston*, no. 19, Aug. 5. Distributed from Cuba to Bahia.

C. SPIRALIS Johnston, *Proc. Amer. acad. arts and sci.*, vol. 40, p. 691 (1905).—El Valle, River trail, *Johnston*, no. 283, Aug. 30. Endemic.

C. SYLVESTRIS Sw., *Fl. Ind. Occ.*, vol. 2, p. 752 (1800).—El Valle, *Miller & Johnston*, no. 105, July 18; San Juan Mt., alt. 500 m., *Johnston*, no. 266, July 19. Further distribution, tropical America.

XYLOSMA Forst. f.

X. NITIDUM (Hellen.) Gray ex Griseb., *Fl. Brit. W. Ind.*, p. 21 (1859). *Hisingera nitida* Hellen., *Vet. akad. handl. Stockh.*, 1792, p. 32, pl. 2 (1792).—Santa Ana, *Ernst*. Distributed in tropical America.

TURNERACEAE.

TURNERA L.

✓ *T. DIFFUSA* Willd. ex Schult., *Syst.*, vol. 6, p. 679, (1820).—El Valle, *Miller & Johnston*, no. 266, July 30, and *Johnston*, no. 288, July 15. Further distribution, Brazil, West Indies, and Central America.

T. ULMIFOLIA L., *Sp. pl.*, vol. 1, p. 271 (1753).—Asuncion, *Miller & Johnston*, no. 223, July 30. Further distribution, tropical America.

PASSIFLORACEAE.

PASSIFLORA L.

P. FOETIDA L., Sp. pl., vol. 2, p. 959 (1753); Griseb., Fl. Brit. W. Ind., p. 294.— Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 85, July 9, and *Johnston*, no. 63, Aug. 3. Venezuela: Cumaná, *Loefling*, 1754; in Prov. Cumaná, in Sierra de Chacao, and near the town of Fernando de Apure, HBK., Nov. gen. et sp., vol. 2, p. 138; Colonia Tovar, *Fendler*, no. 475, 1854–55. Distribution general in tropical America.

P. LAURIFOLIA L., Sp. pl., vol. 2, p. 956 (1753); Griseb., Fl. Brit. W. Ind., p. 293.— Juan Griego trail, alt. 450 m., *Johnston*, no. 289, Aug. 12 to 15. Further distribution, tropical America.

P. MONTICOLA Johnston, Proc. Amer. acad. arts and sci., vol. 40, p. 692 (1905).— Climbing over low shrubs at the mountain top, alt. 700 to 795 m., San Juan Mt., *Johnston*, no. 64, July 11. Endemic.

P. NITENS Johnston, Proc. Amer. acad. arts and sci., vol. 40, p. 692 (1905).— El Valle, South Hill, *Johnston*, no. 65, Aug. 31. Endemic.

CARICACEAE.

CARICA L.

C. PAPAYA L., Sp. pl., vol. 2, p. 1036 (1753); Griseb., Fl. Brit. W. Ind., p. 290.— In Asuncion valley. Venezuela: Cumaná, *Loefling*, Reise nach den spanischen Ländern, p. 152–153. Cultivated in all tropical countries.

LOASACEAE.

MENTZELIA L.

M. ASPERA L., Sp. pl., vol. 1, p. 516 (1753); Griseb., Fl. Brit. W. Ind., p. 298.— Juan Griego, *Ernst*. Venezuela: Colonia Tovar, *Fendler*, no. 453, 1856–57. Further distribution, in tropical America.

BEGONIACEAE.

BEGONIA L.

B. SCANDENS Sw., Prod., p. 86 (1788).— Juan Griego trail, alt. 400 m., *Johnston*, no. 291, July 31. Further distribution, West Indies, Brazil, Peru.

CACTACEAE.

CEREUS Mill.

C. CARIPENSIS (HBK.) DC., Prod., vol. 3, p. 467 (1828). *Cactus caripensis* HBK., Nov. gen. et. sp., vol. 6, p. 66 (1823).— South Hill, El Valle, alt. 300 m., *Johnston*, no. 217, July 18. Further distribution, Mexico.

C. EBURNEUS Salm-Dyck, Obs. bot., p. 6 (1822).— El Valle, *Johnston*, no. 342, July 27. Further distribution, Curaçoa and Chili.

C. JAMACARU DC., Prod., vol. 3, p. 467 (1828).— Tacarigua, *Johnston*, no. 341, Aug. 15. Further distribution, Brazil.

C. MARGARITENSIS Johnston, Proc. Amer. acad. arts and sci., vol. 40, p. 693 (1905).— El Valle, on the hillside, *Johnston*, no. 344, July 27. Endemic.

C. SWARTZII Griseb., Fl. Brit. W. Ind., p. 301 (1860).— Santa Ana, *Ernst*. Found also in Jamaica.

MAMMILLARIA Haw.

M. SIMPLEX Haw., Syn. pl. succ., p. 177 (1812); Griseb., Fl. Brit. W. Ind. p. 300.— Juan Griego, *Ernst*. Further distribution, Haiti and Venezuela.

MELOCACTUS Link & Otto.

M. COMMUNIS Link & Otto in Verh. preuss. Ver. Gartenb., vol. 3, p. 417, pl. 11 (1827); Griseb., Fl. Brit. W. Ind., p. 300.— Juan Griego, *Ernst*; El Valle, plain by sea, *Miller & Johnston*, no. 272, Aug. 3; Pt. Moreno, *Johnston*, no. 343, Aug. 10. Further distribution, West Indies.

OPUNTIA Mill.

O. LEPTOCAULIS DC. in Mém. mus. Par., vol. 17, p. 118 (1828).— En route El Valle to San Antonio, *Johnston*, no. 340, Aug. 3. Further distribution, Mexico.

O. TUNA Mill., Gard. dict., ed. 8, no. 3 (1768); Griseb., Fl. Brit. W. Ind., p. 302.— Common everywhere on the plains and hillsides. El Valle, *Johnston*, no. 218, July 4. Common in tropical America.

PERESKIA Mill.

P. OPUNTIAEFLORE DC. in Mém. mus. Par., vol. 17, p. 76, p. 19 (1828).— Pt. Moreno, *Johnston*, no. 216. Further distribution, Mexico.

P. sp., reported by *Ernst* at Santa Ana, is probably the above.

RHIPSALIS Gaertn.

R. CASSUTHA Gaertn., *Fruct.*, vol. 1, p. 137, pl. 28 (1788); Griseb., *Fl. Brit. W. Ind.*, p. 302 as *cassytha*.—El Valle, *Johnston*, no. 16. Found hanging from the branches of trees; fruit becoming white. Further distribution, tropical America.

THYMELAEACEAE.

DAPHNOPSIS Mart. & Zucc.

D. americana (Mill.), n. comb. *Laurus americana* Mill., *Dict.*, ed. 8, no. 10 (1768). *Daphne tinifolia* Sw., *Prod. veg. Ind. Occ.*, p. 63 (1788). *Daphnopsis tinifolia* Griseb., *Fl. Brit. W. Ind.*, p. 278 (1860).—Juan Griego trail, alt. 450 m., *Johnston*, no. 257, Aug. 14. Further distribution, Jamaica.

LYTHRACEAE.

ROOTALA L.

R. DENTIFERA (Gray) Koehne in *Engl., Bot. Jahrb.*, vol. 1, p. 161 (1881). *Ammannia dentifera* Gray, *Pl. Wright.*, vol. 2, p. 55 (1853).—Juan Griego, *Johnston*, no. 276, Aug. 14. Further distribution, Mexico.

RHIZOPHORACEAE.

RHIZOPHORA L.

R. MANGLE L., *Sp. pl.*, vol. 1, p. 443 (1753); Griseb., *Fl. Brit. W. Ind.*, p. 274.—Laguna Chica, *Johnston*, no. 246, Aug. 10, also at Pt. Piedras, and at Laguna Grande. Venezuela: *Ernst*, *Sobre la flora y fauna*, p. 223. Common to tropical countries.

MYRTACEAE.

MYRCIA DC.

M. CORIACEA (Vahl) DC., *Prod.*, vol. 3, p. 243 (1828); Griseb., *Fl. Brit. W. Ind.*, p. 234. *Myrtus coriacea* Vahl., *Symb.*, vol. 2, p. 59 (1791).—San Juan Mt., alt. 780 m., *Johnston*, no. 263, July 6. These

specimens differ from the typical form in having oval leaves with short blunt points, and in having narrow calyx-lobes. Further distribution, West Indies.

PSIDIUM L.

P. GUAJAVA L., Sp. pl., vol. 1, p. 470 (1753). *P. Guava* Radd. acc. to Griseb., Fl. Brit. W. Ind., p. 241 (1860).— El Valle, *Miller & Johnston*, no. 140, July 14, and *Johnston*, no. 244, July 2. Venezuela: Cumaná, Loeffling *Reise nach den spanischen Ländern*, p. 152–153. Common to tropical countries.

COMBRETACEAE.

COMBRETUM L.

C. SECUNDUM Jacq., Enum. pl. Carib., p. 19 (1760).— Santa Ana, *Ernst*. Further distribution, Trinidad, Venezuela, Colombia, Guiana.

CONOCARPUS L.

C. ERECTUS L., Sp. pl., vol. 1, p. 176 (1753); Jacq., Hist. Stirp. Am., p. 78; Griseb., Fl. Brit. W. Ind., p. 277.— Juan Griego, *Ernst*; Laguna Chica, *Johnston*, no. 215, Aug. 10. Further distribution, tropical America and tropical Africa.

LAGUNCULARIA Gaertn.

L. RACEMOSA Gaertn. f., Fruct., vol. 3, p. 209, pl. 217, fig. 3 (1805); Griseb., Fl. Brit. W. Ind., p. 276.— Juan Griego, *Ernst*; Laguna Chica, *Johnston*, no. 247, Aug. 10. Further distribution, tropical America and tropical Africa.

QUISQUALIS L.

Q. INDICA L., Sp. pl., ed. 2, vol. 1, p. 556 (1762).— El Valle, *Miller & Johnston*, no. 91, July 29. Cultivated in Margarita from tropical Asia.

TERMINALIA L.

T. BUCERAS (L.) Wright in Sauv., Fl. Cub., p. 38 (1873). *Bucida Buceras* L., Syst. nat., ed. 10, vol. 2, p. 1025 (1759).— San Juan Mt., *Johnston*, no. 275, Aug. 28. Further distribution, tropical America.

MELASTOMACEAE.

BLAKEA P. Br.

B. MONTICOLA Johnston, Proc. Amer. acad. arts and sci., vol. 40, p. 693 (1905).— Abundant on the exposed top of San Juan Mt., alt. 700 to 795 m., *Johnston*, no. 51, July 6. Shrub, 1–2 m. high, branching copiously; flowers pink. Endemic. PLATE 27, fig. 1.

CLIDEMIA D. Don.

C. NEGLECTA D. Don, Mem. Wern. soc., vol. 4, p. 307 (1823); Mart., Fl. Bras., vol. 14, pt. 4, p. 483.— El Valle, alt. 600 m., *Miller & Johnston*, no. 33, July 25. Further distribution, Peru and Brazil.

MICONIA Ruiz & Pav.

M. LAEVIGATA (L.) DC., Prod., vol. 3, p. 188 (1828). *Melastoma laevigata* L., Sp. pl., ed. 2, vol. 1, p. 559 (1762).— El Valle, *Miller & Johnston*, no. 119, July 24; San Juan Mt., alt. 600 m., *Johnston*, no. 52, July 11. Venezuela: Colonia Tovar, *Fendler*, no. 2262, 1856–57. Further distribution, tropical America.

M. PRASINA (Sw.) DC., Prod., vol. 3, p. 188 (1828). *Melastoma prasina* Sw., Fl. Ind. Occ., vol. 2, p. 777 (1800).— Juan Griego trail, alt. 450 m., *Johnston*, no. 53, Aug. 12–15. A slender tree, about 7 m. high, with small white flowers. Further distribution, tropical America.

ONAGRACEAE.

JUSSIAEA L.

J. SUFFRUTICOSA L., Sp. pl., vol. 1, p. 388 (1753); Griseb., Fl. Brit. W. Ind., p. 273.— Juan Griego, *Miller & Johnston*, no. 45, Aug. 9. Common to tropical countries.

ARALIACEAE.

GILIBERTIA Ruiz & Pav.

G. ARBOREA (L.) March. in Durand & Pittier, Bull. soc. bot. Belg., vol. 30, p. 281 (1891). *Aralia arborea* L., Pl. Jam. Pugill., pt. 2, p. 11, and Syst. nat., ed. 10, vol. 2, p. 967 (1759). *Dendropanax arboreum*

Dcne. & Planch., Rev. hort., ser. 4, vol. 3, p. 107 (1854).— Juan Griego trail, alt. 450 m., *Johnston*, no. 112, July 31. Further distribution, tropical America. A tree, 20 m. high, with a clear trunk, which is 10 m. high and 35 cm. in diameter. Spread of foliage about 15 m.

OREOPANAX Dcne. & Planch.

O. CAPITATUM (Jacq.) Dcne. & Planch., Rev. hort., ser. 4, vol. 3, p. 108 (1854). *Aralia capitata* Jacq., Hist. Stirp. Am., p. 89 (1763).— Juan Griego trail, alt. 450 m., *Johnston*, no. 308, Aug. 12–15. Venezuela: Colonia Tovar, *Fendler*, nos. 1320 and 526, 1854–55; Funk & Schlim, no. 91, according to Seemann, Journ. bot., vol. 3, p. 270. Further distribution, Jamaica and Brazil.

ERICACEAE.

VACCINIUM L.

V. LATIFOLIUM B. & H. f., Gen., vol. 2, p. 575 (1876), by implication. *Thibaudia latifolia* Griseb., Fl. Brit. W. Ind., p. 143 (1859).— San Juan Mt., alt. 700 m., *Johnston*, no. 272, Aug. 28; also found on Juan Griego trail, alt. 450 m., July 31. Further distribution, Trinidad.

PLUMBAGINACEAE.

PLUMBAGO L.

P. CAPENSIS Thunb., Prod. pl. Cap., p. 33 (1794).— El Valle, in a garden, *Miller & Johnston*, no. 117, July 29. Cultivated in Margarita from South Africa.

P. SCANDENS L., Sp. pl., ed. 2, vol. 1, p. 215 (1762); Griseb., Fl. Brit. W. Ind., p. 390.— Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 36, July 17. Venezuela: lower Orinoco, *Rusby & Squires*, no. 68, 1896. Tropical America.

SAPOTACEAE.

ACHRAS L.

A. ZAPOTA L., Sp. pl., vol. 2, p. 1190 (1753); Jacq., Hist. Stirp. Am., p. 57, pl. 61. *Sapota Achras* Mill., Gard. dict., ed. 8, no. 1 (1768); Griseb., Fl. Brit. W. Ind., p. 399.— El Valle, *Miller & Johnston*, no.

103. Cultivated in El Valle, Asuncion, and Tacarigua. Found in tropical countries.

BUMELIA Sw.

B. CUNEATA Sw., Fl. Ind. Occ., vol. 1, p. 496 (1797); Griseb., Fl. Brit. W. Ind., p. 401; *Jacquinia petiolata* Johnston, Proc. Amer. acad. arts and sci., vol. 40, p. 693 (1905).—Pt. Mosquito, east of Laguna Chica, *Johnston*, no. 273, Aug. 10, and Coche, Aug. 5. Distribution general in West Indies.

OLEACEAE.

LINOCIERA Sw.

L. CARIBAEA (Jacq.) Knobl., Bot. Centralbl., vol. 61, p. 87 (1895). *Chionanthus caribaea* Jacq., Coll., vol. 2, p. 110 (1788). *Linociera compacta* R. Br., Prod., p. 523 (1810); Griseb., Fl. Brit. W. Ind., p. 405.—Juan Griego trail, alt. 350 m., *Johnston*, no. 136, July 2. Tree, 10 m. high. Further distribution, tropical America.

GENTIANACEAE.

COUTOUBEA Aubl.

C. DENSIFLORA Mart., Nov. gen. et sp., vol. 2, p. 111, pl. 185 (1826); Griseb., Fl. Brit. W. Ind., p. 423.—San Juan Mt., alt. 650 m., *Johnston*, no. 123, July 6. Further distribution, tropical America. Flowers white.

APOCYNACEAE.

ECHITES P. Br.

E. SECUNDIFLORA A. DC. in DC., Prod., vol. 8, p. 457 (1844).—San Juan Mt., alt. 750 m., *Johnston*, no. 137, July 11. Venezuela: Colonia Tovar, *Fendler*, nos. 1033, 1034, 1854–55. Further distribution, Mexico.

E. SUBSAGITTATA Ruiz & Pav., Fl. Per., vol. 2, p. 19 (1799); Griseb., Fl. Brit. W. Ind., p. 413.—Santa Ana, *Ernst*. Further distribution, tropical America.

E. UMBELLATA Jacq., Enum. pl. Carib., p. 13 (1760), and Hist. Stirp. Am., p. 30; Griseb., Fl. Brit. W. Ind., p. 414.—Santa Ana, *Ernst*. Further distribution, West Indies.

NERIUM L.

N. OLEANDER L., Sp. pl., vol. 1, p. 209 (1753).— El Valle, *Miller & Johnston*, no. 209, July 11. Cultivated for ornament in all warm countries.

PLUMERIA L.

P. ALBA L., Sp. pl., vol. 1, p. 210 (1753); Griseb., Fl. Brit. W. Ind., p. 411.— Santa Ana, *Ernst*. Venezuela: near Cumaná and Caracas, HBK., Nov. gen. et sp., vol. 3, p. 230. Distributed from Cuba to the French Ids.

P. CARACASANA Johnston, Contrib. U. S. nat. herb., vol. 12, p. 108 (1908).— El Valle, *Miller & Johnston*, no. 100, July 24. Venezuela: between Caracas and La Guaira, alt. 500 m., *Fendler*, no. 1026, Aug. 16, 1855; La Guaira, *Robinson & Lyon*, July 13, 1900.

RAUVOLFIA L.

R. LAMARKII DC., Prod., vol. 8, p. 337 (1844); Griseb., Fl. Brit. W. Ind., p. 408.— El Valle, *Miller & Johnston*, no. 43, July 5, and *Johnston*, no. 135, July 15. Further distribution, West Indies.

TABERNAEMONTANA L.

T. AMYGDALIFOLIA Jacq., Enum. pl. Carib., p. 14 (1760); Bot. reg., vol. 4, p. 338.— El Valle, *Miller & Johnston*, no. 90, and *Johnston*, no. 68, July 1. Venezuela: Colonia Tovar, *Fendler*, no. 1029, Mar. 13, 1855. Further distribution, tropical America. Varying from a tree about 8 meters high with a trunk 1 decimeter in diameter at its base to a diffuse shrub in form.

T. PSYCHOTRIFOLIA HBK., Nov. gen. et sp., vol. 3, p. 227 (1818); Griseb., Fl. Brit. W. Ind., p. 409.— Santa Ana, *Ernst*. Venezuela: Sacupana, *Rusby & Squires*, no. 85, 1896. Further distribution, Trinidad.

THEVETIA Adans.

T. NEREIFOLIA Juss. ex Steud., Nom., ed. 2, vol. 2, p. 680 (1841); Griseb., Fl. Brit. W. Ind., p. 407; Mart., Fl. Bras., vol. 6, pt. 1, pl. 10.— Santa Ana, *Ernst*; El Valle, garden, *Miller & Johnston*, no. 101, July 31. Distribution, tropical America.

ASCLEPIADACEAE.

ASCLEPIAS L.

A. CURASSAVICA L., Sp. pl., vol. 1, p. 215 (1753); Griseb., Fl. Brit. W. Ind., p. 419; Desc., Ant., vol. 2, p. 191, pl. 116.— Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 84, July 11. Venezuela: near Cumaná, HBK., Nov. gen. et sp., vol. 3, p. 190; Consejo, *Fendler*, no. 1037, Mar. 13, 1855; Sacupana, *Rusby & Squires*, no. 26, April, 1896. Further distribution, tropical America.

CALOTROPIS R. Br.

C. PROCERA (Willd.) Dryand. in Ait. f., Hort. Kew., ed. 2, vol. 2, p. 78 (1811); Griseb., Fl. Brit. W. Ind., p. 420; Bot. reg., vol. 21, pl. 1792. *Asclepias procera* Willd. Sp. pl., vol. 1, p. 1263 (1798).— Juan Griego, *Ernst*; El Valle, *Miller & Johnston*, no. 252, July 6. Venezuela: La Guaira, *Fendler*, no. 1053, Aug. 16, 1855. Common in tropical countries.

DITASSA R. Br.

D. SUBULATA Johnston, Proc. Amer. acad. arts and sci., vol. 40, p. 694 (1905).— San Juan Mt., climbing over low shrubs at the summit, alt. 740 m., *Johnston*, no. 262, July 6. Endemic.

IBATIA Dcne.

I. MARITIMA (L.) Dcne. in DC., Prod., vol. 8, p. 599 (1844). *Cynanchum maritimum* L., Mant., p. 54 (1767); Jacq., Hist. Strip. Am., p. 83, pl. 56. *Ibatia muricata* Griseb., Fl. Brit. W. Ind., p. 421 (1861).— Juan Griego, *Ernst*. Further distribution, West Indies, Venezuela.

MARSDENIA R. Br.

M. MACULATA Hook., Bot. mag., pl. 4299 (1847); Griseb., Fl. Brit. W. Ind., p. 422.— El Valle, *Miller & Johnston*, no. 17, July 18, and *Johnston*, no. 67, Aug. 8. A vine hanging from trees. Further distribution, Central America and Colombia.

METASTELMA R. Br.

M. SCHLECTENDAHLII Dcne. in DC., Prod., vol. 8, p. 513 (1844); Griseb., Fl. Brit. W. Ind., p. 417.— El Valle, *Miller & Johnston*, no. 14, July 14. Venezuela: according to *Ernst* in Seem., Journ. bot., vol. 5, p. 294 (1867). Further distribution, tropical America.

SARCOSTEMMA R. Br.

S. GLAUCA HBK., Nov. gen. et sp., vol. 3, p. 194, pl. 229 (1818).— Santa Ana, *Ernst*. Venezuela: near La Guaira, Maiqueti, and Cabo Blanco, HBK., *l. c.*

CONVOLVULACEAE.

CUSCUTA L.

C. AUSTRALIS R. Br., Prod., p. 491 (1810). *C. obtusiflora* HBK., Nov. gen. et sp., vol. 3, p. 122 (1818); Mart., Fl. Bras., vol. 7, p. 380, pl. 127; Griseb., Fl. Brit. W. Ind., p. 476.— Santa Ana, *Ernst*. Distributed from Florida to Peru.

EVOLVULUS L.

E. ARENICOLA Johnston, Proc. Amer. acad. arts and sci., vol. 40, p. 694 (1905).— Along the trail from Porlamar to San Antonio, *Miller & Johnston*, no. 218, Aug. 2. Endemic.

E. FILIPES Mart., Flora, vol. 24, pt. 2, Beibl., p. 100 (1841).— El Valle, *Miller & Johnston*, no. 16, Aug. 9. Further distribution, Brazil.

E. INCANUS Pers., Syn., vol. 1, p. 288 (1805). *E. sericeus* Sw., Prod. veg. Ind. Occ., p. 55 (1788); Griseb., Fl. Brit. W. Ind., p. 475.— Santa Ana, *Ernst*. Distribution general in tropical America.

E. MUCRONATUS Sw. ex Wikstr., Vet. akad. handl. Stockh., p. 61 (1827); Griseb., Fl. Brit. W. Ind., p. 475.— Santa Ana, *Ernst*. Distributed from Porto Rico to Peru.

IPOMOEA L.

I. BATATAS Poir., Encycl., vol. 6, p. 14 (1804); Griseb., Fl. Brit. W. Ind., p. 468. Cultivated, according to Ernst. Commonly cultivated in warm climates.

I. PES-CAPRAE (L.) Sweet, Hort. suburb. Lond., p. 35 (1818); Griseb., Fl. Brit. W. Ind., p. 470. *Convolvulus pes caprae* L., Sp. pl., vol. 1, p. 159 (1753). *Ipomoea biloba* Forsk., Fl. Aegypt.-Arab., p. 44 (1775).— Juan Griego, *Ernst*. Venezuela: Colonia Tovar, *Fendler*, no. 937, 1854–55. All tropical countries.

I. CARNEA Jacq., Enum. pl. Carib., p. 13 (1760); Griseb., Fl. Brit.

W. Ind., p. 469.— El Valle, *Miller & Johnston*, no. 79, July 18, and *Johnston*, no. 80, Aug. 8, and no. 39. Further distribution, Nicaragua, Jamaica, Colombia.

I. COCCINEA L., Sp. pl., vol. 1, p. 160 (1753); Griseb., Fl. Brit. W. Ind., p. 472.— El Valle, *Miller & Johnston*, no. 75, July 19. Venezuela: Colonia Tovar, *Fendler*, nos. 933, 2075, 1854–57. Further distribution, temperate and tropical countries.

I. QUAMOCLIT L., Sp. pl., vol. 1, p. 159 (1753); Griseb., Fl. Brit. W. Ind., p. 472.— El Valle, *Miller & Johnston*, no. 76, July 12. Venezuela: near Cumanacoa and Angostura, HBK., Nov. gen. et sp., vol. 3, p. 110. Further distribution, tropical countries.

I. SINUATA Orteg., Hort. Matr. dec., 84 (1798). *I. dissecta* Pursh acc. to Griseb., Fl. Brit. W. Ind., p. 467.— Asuncion, *Miller & Johnston*, no. 78, Aug. 9. Venezuela: Ernst in Seem., Journ. bot., 1867, p. 290–296. Further distribution, tropical countries.

I. TRIFIDA G. Don, Gen. syst., vol. 4, p. 280 (1838).— El Valle, *Miller & Johnston*, no. 77, July 16. Venezuela: La Victoria, *Fendler*, no. 2074B, Nov. 21, 1856. Further distribution, tropical America.

I. TUBEROSA L., Sp. pl., vol. 1, p. 160 (1753); Griseb., Fl. Brit. W. Ind., p. 467.— Santa Ana, *Ernst*. Further distribution, tropical countries.

JACQUEMONTIA Choisy.

J. VIOLACEA (Vahl.) Choisy in Mém. soc. phys. Genève., vol. 8, p. 61 (1838). *Convolvulus violaceus* Vahl, Symb., vol. 3, p. 29 (1794). *C. pentanthos* Jacq., Coll., vol. 4, p. 210 (1790); Griseb., Fl. Brit. W. Ind., p. 474.— El Valle, *Miller & Johnston*, no. 80, July 12. Venezuela: Ernst in Seem., Journ. bot., 1867, p. 293. Further distribution, Cuba and Mexico to Peru.

BORRAGINACEAE.

BOURRERIA P. Br.

B. EXSUCCA Jacq., Enum. pl. Carib., p. 14 (1760); Griseb., Fl. Brit. W. Ind., p. 482.— Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 10, July 8, and *Johnston*, no. 86, July 15. A slender tree, 3 to 4 m. high. Further distribution, St. Vincent, Colombia, Venezuela.

CORDIA L.

C. ALBA (Jacq.) Roem. & Schult., Syst., vol. 4, p. 466 (1819); Griseb., Fl. Brit. W. Ind., p. 478. *Varronia alba* Jacq., Hist. Stirp.

Am., p. 41 (1763).— El Valle, *Miller & Johnston*, no. 72, July 6, and *Johnston*, no. 87, July 24. Venezuela: Ernst, *Sobre la flora y fauna*, p. 227; La Guaira, *Fendler*, no. 921, Aug. 16, 1855. A slender tree, 5 m. high. Further distribution, tropical America.

C. CYLINDRISTACHYA (Ruiz & Pav.) Roem. & Schult., *Syst.*, vol. 4, p. 459 (1819); Griseb., *Fl. Brit. W. Ind.*, p. 480. *Varronia cylindrostachya* Ruiz & Pav., *Fl. Peruv.*, vol. 2, p. 23, pl. 147 (1799).— Juan Griego, Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 26, July 4, and *Johnston*, no. 85, July 15. Further distribution, Lower California, West Indies to Uruguay.

C. DISCOLOR Cham., *Linnaea*, vol. 4, p. 482 (1829).— San Juan Mt., alt. 570 m., *Johnston*, no. 296, July 19. Leaves narrower than in the typical specimen. Further distribution, Brazil and Bolivia.

C. GERASCANTHUS Jacq., *Hist. Stirp. Am.*, p. 43, pl. 175 (1763); Griseb., *Fl. Brit. W. Ind.*, p. 478.— Santa Ana, *Ernst*. Venezuela: Colonia Tovar, *Fendler*, no. 2054, 1856–57. Further distribution, West Indies, Guatemala to Brazil.

C. GLOBOSA (Jacq.) HBK., *Nov. gen. et sp.*, vol. 3, p. 76 (1818); Griseb., *Fl. Brit. W. Ind.*, p. 481. *Varronia globosa* Jacq., *Enum. pl. Carib.*, p. 14 (1760).— El Valle, *Miller & Johnston*, no. 221, July 18; Asuncion, *Johnston*, no. 84, July 9. Slender bush, 2–3 m. high. Venezuela: Ernst, *Sobre la flora y fauna*, p. 227. Further distribution, tropical America.

C. RETICULATA Vahl, *Eclog. Am.*, vol. 3, p. 5 (1807); Griseb., *Fl. Brit. W. Ind.*, p. 479.— Juan Griego, *Ernst*. Further distribution, West Indies, Venezuela.

C. SEBESTENA L., *Sp. pl.*, vol. 1, p. 190 (1753); Griseb., *Fl. Brit. W. Ind.*, p. 478; Jacq., *Hist. Stirp. Am.*, p. 42.— Juan Griego, *Ernst*; El Valle, *Miller & Johnston*, no. 219, July 26. Further distribution, West Indies to Guiana and Colombia.

HELIOTROPIUM L.

H. CURASSAVICUM L., *Sp. pl.*, vol. 1, p. 130 (1753); Griseb., *Fl. Brit. W. Ind.*, p. 486.— Juan Griego, *Ernst*. Venezuela: Tortuga, Ernst in Seem., *Journ. bot.*, vol. 14, p. 179 (1876). Common to tropical countries.

H. FILIFORME HBK., *Nov. gen. et sp.*, vol. 3, p. 86, pl. 204 (1818); Griseb., *Fl. Brit. W. Ind.*, p. 486.— El Valle, *Miller & Johnston*, no. 148, Aug. 8; Juan Griego, *Johnston*, no. 331, Aug. 14. Venezuela: at Rio Apure, between the towns of El Diamante and San Fernando,

HBK., *Nov. gen. et sp.*, vol. 3, p. 86. Further distribution, American tropics.

H. INDICUM L., *Sp. pl.*, vol. 1, p. 130 (1753); Griseb., *Fl. Brit. W. Ind.*, p. 485.— Juan Griego, Santa Ana, Asuncion, *Ernst*; El Valle, *Miller & Johnston*, no. 206, July 5, and *Johnston*, no. 49, July 15. Found in all tropical countries.

H. PARVIFLORUM L., *Mant.*, vol. 2, p. 201 (1771); Griseb., *Fl. Brit. W. Ind.*, p. 485.— El Valle, *Miller & Johnston*, no. 32, July 7, and *Johnston*, no. 93, Aug. 8; also found at Juan Griego. Further distribution, tropical America.

TOURNEFORTIA L.

T. GNAPHALODES R. Br., *Prod.*, p. 496 (1810), by implication; Griseb., *Fl. Brit. W. Ind.*, p. 483.— Juan Griego, *Ernst*; Pt. Moreno, *Johnston*, no. 105, July 8. Further distribution, Florida, Bahamas, West Indies. A shrub, 0.5–1 m. high, growing in the loose sand near the sea.

T. HIRSUTISSIMA L., *Sp. pl.*, vol. 1, p. 140 (1753); Griseb., *Fl. Brit. W. Ind.*, p. 483.— El Valle, *Miller & Johnston*, no. 47. Venezuela: near Cumaná and Bordones, HBK., *Nov. gen. et sp.*, vol. 3, p. 80. Further distribution, tropical America.

T. INCANA Lam., *Illust.*, vol. 1, p. 417 (1791); Griseb., *Fl. Brit. W. Ind.*, p. 485.— Santa Ana, *Ernst*. Further distribution, Cuba, Haiti.

T. SCANDENS Mill., *Gard. dict.*, ed. 8, no. 4 (1768).— El Valle, *Miller & Johnston*, no. 2, Aug. 2, and no. 249, July 20, and *Johnston*, no. 254, July 27. Further distribution, Jamaica.

T. VOLUBILIS L., *Sp. pl.*, vol. 1, p. 140 (1753); Griseb., *Fl. Brit. W. Ind.*, p. 484.— Santa Ana, *Ernst*. Further distribution, tropical America.

T. SP. Shrubby; leaves oval, entire, glabrous on upper side, pilose on lower side, with acuminate apex and rounded unequal base, 4 cm. wide and 8 cm. long, and smaller; petiole 5 to 10 mm. long; inflorescence cymose, reddish-pubescent; calyx-lobes narrowly acute.— El Valle to San Juan, *Johnston*, no. 83, July 11.

VERBENACEAE.

AVICENNIA L.

A. NITIDA Jacq., *Enum. pl. Carib.*, p. 25 (1760), and Jacq., *Hist. Stirp. Am.*, p. 177.— Pt. Mosquito, *Johnston*, no. 139, Aug. 10.

Venezuela: Ernst, *Sobre la flora y fauna*, p. 223. Further distribution, Cuba to Brazil, tropical Africa.

BOUCHEA Cham.

B. EHRENBERGII Cham. in *Linnaea*, vol. 7, p. 253 (1832); Griseb., *Fl. Brit. W. Ind.*, p. 493.— El Valle, *Miller & Johnston*, no. 205, July 20. Venezuela: La Guaira according to Schauer, *Linnaea*, vol. 20, p. 478. Further distribution, tropical America.

CITHAREXYLUM Mill.

C. QUADRANGULARE Jacq., *Enum. pl. Carib.*, p. 26 (1760); Griseb., *Fl. Brit. W. Ind.*, p. 497; Jacq., *Hort. Vind.*, vol. 1, pl. 22.— Santa Ana, *Ernst*. Further distribution, West Indies, Guiana.

CLERODENDRON L.

C. MOLLE HBK., *Nov. gen. et sp.*, vol. 2, p. 244 (1817).— El Valle, *Miller & Johnston*, no. 8, July 30; en route El Valle to Asuncion, *Johnston*, no. 82, July 9. A form with small flowers, especially a small calyx. Short spines occur in some axils. Further distribution, Peru and Galapagos Ids.

DURANTA L.

D. PLUMIERI Jacq., *Hist. Stirp. Am.*, p. 186, pl. 176, fig. 76 (1763); Griseb., *Fl. Brit. W. Ind.*, p. 498.— Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 115, July 15. Venezuela: Cumaná, *Moritz*, no. 424, according to Schauer, *Linnaea*, vol. 20, p. 482. Further distribution, tropical America.

LANTANA L.

L. CAMARA L., *Sp. pl.*, vol. 2, p. 627 (1753); Griseb., *Fl. Brit. W. Ind.*, p. 495; Desc., *Ant.*, vol. 4, p. 330, pl. 304.— Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 95, July 6. Venezuela: Caracas and Valencia, *Moritz*, according to Schauer, *Linnaea*, vol. 20, p. 481; Colonia Tovar, *Fendler*, no. 860 (in part), Jan. 31, Feb. 23, 1854; Sacupana, *Rusby & Squires*, no. 4; Paloma, *Rusby & Squires*, no. 312; Caracas, *A. H. Moore*, Mar. 16, 1899; San Julian, *Robinson & Lyon*, July 17, 1900. Distribution general in tropical America.

L. LILACINA Desf., *Cat. hort. Par.*, ed. 3, p. 392 (1829); Schauer in *Mart.*, *Fl. Bras.*, vol. 9, p. 261, pl. 44, fig. 1. *L. stricta*, var. *lilacina*

Griseb., Fl. Brit. W. Ind., p. 496 (1861).— El Valle, *Miller & Johnston*, no. 94. Venezuela: Caracas, *Moritz*, according to Schauer, *Linnaea*, vol. 20, p. 481. Distributed from Mexico to Brazil.

L. RETICULATA Pers., Syn., vol. 2, p. 141 (1807); Griseb., Fl. Brit. W. Ind., p. 496; Ernst, Bot. Excurs. Margarita, p. 7. *L. Sellowiana* Link & Otto, Ic. pl. sel. Berol., p. 107, pl. 50 (1828).— Santa Ana, *Ernst*. Further distribution, West Indies, Venezuela.

L. TRIFOLIA L., Sp. pl., vol. 2, p. 626 (1753); Griseb., Fl. Brit. W. Ind., p. 496.— Santa Ana, *Ernst*. Venezuela: Aragua, *E. Otto & Moritz*, according to Schauer, *Linnaea*, vol. 20, p. 481. Further distribution, tropical America.

LIPPIA L.

L. GEMINATA HBK., Nov. gen. et sp., vol. 2, p. 266 (1817); Griseb., Fl. Brit. W. Ind., p. 495.— Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 125, Aug. 16, and *Johnston*, no. 81, Aug. 8. Further distribution, tropical America. A spreading bush, 1 m. high.

L. MICROMERA Schauer in DC., Prod., vol. 11, p. 587 (1847); Griseb., Fl. Brit. W. Ind., p. 495.— Juan Griego, *Ernst*. Venezuela: Angostura, *Moritz*, according to Schauer, *Linnaea*, vol. 20, p. 480. Distributed from West Indies to Guiana.

PRIVA Adans.

P. LAPPULACEA (L.) Pers., Syn., vol. 2, p. 139 (1807). *P. echinata* Juss., Ann. mus. Par., vol. 7, p. 69 (1806); Griseb., Fl. Brit. W. Ind., p. 493. *Verbena lappulacea* L., Sp. pl., vol. 1, p. 19 (1753).— Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 96, July 9. Further distribution, tropical America.

STACHYTARPHETA Vahl.

S. CAJANENSIS Vahl, Enum., vol. 1, p. 208 (1804); Griseb., Fl. Brit. W. Ind., p. 494.— Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 93, July 6, and *Johnston*, no. 92, Aug. 8. Venezuela: near Cumaná, Bordones, and Caripe, HBK., Nov. gen. et sp., vol. 2, p. 280; Guayre River, *Moritz*, and Orinoco, *S. Ayres*, according to Schauer, *Linnaea*, vol. 20, p. 478. Further distribution, tropical America.

S. JAMAICENSIS (L.) Vahl, Enum., vol. 1, p. 206 (1804); Griseb., Fl. Brit. W. Ind., p. 494. *Verbena jamaicensis* L., Sp. pl., vol. 1, p. 19 (1753). *S. indica* Vahl, Enum., vol. 1, p. 206 (1804); Griseb.,

Fl. Brit. W. Ind., p. 494. *Verbena indica* L., Sp. pl., ed. 2, vol. 1, p. 27 (1762).—El Valle, *Miller & Johnston*, no. 92, July 5. Venezuela: near Cumaná, HBK., Nov. gen. et sp., vol. 2, p. 279. Further distribution, tropical countries.

LABIATAE.

COLEUS Lour.

C. AMBOINICUS Lour., Fl. Cochinch., vol. 2, p. 372 (1790); Griseb., Fl. Brit. W. Ind., p. 487. *Plectranthus aromaticus* Roxb., Hort. Bengal., p. 45 (1814). *C. aromaticus* Benth. in Wallich, Pl. As. rar., vol. 2, p. 15 (1831); Bot. reg., vol. 18, pl. 1520.—Santa Ana, *Ernst*. Introduced into the West Indies from the East Indies.

HYPTIS Jacq.

H. CAPITATA Jacq., Coll., vol. 1, p. 102 (1786), and Ic. rar., vol. 1, pl. 114; Griseb., Fl. Brit. W. Ind., p. 488.—Santa Ana, *Ernst*. Further distribution, tropical America, Manila.

H. PECTINATA (L.) Poit., Ann. mus. Par., vol. 7, p. 474, pl. 30 (1806); Griseb., Fl. Brit. W. Ind., p. 489. *Nepeta pectinata* L., Syst. nat., ed. 10, vol. 2, p. 1097 (1759).—El Valle, *Miller & Johnston*, no. 110, July 24. Further distribution, tropical America, East Indies.

LEONOTIS R. Br.

L. NEPETIFOLIA R. Br. in Ait. f., Hort. Kew., ed. 2, vol. 3, p. 409 (1811); Griseb., Fl. Brit. W. Ind., p. 492.—Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 74, July 19. Common in tropical countries.

SALVIA L.

S. COCCINEA Juss. ex Murr., Comm. Goetting., vol. 1, p. 86, pl. 1 (1778); Griseb., Fl. Brit. W. Ind., p. 490.—Santa Ana, *Ernst*. Further distribution, tropical America.

S. OCCIDENTALIS Sw., Prod. veg. Ind. Occ., p. 14 (1788); Griseb., Fl. Brit. W. Ind., p. 490.—Santa Ana, *Ernst*. Further distribution, tropical America.

S. TILIAEFOLIA Vahl, Symb. bot., vol. 3, p. 7 (1794).—Santa Ana, *Ernst*. Venezuela: valley of Caracas, HBK., Nov. gen. et sp., vol. 2, p. 299 (as *S. fimbriata*). Further distribution, Mexico.

SOLANACEAE.

BASSOVIA Aubl.

B. CILIATA Johnston, Proc. Amer. acad. arts and sci., vol. 40, p. 694 (1905).— El Valle, River trail, *Miller & Johnston*, no. 255, July 15, and *Johnston*, no. 75, Aug. 30.

BRACHISTUS Miers.

B. PRINGLEI Wats., Proc. Amer. acad. arts and sci., vol. 25, p. 159 (1890).— El Valle, *Miller & Johnston*, no. 35, July 27. Further distribution, Mexico, Central America, and Colombia.

BRUNFELSIA L.

B. HOPEANA (Hook.) Benth. in DC., Prod., vol. 10, p. 200 (1846); Griseb., Fl. Brit. W. Ind., p. 432; Mart., Fl. Bras., vol. 8, pt. 1, p. 261, pl. 43. *Franciscea Hopeana* Hook., Bot. mag., pl. 2829 (1828).— El Valle, *Miller & Johnston*, no. 265, Aug. 2, and *Johnston*, no. 71, Aug. 31 on South Hill. Further distribution, Trinidad, Brazil.

CAPSICUM L.

C. ANNUUM L., Sp. pl., vol. 1, p. 188 (1753); Desc., Ant., vol. 6, p. 172, pl. 422.— El Valle, *Miller & Johnston*, no. 81, July 24. Venezuela: Cumaná, Loeffling, Reise nach den spanischen Ländern, p. 152-153. All tropical countries.

C. BACCATUM L., Mant., vol. 1, p. 47 (1767); Griseb., Fl. Brit. W. Ind., p. 436; Desc., Ant., vol. 6, p. 177, pl. 423.— El Valle, *Miller & Johnston*, no. 82, July 12. Venezuela: between Cumaná and Bordones, HBK., Nov. gen. et sp., vol. 3, p. 49. Found in all tropical countries.

C. FRUTESCENS L., Sp. pl., vol. 1, p. 189 (1753); Griseb., Fl. Brit. W. Ind., p. 436; Lam., Encycl., pl. 116.— Cultivated, according to Ernst. Venezuela: near Bordones, HBK., Nov. gen. et sp., vol. 3, p. 48. Found in all tropical countries.

CESTRUM L.

C. VESPERTINUM L., Mant., vol. 2, p. 206 (1771); Griseb., Fl. Brit. W. Ind., p. 443; Jacq., Hort. Schoenbr., vol. 3, pl. 328.— River trail, El Valle, *Johnston*, no. 285, Aug. 30. Further distribution, West Indies to Panama, Peru, and Brazil.

DATURA L.

D. METEL L., Sp. pl., vol. 1, p. 179 (1753); Griseb., Fl. Brit. W. Ind., p. 434; Bot. mag., vol. 35, pl. 1440.—El Valle, *Miller & Johnston*, no. 83, July 30. Further distribution, tropical America, tropical Africa, Spain.

D. TATULA L., Sp. pl., ed. 2, vol. 1, p. 256 (1762); Griseb., Fl. Brit. W. Ind., p. 434; Sweet, Brit. fl. gard., vol. 1, pl. 83.—Santa Ana, *Ernst*. Further distribution, tropical and temperate countries.

LYCIUM L.

L. SALSUM Ruiz & Pav., Fl. Per., vol. 2, p. 46, pl. 183 (1799).—El Valle, *Miller & Johnston*, no. 153, July 31, and *Johnston*, no. 61, Aug. 3. Further distribution, Peru.

LYCOPERSICUM Hill.

L. HUMBOLDTII (Willd.) Dunal, Solan., p. 112 (1813); Griseb., Fl. Brit. W. Ind., p. 436. *Solanum Humboldtii* Willd., Hort. Berol., p. 27, pl. 27 (1804).—Cultivated, according to Ernst. Distributed from Mexico to Brazil.

NICOTIANA L.

N. TABACUM L., Sp. pl., vol. 1, p. 180 (1753); Griseb., Fl. Brit. W. Ind., p. 434.—Cultivated. Widely grown in temperate and tropical countries.

PHYSALIS L.

P. PERUVIANA L., Sp. pl., ed. 2, vol. 2, p. 1670 (1763); Griseb., Fl. Brit. W. Ind., p. 435.—Santa Ana, *Ernst*. Widely distributed in temperate and tropical countries.

SOLANUM L.

S. ACULEATISSIMUM Jacq., Coll., vol. 1, p. 100 (1786); Griseb., Fl. Brit. W. Ind., p. 442.—Santa Ana, *Ernst*. Further distribution, tropical America.

S. HIRTUM Vahl, Symb. bot., vol. 2, p. 40 (1791).—Santa Ana *Ernst*.

S. LANCEAEFOLIUM Jacq., Coll., vol. 2, p. 286 (1788).—San Juan Mt., alt. 790 m., *Johnston*, no. 69, July 6. Slender shrub, ascending, 1–1.5 m. high. Further distribution, West Indies, Venezuela.

S. MARGARITENSE Johnston, Proc. Amer. acad. arts and sci., vol. 40, p. 695 (1905).—El Valle, a single ascending stem branching copiously near the top, found at the side of the River trail, *Johnston*, no. 315, Aug. 20. PLATE 29, fig. 2.

S. NIGRUM L., Sp. pl., vol. 1, p. 186 (1753). *S. nodiflorum* Jacq., Ic. pl. rar., vol. 2, p. 11, pl. 326 (1781); Griseb., Fl. Brit. W. Ind., p. 437.—Santa Ana, *Ernst*; El Valle, *Johnston*, no. 73, July 16. Venezuela: Cumaná, Loeffling, Reise nach den spanischen Ländern, p. 152–153. A low herb, about 5 dm. high. Temperate and tropical countries.

S. POLYGAMUM, Vahl, Symb. bot., vol. 3, p. 39, pl. 55 (1794); Griseb., Fl. Brit. W. Ind., p. 442.—El Valle, *Miller & Johnston*, no. 143, July 18. Further distribution, Trinidad, St. Thomas, St. Croix.

S. SEAFORTHIANUM Andr., Bot. rep., vol. 8, pl. 504 (1799–1811).—El Valle, *Miller & Johnston*, no. 104, July 18. Further distribution, tropical America.

S. TRISTE, Jacq., Enum. pl. Carib., p. 15 (1760); Griseb., Fl. Brit. W. Ind., p. 437.—Juan Griego trail, alt. 450 m., *Johnston*, no. 70, July 22. Venezuela: near Cumanacoa and Guanaguana, HBK., Nov. gen. et sp., vol. 3, p. 34. Further distribution, tropical America.

S. VERBASCIFOLIUM L., Sp. pl., vol. 1, p. 184 (1753); Griseb., Fl. Brit. W. Ind., p. 438.—Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 222, and *Johnston*, no. 74, July 15. Venezuela: near Cumaná, HBK., Nov. gen. et sp., vol. 3, p. 30; Ernst in Seemann's Journ. bot., vol. 3, p. 319. Further distribution, tropical America to East Indies. A low shrub, about 1 m. high.

S. UMBRATILE Johnston, Proc. Amer. acad. arts and sci., vol. 40, p. 695 (1905).—Rio Asuncion, in the heavy woods along the trail to Juan Griego, *Johnston*, no. 321, July 22.

SCROPHULARIACEAE.

BEYRICHIA Cham. & Schlecht.

B. SCUTELLARIOIDES Benth., Scroph. Ind., p. 9 (1835), in note; Griseb., Fl. Brit. W. Ind., p. 429; Mart., Fl. Bras., vol. 8, pt. 1, pl. 50, fig. 2.—Santa Ana, *Ernst*. Further distribution, Trinidad, Venezuela, Brazil.

CAPRARIA L.

C. BIFLORA L., Sp. pl., vol. 2, p. 628 (1753); Griseb., Fl. Brit. W. Ind., p. 427; Desc., Ant., vol. 4, p. 313, pl. 300.—Santa Ana, *Ernst*,

reported as *C. mexicana*; El Valle, *Miller & Johnston*, no. 41, July 30, and *Johnston*, no. 265, Aug. 8. Venezuela: near Cumaná, HBK., *Nov. gen. et sp.*, vol. 2, p. 354. Further distribution, tropical America and tropical Africa.

ILYSANTHES Rafin.

I. RIPARIA Rafin., *Ann. nat.*, p. 13 (1820).— Juan Griego, *Johnston*, no. 125, Aug. 14. Further distribution, tropical America.

SCOPARIA L.

S. DULCIS L., *Sp. pl.*, vol. 1, p. 116 (1753); Griseb., *Fl. Brit. W. Ind.*, p. 427.— Juan Griego, *Ernst*; El Valle, *Miller & Johnston*, no. 144, Aug. 11. Venezuela: between Caracas and Bordones, HBK., *Nov. gen. et sp.*, vol. 2, p. 354; Cumaná, Loeffling, *Reise nach den spanischen Ländern*, p. 152–153. Further distribution, tropical countries.

BIGNONIACEAE.

BIGNONIA L.

B. ACUMINATA Johnston, *Proc. Amer. acad. arts and sci.*, vol. 40, p. 696 (1905).— El Valle, *Johnston*, no. 345. Endemic. PLATE 29, figs. 1, 1a, 1b.

B. AEQUINOCTIALIS L., *Sp. pl.*, vol. 2, p. 623 (1753); Griseb., *Fl. Brit. W. Ind.*, p. 448; Plum., *Ic. Burm.*, pl. 55.— El Valle, *Johnston*, no. 78, Aug. 8. Further distribution, tropical America. A vine or sprawling shrub.

B. SP.— El Valle, *Miller & Johnston*, no. 154, Aug. 6. Leaves trifoliolate, glabrous, smooth; calyx cupulate; margin undulate, shortly 5-parted; corolla purple, 5-lobed, slightly 2-lipped, about 2.5 cm. long.

B. SP.— El Valle, *Johnston*, no. 77, Aug. 15. Calyx cupulate, with 5 procurrent short teeth; corolla purple, 5-lobed, slightly 2-lipped, 3–5 cm. long.

CRESCENTIA L.

C. CUJETE L., *Sp. pl.*, vol. 2, p. 626 (1753); Jacq., *Hist. Stirp. Am.*, p. 175; Griseb., *Fl. Brit. W. Ind.*, p. 445.— Santa Ana, *Ernst*; El Valle, *Johnston*, no. 248. A tree, about 4 m. high, with wide-spreading top and trunk 2.5 dm. in diameter at the base. Common to tropical America.

MACFADYENA A. DC.

M. CORYMBOSA Griseb., Bonplandia, vol. 6, p. 10 (1858).—El Valle, *Johnston*, no. 255, July 24. Distributed from Panama to equatorial Brazil.

TABEBUIA Gom.

T. RUFESCENS Johnston, Proc. Amer. acad. arts and sci., vol. 40, p. 696 (1905).—San Juan Mt., alt. 500 m., *Johnston*, no. 79, July 2. Endemic.

TECOMA Juss.

T. STANS (L.) Juss., Gen., p. 139 (1789); Griseb., Fl. Brit. W. Ind., p. 447. *Bignonia stans* L., Sp. pl., ed. 2, vol. 2, p. 871 (1762).—El Valle, *Miller & Johnston*, no. 220, July 18, and *Johnston*, no. 76, July 24. Venezuela: Mt. Cocollar, HBK., Nov. gen. et sp., vol. 3, p. 144. Further distribution, Mexico and West Indies.

MARTYNIACEAE.

CRANIOLARIA L.

C. ANNUA L., Sp. pl., vol. 2, p. 618 (1753); Jacq., Hist. Stirp. Am., p. 173; Griseb., Fl. Brit. W. Ind., p. 466.—El Valle, *Miller & Johnston*, no. 89, July 12. Venezuela: Ernst, Sobre la flora y fauna, p. 227; llanos of New Barcelona, HBK., Nov. gen. et sp., vol. 3, p. 153. Distribution, New Mexico to Venezuela.

GESNERIACEAE.

DRYMONIA Mart.

D. SERRULATA (Jacq.) Mart., Nov. gen. et sp., vol. 3, p. 59 (1829). *D. bicolor* Lindl., Bot. reg., vol. 24, pl. 4 (1838). *Besleria serrulata* Jacq., Hort. Schoenb., vol. 3, p. 21 (1798).—Rio Asuncion, alt. 400–500 m., *Johnston*, no. 278, Aug. 12–15. Found in the West Indies.

LENTIBULARIACEAE.

UTRICULARIA L.

U. ALPINA Jacq., Enum. pl. Carib., p. 11 (1760). *U. montana* Jacq., Hist. Stirp. Am., p. 7, pl. 6 (1763); Griseb., Fl. Brit. W. Ind.,

p. 390.— San Juan Mt., alt. 600 m., *Miller & Johnston*, no. 271, Aug. 2, and *Johnston*, no. 223, July 2. Further distribution, tropical America.

ACANTHACEAE.

DIANTHERA L.

D. SECUNDA (Vahl) Griseb., *Goett. Abh.*, vol. 7, p. 246 (1857). *Justicia secunda* Vahl, *Symb. bot.*, vol. 2, p. 7 (1791).— San Juan Mt., alt. 795 m., *Johnston*, no. 89, July 2. Further distribution, tropical America.

JACOBINIA Moric.

J. PAUCIFLORA (Nees) Benth. & Hook. f., *Gen.*, vol. 2, p. 1115 (1876). *Sericographis pauciflora* Nees in *Mart., Fl. Bras.*, vol. 9, p. 110 (1847).— South Hill, El Valle, alt. 300 m., *Johnston*, no. 19, July 27. Further distribution, Brazil.

RUELLIA L.

R. TUBEROSA L., *Sp. pl.*, vol. 1, p. 635 (1753); Griseb., *Fl. Brit. W. Ind.*, p. 452.— El Valle, *Miller & Johnston*, no. 88, July 12. Venezuela: Colonia Tovar, *Fendler*, no. 799, Aug. 16, 1855. Further distribution, tropical America.

SIPHONOGLOSSA Oerst.

S. PILOSELLA (Nees) Torr., *Bot. Mex. bound.*, p. 124 (1859). *Monechma Pilosella* Nees in *DC., Prod.*, vol. 11, p. 412 (1847).— El Valle, *Miller & Johnston*, no. 227, July 26. Further distribution, Texas, Mexico, and St. Thomas.

RUBIACEAE.

BASANACANTHA Hook. f.

B. TETRACANTHA (Cav.) Hook. f. in Benth. & Hook. f., *Gen.*, vol. 2, p. 83 (1873). *Mussaenda tetraantha* Cav., *Ic.*, vol. 5, p. 20, pl. 435 (1799).— Santa Ana, *Ernst*. American tropics.

CEPHAELIS Sw.

C. MUSCOSA (Jacq.) Sw., *Prod. veg. Ind. Occ.*, p. 46 (1788); Griseb., *Fl. Brit. W. Ind.*, p. 347. *Morinda muscosa* Jacq., *Hist. Stirp. Am.*,

p. 65, pl. 45 (1763).— San Juan Mt., alt. 500 m., *Johnston*, no. 113, July 11. Further distribution, West Indies, Guiana to Brazil. A slender shrub, 0.5–1 m. high.

CHIOCOCCA P. Br.

C. MICRANTHA Johnston, Proc. Amer. acad. arts and sci., vol. 40, p. 696 (1905).— San Juan Mt., in woods above South Hill, alt. 400 m., *Johnston*, no. 115, July 27. Endemic. PLATE 29, figs. 3, 3a, 3b, 3c.

C. RACEMOSA Jacq., Hist. Stirp. Am., p. 68 (1763); Griseb., Fl. Brit. W. Ind., p. 336.— El Valle, *Miller & Johnston*, no. 42, July 15, on bank of the River trail; Tacarigua, *Johnston*, no. 119, Aug. 15. Widely distributed in tropical America.

CHOMELIA Jacq.

C. SPINOSA Jacq., Enum. pl. Carib., p. 12 (1760), & Hist. Stirp. Am., p. 18.— Santa Ana, *Ernst*.

COUTAREA Aubl.

C. hexandra (Jacq.), n. comb. *Portlandia hexandra* Jacq., Hist. Stirp. Am., p. 63, pl. 182, fig. 20 (1763). *Coutarea speciosa* Aubl., Pl. Guian., vol. 1, p. 314, pl. 122 (1775); Griseb., Fl. Brit. W. Ind., p. 323.— Santa Ana, *Ernst*. Widely distributed in tropical America.

DIODIA L.

D. RIGIDA (HBK.) Cham. & Schlecht., Linnaea, vol. 3, p. 341 (1828); Griseb., Fl. Brit. W. Ind., p. 348. *Spermacoce rigida* HBK., Nov. gen. et sp., vol. 3, p. 342 (1818).— Santa Ana, *Ernst*. Further distribution, West Indies to Paraguay.

ERITHALIS P. Br.

E. FRUTICOSA L., Syst. nat., ed. 10, vol. 2, p. 930 (1759); Griseb. Fl. Brit. W. Ind., p. 336.— Juan Griego, *Ernst*. Further distribution, tropical America.

GONZALAGUNIA Ruiz & Pav.

G. HIRSUTA (Jacq.) Schum. in Mart., Fl. Bras., vol. 6, pt. 6, p. 291 (1889). *Justicia hirsuta* Jacq., Enum. pl. Carib., p. 11 (1760).

Gonzalea spicata DC., Prod., vol. 4, p. 437 (1830); Griseb., Fl. Brit. W. Ind., p. 321.—El Valle, *Miller & Johnston*, no. 217, July 24. San Juan Mt., *Johnston*, no. 100, July 11. Distribution general in tropical America.

GUETTARDA L.

G. PARVIFLORA Sw., acc. to Ernst, by which, however, is probably meant *G. parvifolia* Sw., Fl. Ind. Occ., vol. 3, p. 1958 (1806); Griseb., Fl. Brit. W. Ind., p. 333.—Santa Ana, *Ernst*.

G. SCABRA Lam., Tabl. encycl., vol. 2, p. 218, pl. 154, fig. 3 (1793).—San Juan Mt., alt. 600 m., *Johnston*, no. 114, July 19. Tree, 6 m. high; wood very brittle. Distribution general in tropical America.

HILLIA Jacq.

H. PARASITICA Jacq., Enum. pl. Carib., p. 18 (1760), and Hist. Stirp. Am., p. 96, pl. 66. *H. longiflora* Sw., Prod. veg. Ind. Occ., p. 58 (1788); Griseb., Fl. Brit. W. Ind., p. 325.—San Juan Mt., alt. 550 m., *Johnston*, no. 41, July 16. Shrub, 2–4 m. high; flowers waxy, white. Further distribution, Mexico, West Indies, Colombia.

PSYCHOTRIA L.

P. GLABRATA Sw., Prod. veg. Ind. Occ., p. 43 (1788); Griseb., Fl. Brit. W. Ind., p. 341.—El Valle, *Miller & Johnston*, no. 215, Aug. 15; Juan Griego trail, alt. 450 m., *Johnston*, no. 337, Aug. 12–15. Further distribution, Jamaica, Antigua, Cuba.

P. HORIZONTALIS Sw., Prod. veg. Ind. Occ., p. 44 (1788); Griseb., Fl. Brit. W. Ind., p. 344.—El Valle, *Miller & Johnston*, no. 49, July 27. Further distribution, tropical America.

RANDIA L.

R. ACULEATA L., Sp. pl., vol. 2, p. 1192 (1753); Griseb., Fl. Brit. W. Ind., p. 318.—South Hill, El Valle, *Johnston*, no. 280, Aug. 31. Venezuela: Ernst in Seem., Journ. bot., vol. 5, p. 292 (1867). Distribution general in West Indies.

SPERMACOCE L.

S. TENUIOR L., Sp. pl., vol. 1, p. 102 (1753) excl. syn. Dill.; Griseb., Fl. Brit. W. Ind., p. 349.—El Valle, *Miller & Johnston*, no. 198, July 15; Juan Griego trail, *Johnston*, no. 99, Aug. 12–15. Widely distributed in tropical America.

S. VERTICILLATA L., Sp. pl., vol. 1, p. 102 (1753).— Santa Ana, *Ernst*. Distributed in tropical America and Africa.

CUCURBITACEAE.

ANGURIA L.

A. UMBROSA HBK., Nov. gen. et sp., vol. 2, p. 121 (1817); Griseb., Fl. Brit. W. Ind., p. 289.— Juan Griego trail, alt. 450 m., *Johnston*, no. 287, Aug. 12–15. Venezuela: near Bordones and Cumaná, HBK., *l. c.* Further distribution, Mexico, Trinidad, Venezuela.

ANGURIOPSIS Johnston.

A. MARGARITENSIS Johnston, Proc. Amer. acad. arts and sci., vol. 40, p. 697 (1905).— Along the roadside from El Valle to San Antonio, *Johnston*, no. 286, Aug. 8. Climbing over such shrubs as *Lycium salsum* and *Cereus eburneus*.

CERATOSANTHES Adans.

✓ C. TUBEROSA J. F. Gmel., Syst., p. 102 (1791); Griseb., Fl. Brit. W. Ind., p. 289.— El Valle, *Miller & Johnston*, nos. 258, 248; Tacarigua, *Johnston*, no. 62, Aug. 14. Further distribution, Grenada, Martinique, Venezuela.

CITRULLUS Forsk.

C. VULGARIS Schrad. ex Eckl. & Zeyh., Enum., p. 279 (1835); Duthie & Fuller, Field and gard. crop, vol. 2, pls. 55, 56.— Cultivated.

CUCUMIS L.

C. MELO L. Sp. pl., vol. 2, p. 1011 (1753).— El Valle, *Miller & Johnston*, no. 87. Cultivated.

C. ANGURIA L., Sp. pl., vol. 2, p. 1011 (1753); Griseb., Fl. Brit. W. Ind., p. 288; Mart., Fl. Bras., vol. 6, pt. 4, p. 16.— El Valle, *Miller & Johnston*, no. 224, July 14. Distribution general in tropical America.

CUCURBITA L.

C. PEPO L., Sp. pl., vol. 2, p. 1010 (1753); Desc., Ant., vol. 5, pl. 323.— Cultivated, according to Ernst.

MELOTHRIA L.

M. PERVAGA (Macf.) Griseb., Fl. Brit. W. Ind., p. 289 (1860). *Landersia pervaga* Macf., Fl. Jamaic., vol. 2, p. 142 (1837).— Santa Ana, *Ernst*. Distribution general in tropical America.

MOMORDICA L.

M. CHARANTIA L., Sp. pl., vol. 2, p. 1009 (1753); Griseb., Fl. Brit. W. Ind., p. 287.— Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 86, July 12. Widely distributed in tropical countries.

CAMPANULACEAE.

CENTROPOGON Presl.

C. SURINAMENSIS (L.) Presl, Prod. monog. Lobel., p. 48 (1836); Paxt., Mag., vol. 13, p. 149; Griseb., Fl. Brit. W. Ind., p. 385. *Lobelia surinamensis* L., Sp. pl., ed. 2, vol. 2, p. 1320 (1763).— San Juan Mt., alt. 750 m., *Johnston*, no. 88, July 6. Further distribution, St. Vincent, Trinidad, and tropical South America.

GOODENIACEAE.

SCAEVOLA L.

S. PLUMIERII Vahl, Symb. bot., vol. 2, p. 36 (1791); Griseb., Fl. Brit. W. Ind., p. 388.— Pt. Mosquito, *Johnston*, no. 319, Aug. 10. Venezuela: Tortuga, *Ernst*, Fl. Chelon. in Journ. bot., vol. 14, p. 178. Widely distributed in tropical countries.

COMPOSITAE.

ACANTHOSPERMUM Schrank.

A. AUSTRALE (Loefl.) Ktze., Rev. gen., vol. 1, p. 303 (1891). *A. brasilum* Schrank, Pl. rar. hort. Monac., vol. 2, p. 53 (1819). *A. xanthioides* DC., Prod., vol. 5, p. 521 (1836); Griseb., Fl. Brit. W. Ind., p. 369. *Melampodium australe* Loefl., It. Hisp., p. 268 (1758).— Santa Ana, *Ernst*. Further distribution, West Indies, Venezuela, Guiana to Buenos Ayres.

AGERATUM L.

A. CONYZOIDES L., Sp. pl., vol. 2, p. 839 (1753); Griseb., Fl. Brit. W. Ind., p. 356.—Santa Ana, *Ernst*. Common in tropical countries.

BACCHARIS L.

B. RHEXIOIDES HBK., Nov. gen. et sp., vol. 4, p. 66 (1820).—El Valle, *Miller & Johnston*, no. 230, July 30; San Juan Mt., alt. 600 m., *Johnston*, no. 98, Aug. 28. Further distribution, Peru, Brazil.

BIDENS L.

B. PILOSA L., Sp. pl., vol. 1, p. 832 (1753). *B. leucantha* Willd., Sp. pl., vol. 3, p. 1719 (1804); Plum., Ic. Burm., pl. 53; Griseb., Fl. Brit. W. Ind., p. 373.—Santa Ana, *Ernst*. Distribution general in tropical countries.

BLAINVILLEA Cass.

B. BAHIENSIS (DC.) Baker in Mart., Fl. Bras., vol. 6, pt. 3, p. 177, pl. 57 (1882). *Oligogyne bahiensis* DC., Prod., vol. 5, p. 629 (1836).—El Valle, *Miller & Johnston*, no. 131, July 20. Further distribution, Brazil.

CLIBADIUM L.

C. SURINAMENSIS L., Mant., vol. 2, p. 294 (1771). *C. asperum* DC., Prod., vol. 5, p. 506 (1836); Griseb., Fl. Brit. W. Ind., p. 367.—Santa Ana, *Ernst*. Distribution general in tropical America.

ECLIPTA L.

E. ALBA (L.) Hassk., Pl. Jav. rar., p. 528 (1848); Griseb., Fl. Brit. W. Ind., p. 370. *E. erecta* L., Mant., vol. 2, p. 286 (1771). *Verbesina alba* L., Sp. pl., vol. 2, p. 902 (1753).—Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 241, July 30. Widely distributed in temperate and tropical countries.

ELEPHANTOPUS L.

E. SPICATUS B. Juss. ex Aubl., Pl. Guian., vol. 2, p. 808 (1775). *Distreptus spicatus* Cass., Dict. sci. nat., vol. 13, p. 367 (1819); Griseb., Fl. Brit. W. Ind., p. 355.—Santa Ana, *Ernst*. Venezuela: Caracas, according to Sch. Bip., Linnaea, vol. 20, p. 519. Widely distributed in tropical America.

ELEUTHERANTHERA Poit.

E. OVATA Poit. ex Steud., *Nom.*, ed. 2, vol. 1, p. 549 (1841).— El Valle, *Miller & Johnston*, no. 132, July 18. Distributed in tropical America.

ERIGERON L.

E. SPATHULATUS Vahl in West, *Bidr. Ste-Croix*, p. 303 (1793); Griseb., *Fl. Brit. W. Ind.*, p. 365.— Rio Asuncion, alt. 450 m., *Johnston*, no. 324, July 29. Further distribution, Antigua, and Virgin Ids.

EUPATORIUM L.

E. BALLOTAEFOLIUM HBK., *Nov. gen. et sp.*, vol. 4, p. 121 (1820); Mart., *Fl. Bras.*, vol. 6, pt. 2, p. 380.— El Valle, *Miller & Johnston*, no. 234, July 15; San Juan Mt., alt. 500 m., *Johnston*, no. 94, July 19. Venezuela: Colonia Tovar, *Fendler*, no. 653, 1854–55; La Guaira, *Robinson & Lyon*, July 12, 1900. Further distribution, Colombia, Brazil.

E. IRESINOIDES HBK., *Nov. gen. et sp.*, vol. 4, p. 106, pl. 340 (1820); Griseb., *Fl. Brit. W. Ind.*, p. 360.— El Valle, *Miller & Johnston*, no. 129, July 30; San Juan Mt., alt. 500 m., *Johnston*, no. 95, July 19. Widely distributed in West Indies, Panama, Venezuela. A thick shrub, 2–3 m. high.

ISOCARPHA R. Br.

I. OPPOSITIFOLIA R. Br., *Trans. Linn. soc.*, vol. 12, p. 110 (1816); Griseb., *Fl. Brit. W. Ind.*, p. 376.— El Valle, *Miller & Johnston*, no. 138, July 10. Further distribution, Bahamas, Jamaica, Trinidad.

LACTUCA L.

L. INTYBACEA Jacq., *Ic. pl. rar.*, vol. 1, pl. 162 (1781–1786). *Brachyramphus intybaceus* DC., *Prod.* vol. 7, pt. 1, p. 177 (1838); Griseb., *Fl. Brit. W. Ind.*, p. 384.— El Valle, *Miller & Johnston*, no. 25, July 27, and *Johnston*, no. 351, Aug. 12–15. Widely distributed in tropical countries.

MIKANIA Willd.

M. AMARA Willd., *Sp. pl.*, vol. 3, p. 1744 (1804).— En route El Valle to Juan Griego, *Johnston*, no. 104, Aug. 12–15. Further distribution, Martinique, Bolivia.

PARTHENIUM L.

P. HYSTEROPHORUM L., Sp. pl., vol. 2, p. 988 (1753); Griseb., Fl. Brit. W. Ind., p. 369.— Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 233. Venezuela: near Caracas and on the banks of the Orinoco, HBK., Nov. gen. et sp., vol. 4, p. 259. Widely distributed in temperate and tropical America.

PLUCHEA Cass.

P. ODORATA (L.) Cass., Dict. sci. nat., vol. 42, p. 3 (1826); Griseb., Fl. Brit. W. Ind., p. 366. *Conyza odorata* L., Syst. nat., ed. 10, vol. 2, p. 1213 (1760).— Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 1, July 21, and *Johnston*, no. 318. Distribution general in tropical America.

POROPHYLLUM Adans.

P. RUDERALE (Jacq.) Cass., Dict. sci. nat., vol. 43, p. 56 (1826); Griseb., Fl. Brit. W. Ind., p. 379. *Kleinia ruderalis* Jacq., Enum. pl. Carib., p. 28 (1760), as *rudealis*.— Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 130, July 24. Distribution general in tropical America.

SENECIO L.

S. SONCHIFOLIA (L.) Moench, Meth. suppl., p. 231 (1802). *Cacalia sonchifolia* L., Sp. pl., vol. 2, p. 835 (1753). *Emilia sonchifolia* DC., Prod., vol. 6, p. 302 (1837).— El Valle, *Miller & Johnston*, no. 137, July 19. Widely distributed in tropical countries.

SONCHUS L.

S. OLERACEUS L., Sp. pl., vol. 2, p. 794 (1753); Griseb., Fl. Brit. W. Ind., p. 384.— Santa Ana, *Ernst*. Widely distributed in temperate and tropical countries.

SPILANTHES Jacq.

S. OCYMIFOLIA (Lam.) A. H. Moore, Proc. Amer. acad. arts and sci., vol. 33, p. 531 (1907). *Bidens ocymifolia* Lam., Encycl., vol. 1, p. 416 (1783). *Spilanthus exasperata* Jacq., Ic. pl. rar., vol. 3, p. 15, pl. 584 (1786–93).— Rio Asuncion, alt. 450 m., *Johnston*, no. 102, Aug. 12–15. Venezuela: Caracas, *Birschel*; Colonia Tovar, *Fendler*, no. 691, 1854–55. Distribution general in tropical America.

SYNEDRELLA Gaertn.

S. NODIFLORA Gaertn., *Fruct.*, vol. 2, p. 456, pl. 171 (1791); Griseb., *Fl. Brit. W. Ind.*, p. 377.—Santa Ana, *Ernst*. Distribution genera in tropical America.

TRIXIS P. Br.

T. RADIALE (L.) Lag., *Amen. nat.*, vol. 1, p. 36, in obs. (1811), combination implied but not specifically made; Hook. f. & Jacks., *Ind. Kew.*, vol. 2, p. 1131 (1895). *Perdicium radiale* L., *Sp. pl.*, ed. 2, vol. 2, p. 1248 (1763). *Trixis frutescens* P. Br. ex Spreng., *Syst.*, vol. 3, p. 501 (1826); Griseb., *Fl. Brit. W. Ind.*, p. 383; Ernst, *Bot. Excurs. Margarita*, p. 6.—Santa Ana, *Ernst*; El Valle, *Miller & Johnston*, no. 24, Aug. 1. Widely distributed in tropical America.

VERBESINA L.

V. ALATA L., *Sp. pl.*, vol. 2, p. 901 (1753); Griseb., *Fl. Brit. W. Ind.*, p. 374; Sims., *Bot. mag.*, pl. 1716.—Santa Ana, *Ernst*. Distribution general in tropical America.

VERNONIA Schreb.

V. ARBORESCENS (L.) Sw., *Fl. Ind. Occ.*, vol. 3, p. 1320 (1806); Griseb., *Fl. Brit. W. Ind.*, p. 353; Plum., *Ic. Burm.*, pl. 130, fig. 2. *Conyza arborescens* L., *Syst. nat.*, ed. 10, vol. 2, p. 1213 (1759).—San Juan Mt., alt. 500 m., *Johnston*, no. 96, July 19. Flowers blue; stem 2–3 m. high. Distribution general in tropical America.

V. MILLERI Johnston, *Proc. Amer. acad. arts and sci.*, vol. 40, p. 698 (1905).—Summit of South Hill, alt. 300 m., *Miller & Johnston*, no. 254, July 31, and *Johnston*, no. 329, Aug. 31. Endemic.

V. SCORPIOIDES (Lam.) Pers., *Syn.*, vol. 2, p. 404 (1807); Griseb., *Fl. Brit. W. Ind.*, p. 353. *Conyza scorpioides* Lam., *Encycl.*, vol. 2, p. 88 (1786).—El Valle, *Miller & Johnston*, nos. 133, 134, July; Juan Griego trail, *Johnston*, nos. 322, 323, July. Venezuela: Caracas, according to Sch. Bip., *Linnaea*, vol. 20, p. 510. Further distribution, Trinidad and tropical South America.

WEDELIA Jacq.

W. BUPHTHALMOIDES Griseb., *Goett. Abh.*, vol. 7, p. 235 (1857).—El Valle, *Miller & Johnston*, nos. 145, 146, and 147, July and Aug.

Shrubby, spreading, 0.3 to 1 m. high. Further distribution, West Indies.

W. CARACASANA DC. Prod., vol. 5, p. 541 (1836); Griseb., Fl. Brit. W. Ind., p. 371.—San Juan Mt., alt. 600 m., *Johnston*, no. 97, July 11. Venezuela: near Caracas, *Vargas*, no. 97, 1829; *Birschel*; *A. H. Moore*, Mar. 16, 1899; Colonia Tovar, *Fendler*, nos. 682, 683, in 1854–55, and 1961, Jan. 25, 1857; La Guaira, *Robinson & Lyon*, July 6. Further distribution, Trinidad, Panama.

WULFFIA Neck.

W. BACCATA (L. f.) Ktze., Rev. gen., vol. 1, p. 373 (1891). *Coreopsis baccata* L. f., Suppl., p. 380 (1781). *Helianthus ? sarmentosus* Rich., Act. soc. nat. hist. Par., vol. 1, p. 112 (1792). *Wulffia stenoglossa* DC., Prod., vol. 5, p. 563 (1836); Griseb., Fl. Brit. W. Ind., p. 372.—San Juan Mt., alt. 500 m., *Johnston*, no. 101, July 19. Bush, 1–1.5 m. high. Further distribution, West Indies, Guiana to Peru.

Economic Plants of Margarita.

The most important of the plants, which are cultivated on Margarita, is the coconut palm. Although there are only the two large groves, one completely filling the lower part of El Valle and the other extending through Asuncion valley, yet they furnish a large part of the coconuts used on the island. The huts of the poor people are constructed of the leaves, and the fruit constitutes an important part of their food. The cultivation of these groves consists merely in keeping the undergrowth down and in maintaining irrigation ditches.

The next most important vegetable product of the island is cassava made from *Manihot utilissima*. Fields of this are usually upon a hillside and it is abundantly grown in such places in El Valle. There is, however, in Asuncion, one large field of cassava on the plain. The cultivation of this plant on the hillside, which is preferable on account of loose soil and good drainage, is rendered difficult by the steepness of the slopes. Planting is done by setting out cuttings from the stem each about 15 cm. (6 in.) long, that are placed in rows about 1.5 m. apart. The earth is heaped in small ridges between the rows and the plants so as to form ridges about each plant, thus serving to hold whatever water may come down. In some parts, a single row of stones extends between each two rows of plants, in that way forming

a sort of a stone wall about each plant. This contrivance is to prevent the heavy rains from washing all the soil down the hillside. When the crops are mature, the roots are gathered and treated in the customary way, bruised, mashed, and the poisonous juice pressed out. The dried remainder is grated into meal and made into cassava bread which is sold in large, thin, circular disks.

Indian corn is grown very little upon the island, and then it is used mostly for fodder. A few acres were given up to its cultivation at an altitude of 500 m. in 1901. In 1903, however, the same space was entirely occupied by a rank growth of *Cordia cylindristachya* and other weeds.

The bread-fruit tree, *Artocarpus incisa*, is to be found in Asuncion valley. Bananas and plantains are to be had in moderate amount and only fair in quality.

Dates grow in sufficient abundance for the needs of the natives. There are probably a half dozen mature trees in El Valle. The foot of the mountain with its moist soil and extremely hot atmosphere is a good place for growing the trees.

The cashew-nut (*Anacardium occidentale*) and the hog-plum (*Spondias lutea*) are to be found sparingly near Asuncion.

Maranta arundinacea, the arrowroot plant, grows in the woods above Asuncion but it is not cultivated.

The mamon (*Melicocca bijuga*) and the toco (*Crataeva Tapia*) are often eaten and sometimes found for sale in the market-place.

The mango is the most abundant fruit in Margarita and though of inferior quality is largely used by all the people.

There are orange trees in El Valle, Asuncion, and Tacarigua, those from the last place being superior. The few bitter orange and the lime trees are of little importance.

Good sapodillas or nisperos grow both in El Valle and at Asuncion.

A poor quality of pineapple is to be found in the market in season. There are several pineapple fields on the hillsides of El Valle.

Sugar cane grows well in very few places on the island. There are several small cane-presses, turned either by hand or by burro. The product is for home consumption, and there is not enough of it to supply the people. Most of the sugar that is used is brought over from Cumaná in the form of large brown cakes called *papelón*. The cane-juice may be found in the market in a slightly fermented condition when it is known as *guarapo*.

The following fruits and vegetables grow in El Valle and at Asuncion though sparingly, not being cultivated to any extent: *Annona reticulata*, the custard-apple; *Malpighia puniceifolia* a small fruit not used much; *Cajanus indicus*, the pigeon pea; *Dolichos* sp., a pea; *Phaseolus vulgaris*, a bean; *Psidium guajava*, from which guava jelly is made; *Passiflora laurifolia*, the belle-apple; *Dioscorea alata*, a yam; *Cucumis Melo* and *C. Anguria*, both small melons; *Physalis peruviana*, the "tomato"; *Tamarindus indica*, the tamarind, quite abundant in El Valle.

The foregoing plants may be considered as the only ones of much economic importance to the inhabitants; that is, they are the only ones that are cultivated or made much use of. As a matter of fact the number of plants that are found growing on Margarita and that are important commercially on the mainland and elsewhere is rather large. The list contains a few specimens of timber trees, of medicinal plants, of plants producing resins and gums, and other products such as dyes and tannins. The fact that these do grow upon Margarita suggests that they might be cultivated in greater abundance. That they are not found in greater quantities, while of course due largely to the physical conditions of the island, is also owing to the ignorance and lack of care on the part of the inhabitants. This is strikingly illustrated in two or three small private haciendas where such things as grapes, egg-plants, tomatoes, and peppers are successfully cultivated. The fact that so many of the plants furnish useful products suggests the possibility that Margarita may be made more productive than it is at present; for that reason it is desirable to enumerate them here together with their uses.

Material for the following has largely been drawn from La Exposicion nacional de Venezuela en 1883 by A. Ernst; the World's Columbian Exposition in Chicago — Venezuela; and Medicinal plants of Caracas by A. Ernst in Seemann's Journal of botany for 1865.

WOODS.

ANACARDIUM OCCIDENTALE. Wood strong and durable. Little used, as its fruit is of more importance. Trees scarce.

ACHRAS ZAPOTA. *Nispero.* Wood very hard, strong, and heavy, of a reddish color and taking a beautiful polish. Chiefly valued for its fruit. Trees abundant.

BOURRERIA EXSUCCA. Wood good but little used. This is a small tree averaging between 3 and 5 m. in height. Fairly common.

BURSERA SIMARUBA. Soft and resinous wood. Common on hilltop.

CAESALPINIA CORIARIA. *Dividive*. On the mainland a large tree reaching sometimes a height of 30 m. with a clear trunk 10 m. high. On Margarita and on Coche it occurs as bushes about 2 m. high. The wood is very heavy, strong, and fine-grained. The sapwood is whitish yellow, the heartwood black and almost as hard as iron. Rather scarce.

CAPPARIS PACHACA. *Ajicito*. A small tree with a light-colored wood of not much hardness, used for cabinet work. Very few trees.

CASSIA FISTULA. *Cañafistula*. Wood of a flesh-color, heavy, hard, and strong but not much used. Few trees.

CLUSEA ROSEA. *Copey*. Wood of a reddish color, rather heavy, used considerably on Margarita for building-posts, but not much elsewhere. Common.

CORDIA ALBA. *Canjaro*. Attains a height of 12 to 15 m. with a trunk 4 to 5 m. high. A tolerably good wood for building purposes. Only a few trees.

CRATAEVA GYNANDRA. *Toco*. Very light and soft, generally of a whitish color though sometimes showing reddish veins. Sawn into boards for boxes. Common in El Valle.

CRESCENTIA CUJETE. *Taparo*. Wood yellowish white, close-grained, and rather hard and strong. The tree is of medium size. Common.

GUAJACUM ARBOREUM. *Vera*. A large tree yielding a wood similar to the following.

GUAJACUM OFFICINALE. *Guayacan*. Wood exceedingly hard and tough, the fibers crossing each other, so that it does not split. The sap wood is of a yellowish color; the heart wood is brown with dark greenish veins and markings. Used for turnery work. Both of these trees are abundant.

GUAZUMA ULMIFOLIA. *Guacimo*. Of a grayish white color with a somewhat reddish hue and occasionally some dark veins; it is fibrous, not very fine-grained, and comparatively light.

HIPPOMANE MANCINELLA. *Manzanilla de playa*. Good wood, durable and heavy, fine grain, annual rings distinct, and pores numerous. Few trees.

HURA CREPITANS. *Jobillo*. Wood light and soft, of fibrous texture, durable under water, and color white. Few trees.

HYMENAEA COURBARIL. *Algarrobo.* A very hard and heavy wood, of dark yellowish color with some greenish veins; it has straight fibers and is free of knots, so that it can be easily worked. It is used especially for crushing-wheels and similar things in coffee estates. Height usually 20 to 25 m., with a clear trunk 7 to 8 m. On Margarita, however, the only specimens observed were very low trees.

LAGUNCULARIA RACEMOSA. *Mangle amarillo.* Wood hard and heavy, fibrous and compact in texture. Color gray with many black points. Common about the lagoons.

LONCHOCARPUS SP. *Mahomo.* Very hard and elastic. The species on Margarita are from 15 to 20 m. high. Few trees.

MALPHIGIA PUNICIFOLIA. Wood very compact, light, not very durable, of a clear brown color. Few trees.

MELICOCCA BIJUGA. *Mamon.* Wood hard and heavy, compact and close-grained, color yellowish with very narrow and somewhat darker veins. Its fruit is usually valued more highly than the wood. Common.

MORISONIA SP. Wood white, soft and light. Scarce.

NECTANDRA CORIACEA. Very strong and resistant, not heavy, with good grain, and a more or less agreeable odor. Is easy to work, being used in carpentry and cabinet work. Scarce.

OREOPANAX CAPITATUM. *Candelero.* Wood whitish, brittle and light. Scarce.

PISONIA INERMIS. Wood of little weight, light in color, good for use under water. Common.

RHIZOPHORA MANGLE. *Mangle colorado.* Wood red, strong, and heavy. Much used for rafters. Very abundant about lagoons.

TABERNAEMONTANA PSYCHOTRIFOLIA. *Berraco.* The wood is fibrous, not very hard, and of an olive color, sometimes with darker veins. It is easily worked and takes a good polish. Common.

Other trees found in small numbers on Margarita and not much used are *INGA INGOIDES*, *GUETTARDA SCABRA*, *MORISONIA JOHNSTONII*, *ACACIA MACRACANTHA*, and *LINOCIERA LATIFOLIA*.

FIBER PLANTS.

All of the following grow rather sparsely in Margarita: —

AGAVE AMERICANA. *Cocuy.*

BOMBAX CEIBA. *Ceiba.* The fibers are short and are used solely for stuffing pillows, etc.

BROMELIA PINGUIN. *Maya*.

GOSSYPIUM BARBADENSE. *Algodon*. Many hammocks are hand-made from cotton on Margarita. See Ernst: *La Exposicion nacional de Venezuela en 1883*, pages 560, 561 for quotation describing method of making hammocks according to A. A. Level, *La Margarita*, pages lxviii and lxix.

MUSA PARADISIACA. *Platano*.

TOURNEFORTIA HIRSUTISSIMA. *Niguo*.

TRAGIA VOLUBILIS. *Pringamosa Morada*.

PALMA CARANA so called by the natives and mentioned by Ernst. Its specific identity is doubtful. The leaves are used to make brooms, ropes, etc.

GUMS AND RESINS.

ACHRAS ZAPOTA. *Gum Chicle*. Milk juice obtained by incision in bark. Tapping may occur once in three years without danger to life of tree. The raw milk is boiled and then allowed to harden into the gum. Used for chewing gum.

BURSERA GUMMIFERA. *Resina indio desnudo*.

CERCIDIUM VIRIDE. *Res na de cuica ó yabo*. This resin exudes from the bark of the stem and branches, covering them in a continuous layer. It is used by soap manufacturers.

CLUSEA ROSEA. *Resina de Copey*.

HYMENAEA COURBARIL. *Resina de algarrobo*. The resin exudes from the stem and roots of the tree and is often found in a semi-fluid state in the soil. It may be used for making varnish, like copal. Is used for incense.

SPONDIAS LUTEA. *Goma de jobo*.

DYES AND TANNIN.

BIXA ORELLANA. *Onoto*. The seeds are covered with a deep red pulp which hardens when dry, and being separated from the seeds forms the arnatto of commerce, used by dyers and varnish-makers also for coloring cheese and butter. The South American Indians paint their bodies with it.

CAESALPINIA CORIARIA. *Dividive*. The pods contain from 30 to 40% tannin and form an important article of exportation from several ports of Venezuela.

CECROPIA PELTATA. The bark may be used for tanning.

INDIGOFERA SUFFRUTICOSA. Formerly much used in making indigo.

PERSEA GRATISSIMA. The bark of this might be used for tanning leather.

RHIZOPHORA MANGLE. Contains from 22 to 33% of tannin according to the age of the tree, and likewise a pigment which colors the leather.

MEDICINAL PLANTS.

ABRUS PRECATORIUS. Substitute for licorice in India. Is a poison and a medicine.

ACACIA MACRACANTHA. *Corteza de Cují*. Astringent.

AGAVE AMERICANA. *Raiz de Cocuy*. Purgative.

ANACARDIUM OCCIDENTALE. Root is purgative the green fruit astringent. In the middle layer of shell of fruit is an oily liquid capable of poisoning the skin, and turning black on exposure. This is used as an indelible ink.

ANNONA MURICATA. Root yields a fish poison.

ANNONA SQUAMOSA. Bark has drastic properties.

ARGEMONE MEXICANA. *Cardo santo*. Used as a mild cathartic and in cases of intermittent fever, and dropsy.

ARISTOLOCHIA RINGENS. *Congrina*. For rheumatism.

ASCLEPIAS CURASSAVICA. The root is a diuretic and carminative, in large doses a cathartic and an emetic.

BASTARDIA VISCOSA. *Chivatera ó fistulera*. Aromatic. The powder is said to cure fistula.

BIXA ORELLANA. The red arillus is used in soups and sauces.

BRUNFELSIA HOPEANA. The dried root and stem used for chronic muscular rheumatism.

BURSERA GUMMIFERA. *Indio desnudo*. Used for rheumatism.

CAMPYLONEURUM PHYLLITIDIS. *Lengua de sierpe*. Antisyphilitic.

CAPPARIS JAMAICENSIS and CAPPARIS CYNOPHALLOPHORA. Root bark possesses blistering properties and may be taken internally as a diuretic.

CAPSICUM BACCATUM. The berries used as caustics, and the leaves bruised and mixed with tallow, are applied to tumors to promote suppuration.

CAPRARIA BIFLORA. The root is a tonic.

CARICA PAPAYA. The juice from the fruit aids in digestion.

CASSIA BIFLORA. Leaves soaked in water make a refreshing draught, principally taken in fever caused by insolation, but also in intermittents.

CASSIA FISTULA. *Cañafistula*. Mild purgative.

CASSIA OCCIDENTALIS. *Brusca*. Febrifuge and astringent. The seeds roasted give a drink similar to coffee.

CERATOSANTHES TUBEROSA. *Raiz de pepino*. Emetic.

CISSAMPELOS PAREIRA. Diuretic.

CORDIA GERASCANTHUS. *Cantaro*. Sudorific and pectoral.

COSTUS SPICATUS. *Raiz de Caña de la India*. Antisiphilitic.

CRANIOLARIA ANNUA. *Escorzonera*. The seeds are used against the irregularities of the blood, the root is a purgative and cooling.

DACTYLOCTENIUM AEGYPTIUM. *Raiz de Guarataro*. Diuretic.

DIEFFENBACHIA SEGUINE. Decoction made from stem, thickened with gum arabic is used in cases of gonorrhoea.

GUAZUMA ULMIFOLIA. *Guasimo*. Mucilaginous, refreshing and healing.

HIPPOMANE MANCINELLA. Fish poison from juice. Caustic, emetic, cathartic.

HYMENAEA COURBARIL. The dried pulp of the fruit is a pectoral.

JATROPHA CURCAS. *Pinon*. Emetic.

JATROPHA GOSSYPIFOLIA. *Tivatua*. Emetic.

LANTANA CAMARA. *Cariaquito encarnado*. Diuretic and refreshing. The root is used against gonorrhoea.

MANGIFERA INDICA. Seed is anthelmintic; juice of trunk antisiphilitic; bark and leaves astringent.

MELIA AZEDARACH. Decoction of bark is an anthelmintic for the removal of the round worm.

MELOCHIA TOMENTOSA. *Bretonica*. Used in the infirmities of the eyes.

PARTHENIUM HYSTEROPHORUM. Large doses have an antipyretic effect.

PEDILANTHUS TITHYMALOIDES. The milky sap is an emetic.

PERSEA GRATISSIMA. Astringent kernel, cut in pieces, roasted, and reduced to powder, good for diarrhoea and dysentery.

PETIVERIA ALLIACEA. *Raiz de Mapurite*. Antispasmodic and vermifuge.

PHYLLANTHUS NIRURI. Laxative and alterative, especially against jaundice.

PLUMBAGO SCANDENS. *Guapote*. Rubefacient.

PORTULACA OLERACEA. Decoction is anthelmintic and refreshing.

PORTULACA PILOSA. *Verdolaga salvaje*. A bitter and tonic.

SCOPARIA DULCIS. *Raiz de escobilla*. A decoction used to restrain diarrhea and vomiting.

SIDA RHOMIFOLIA. *Escoba blanca ó babosa*. The root is a diuretic.

SPONDIAS LUTEA. *Corteza de Jobo*. A decoction is used to cauterize stubborn ulcers.

STACHYTARPHETA JAMAICENSIS. *Verbena*. A bitter, tonic, and febrifuge.

TRIXIS RADIALE. *Juan de la Calle*. Antirheumatic.

TURNERA DIFFUSA. Contains damiana, a stimulant tonic; in large quantities a laxative.

TURNERA ULMIFOLIA. Carminative and tonic.

Distribution of the Plants.

It may easily be seen from the description of the physical features of the island that the variety of the vegetative conditions is very great and also that the conditions for vegetative growth are much more favorable in the rainy than in the dry season. The distribution of the plants is naturally determined by their adaptation to particular conditions.

Bordering the sandy beaches are bushes of *Tournefortia gnaphalodes* and *Suriana maritima*, both of these being narrow-leaved, and the former being woolly-pubescent. *Croton flavens* is a similar plant. Next inland occur the low spiny bushes of *Castela Nicholsoni*. The small and long-rooted *Euphorbia buxifolia* grows in the sand dunes and near by are the small trees of *Bumelia cuneata* and *Guaiacum officinale*. On the exposed rocky shores by Juan Griego, *Euphorbia thymifolia* grows in abundance in almost no soil.

The region nearest in character to the seashore is the lagoon. This is often bordered by *Rhizophora Mangle*, *Laguncularia racemosa*, and *Avicennia nitida*, all shrubby or aborescent plants. On clear sandy stretches by the lagoons and sometimes partly submerged in the water are the low succulent plants, *Batis*, *Salicornia*, and *Trianthema*. Mingled with these in the drier places are *Alternanthera canescens* and *Iresine portulacoides*, both having a low sprawling habit. On the muddy shores of the brackish pond near Juan Griego grow the

tiny *Cypselea humifusa*, *Euphorbia thymifolia*, *Ilysanthes riparia*, and small specimens of *Mollugo verticillata*.

Inland from these wastes are the plains covered with the melon cactus, the flat-stemmed *Opuntia*, the symmetrical tree-like *Pereskia*, and the candelabra-shaped, tall *Cereus eburneus*. All these are thorny and more or less fleshy plants. In addition are the arborescent acacias, and *Capparis cynophallophora*; the shrubby *Croton flavens*, *Croton Milleri*, *Jatropha gossypifolia*, and *Jatropha urens*, and the small shrub *Stylosanthes*.

The desolation of the plains is emphasized on the hills by the addition of great stretches of *Agave* and *Aloe* which make the regions almost inaccessible. The high parts of the hills have dense growths of bushes, as *Cordia cylindristachya*, *C. globosa*, *Securidaca*, *Capparis verrucosa*, and *Heteropteris laurifolia*. Then scattered over the hills are the small trees of *Capparis cynophallophora*, *C. linearis*, *Bursera*, and *Steriphoma*. Along the hilltops are a few larger trees of *Morisonia* and *Clusia*. These trees have leathery and very large leaves in all cases except *Bursera* and *Capparis linearis*. The undergrowth among the trees on the hills consists of the green-stemmed *Pedilanthus*, the bushy *Brunfelsia*, and the bromeliaceous plants *Aechmea* and *Thecophyllum*. Here are a few epiphytes as *Oncidium*, the cactus *Rhipsalis*, a few *Polypodiums*, some of the *Bromeliaceae*, and *Anthurium scandens*.

The vegetation of the valleys, with the exception of *Asuncion* and *El Valle*, is similar in general to that of the hills and the plains. These two valleys have groves of coconut, mango, sapodilla, and orange trees, and in consequence afford a good place for the growth of annual plants. The river beds and arroyas are the most interesting places in the valleys. The only large river bed on the island is that extending from the mountain through *El Valle* to the sea at *Porlamar*. It is bordered with such trees as *Crataeva Tapia*, *Guajacum arboreum*, *Lonchocarpus*, *Pithecolobium*, and *Bombax*, all with tall gray trunks. There are many bushes, some half-climbers, *Chiococca*, *Cestrum*, *Malpighia purpurea*, *Solanum*, *Acacia*, and *Marsdenia*. The arroyas or gullies high up in the valleys have the small tree *Tecoma*, the shrub *Cordia globosa*, and the vine *Bignonia*.

The mountain furnishes varied situations and conditions for the growth of plants. In general it is forested from 300 m. nearly to the summit; in the valleys the woods grow at a lower altitude also. The

trees which make up the forest are *Bombax*, *Clusia rosea*, *Cecropia*, *Inga*, *Gilibertia*, *Linociera*, and the palms *Acrocomia*, *Oreodoxa*, and *Bactris*, all these being trees of a more or less straight trunk. The crooked trees of 500 m. altitude or more are *Guettarda*, *Hellia*, *Pisonia*, *Nectandra*, *Phoebe*, *Psychotria*, and *Clusia lutea*. At the summit of the mountain are the dwarfed *Clusia lutea*, the wide-spreading *Blakea*, *Vaccinium*, and *Myrcia*.

Among the trees of the lower altitudes there is little undergrowth, consisting of the ferns or orchids. At an altitude of 400 m. on the San Juan trail there is a small marshy area covered with *Heliconia Bihai* and at one side is *Acalypha*. At an altitude of 500 m. in the Asuncion valley, that is, the northeast side of the island, there is considerable undergrowth. In the woods, *Dioscorea*, *Smilax*, *Piper*; by the "rios," *Athyrocarpus*, *Costus*, *Calathea*, *Renealmia*; and on the rocks and trees, *Philodendron*, *Anthurium*, and *Dieffenbachia*, together with many terrestrial and epiphytic ferns and orchids, may be found. Various members of the Gramineae are scattered throughout the woods. In open thickly grown places is *Scleria bracteata*; by rivulets are *Cyperus*, *Scirpus*, *Eleocharis*, and a few other Cyperaceae. *Drymonia serrulata* is one of the vines among the trees by the "rio." *Gonzalugania* and *Chiococca micrantha* at lower altitudes have slender ascending or climbing habits. Above 500 m. the melastomaceous *Clidemia* and *Miconia* are to be found. The deep ravines are characterized by the abundance of ferns, especially one ravine by the tree-fern, *Cyathea*.

The wooded mountain top between 600 and 700 m. has practically no undergrowth. The low trees already mentioned are crooked and crowded together. They are covered with moss which is saturated with moisture. On the trunks may be found *Polypodium jubaeforme* and *Xiphopteris serrulata*, but practically nothing else, unless it is *Lycopodium* and mosses. Above 700 m. or on the exposed part of the mountain top is a great variety of plants. The bromeliaceous genus *Glomeropitcairnia* is found growing thickly over parts of the top. The delicate *Utricularia* is abundant in the rich and moist humus. The tiny shrub *Sauvagesia*, the vine *Echites*, and the sprawling *Epidendrum secundum*, the erect *Epidendrum nocturnum*, the beautiful *Centropogon*, several passion-flowers, the gentian *Coutoubea*, the silver fern and several sedges cover the top of the mountain. Such in general is the distribution of the plants according to regions.

In connection with this discussion there is an interesting field for study in the distribution of the individual species of plants whether in groups or singly, whether in one place or scattered in many, and whether on one slope and not on another.

The species of plants found on the seashore and by the lagoons are without exception growing in groups with but little intermixture. Almost any of the plants illustrate this, *Rhizophora*, *Avicennia*, *Batis*, *Salicornia*, and *Trianthema*. The species growing on the plains are found in abundance though well interspersed with other species. So far as was discovered *Opuntia leptocaulis* was growing in abundance but over only a small area to the west of Porlamar. Similarly, *Croton Milleri* was localized though well mixed with other plants. Many of the plants were to be found in different locations, which, however, had similar moisture conditions. This was even more accentuated in the valleys and hillside than on the plains. While many plants could be found in a fairly large quantity, the majority of the hillside plants occurred in small numbers. Some plants which were found only on the south slope of a hill might be found on the south slope of another hill but not on the north side. Further detailed exploration might tend to generalize this statement but the conditions as given were rather striking to me. For example, *Steriphoma elliptica* occurs on the south slope of South Hill and on the south slope of North Hill but not on the other parts of the island so far as explored. *Bauhinia cumanensis* occurs similarly. Cases of isolation are *Securidaca* only on the north side of North Hill, *Hymenea Courbaril* on the south side of South Hill and *Pedilanthus* on the summit of South Hill.

The instances in which only two or three plants of a species were found are few and it must be admitted that a thorough examination of the hills and valleys in a better season would probably show more of the plants. Notwithstanding this the paucity of specimens was only too apparent to me when collecting, and it seems to be a fact that in the majority of cases (striking exceptions are *Tribulus*, *Stachytarpheta*, *Jatropha*, and *Croton*) the number of plants of the individual species is very much smaller than is the case with our common plants of the United States. Only one plant was found of *Chiococca micrantha*, a half dozen near together of *Securidaca*, a single one of *Hymenea*, a single tree of *Acacia macracantha* in San Antonio valley and three or four along the river trail of El Valle, three plants of *Oncidium luridum*, three of *Huntleya*, and three of *Elleanthus attenuatus*. The list

might easily be extended and with a more thorough study might furnish an interesting question as to the rapidity of multiplication of these plants and as to the means by which they hold their own among the more rapidly multiplying plants. As to the question why certain plants are found on one slope and not on another, the palms as an example may explain. At an altitude of 500 or more meters, palms of various kinds are scattered about among the other forest vegetation. This occurs, however, only on slopes to the northeast, that is, exposed to the northeast trades. The opposite sides at this high altitude present an ordinary forest front undotted by a single palm. Moisture, then, either by its immediate presence or in its relation to the winds very probably is a factor in the distribution of all the plants.

So far as methods of distribution are concerned it may be said that there are very few special adaptations to dispersal. *Cenchrus echinatus* seems to be the only one adapted for dispersal by means of its prickly fruit, which adheres to animals. The various members of the Bignoniaceae and of the Asclepiadaceae are suited for wind dispersion as are also *Gossypium* and *Bombax*. Of course there is no limit to the carrying of seeds by birds from one valley to another so that the absence or presence of moisture is probably the most potent factor restricting the mountain plants to the mountain and the lowland plants to the lowlands.

The further question as to the distribution of the plants according to season is quite as interesting as the distribution of the plants in the various topographical regions. There is a striking difference in the appearance of the plains, the hills, and the valleys as seen in the rainy season and in the dry. In the rainy period the fields are carpeted with green and the bushes and trees are heavy with foliage and bright with blossoms. In the dry season the fields are almost devoid of stick or leaf and many bushes and trees are to every appearance dead. When the rains come on in July or August, *Tribulus terrestris* and *Kalstroemia maxima* cover the roadsides and plains; *Stachytarpheta coccinea* and *S. jamaicensis*, *Spermacoce tenuior*, *Argemone mexicana*, *Asclepias curassavica*, and many others form a rank growth of weeds in the coconut groves and cane fields; various shrubs of the hillside, *Capparis verrucosa*, *Cassia emarginata*, *Bauhinia cumanensis*, and others are out in leaf and in flower; and the climbing shrubs and vines form a luxuriant growth along the "rio" beds. In the dry season only a few of these plants can be found in flower. It is noteworthy that in several

cases the flowers appear before the leaves on shrubs; for example, *Cercidium viride*, *Gliricidia lutea*, several Bignonias, *Erythrina*, *Cassia emarginata*, and *Pedilanthus tithymaloides*.

In pleasing contrast to the plains, the mountain summit is constantly clothed in green vegetation and many blossoms are always to be found. The presence the year round of the moisture-laden clouds accounts for this difference between the mountain top and the plains. The latter have only a few months (August to February) of green vegetation, with the remainder of the season characterized by gray lifeless bushes and trees and by an utter lack of low herbs.

The foregoing represents in brief the distribution of the plants on Margarita. The discussion has been more suggestive than exhaustive. A thorough exploration of the island according to scientific methods in such work would yield valuable information not particularly in regard to Margarita but from the point of view of the life history of the plants themselves. As evinced in the above paragraphs the following topics have seemed to the writer of paramount importance in considering the plant distribution: occurrence of the plants in regions of different vegetative conditions; occurrence in groups or scatteringly; and the effect of the seasons both on the occurrence of the plants in different regions and on the abundance of the plants.

Composition of the Flora.

In order to compare the vegetation of Margarita and Coche with that of the adjacent regions in as thorough a way as is desirable, it is necessary to have a full understanding of the composition of the vegetation.

The purpose of studying the flora of these islands from an economic as well as a purely scientific point of view, has necessitated cataloguing the cultivated plants. These may or may not be native of the region but in either case they are so widely cultivated in all of tropical America and some of them commonly in the East Indies that for the purposes of comparing floras they must be entirely disregarded. Of those that come under this head the following have been included in the catalogue of plants. Although they are not all cultivated in Margarita yet they are in many other places (see Alph. De Candolle, *Géographie bot.*, vol. 2, p. 981-983):

Achras Zapota

Agave americana

Anacardium occidentale

Ananas sativa

Annona reticulata

Annona squamosa

Antigonon leptopus	Maranta arundinacea
Artocarpus incisa	Momordica Charantia
Buginvillea spectabilis	Musa paradisiaca
Capsicum annuum	Nerium oleander
Carica papaya	Nicotiana Tabacum
Citrullus vulgaris	Phaseolus vulgaris
Citrus Aurantium	Phoenix dactylifera
Cocos nucifera	Physalis peruviana
Crescentia Cujete	Plumbago capensis
Cucumis Anguria	Psidium guajava
Cucumis Melo	Quisqualis indica
Cucurbita Pepo	Ricinus communis
Dioscorea alata	Saccharum officinarum
Ipomoea Batatas	Spondias lutea
Ipomoea tuberosa	Tamarindus indica
Mangifera indica	Thevetia nereifolia
Manihot utilissima	Zea Mays

The above list of forty names includes plants cultivated for ornament as well as those of more practical value. Out of the 634 plants of Margarita and Coche this leaves 590 as constituting the wild plants of the islands. But of this number many are found to be plants of widespread distribution. Undoubtedly some are native and yet many have been introduced. Margarita is one of the oldest known and longest settled (1525) parts of America, hence the opportunities for introduction have been great. The plants found in this catalogue and more or less common in all tropical countries are as follows:

Achyranthes aspera	Cissampelos pareira
Ageratum conyzoides	Clitoria Ternatea
Amaranthus paniculatus	Conocarpus erectus
Amaranthus spinosus	Crotolaria incana
Amaranthus tristis	Cyperus distans
Bidens pilosa	Cyperus ligularis (Mariscus)
Caesalpinia pulcherrima	Dactyloctenium aegyptium
Cajanus indicus	Datura Metel
Calotropis procera	Datura Tatula
Canavalia obtusifolia	Desmanthus virgatus
Capraria biflora	Desmodium incanum
Capsicum baccatum	Eclipta alba
Capsicum frutescens	Eleocharis capitata
Cassia fistula	Eragrostis ciliaris
Cassia occidentalis	Fuirena umbellata
Cassia Tora	Heliotropium curassavicum
Cenchrus echinatus	Heliotropium indicum
Chenopodium ambrosioides	Hyptis capitata

Hyptis pectinata	Psidium guajava
Indigofera suffruticosa	Rhizophora Mangle
Ipomoea coccinea	Sauvagesia erecta
Ipomoea Quamoclit	Scaevola Plumieri
Ipomoea sinuata	Scoparia dulcis
Jatropha Curcas	Senecio sonchifolia
Jussiaea suffruticosa	Sesuvium portulacastrum
Laguncularia racemosa	Sonchus oleraceus
Leonotis nepetaefolia	Solanum verbascifolium
Leptochloa mucronata	Sporobolus virginicus
Panicum prostratum	Stachytarpheta jamaicensis
Parkinsonia aculeata	Suriana maritima
Paspalum conjugatum	Telanthera ficoides
Passiflora foetida	Tribulus cistoides
Pisonia aculeata	Ximenia americana

These widely distributed plants are, of course, common enough in most of tropical America in their respective habitats. With the exception of the sedges, grasses, and ferns, most of the above plants are found about the valleys and along the routes of travel. The exceptions are made because the groups mentioned require the moisture that is found in Margarita only above the valleys in the mountains.

Excluding both the cultivated plants and those of general tropical distribution, there are left but 524 whose habitat is restricted to the American tropics. Margarita is a continental island, belonging to Venezuela. The question naturally arises whether the most of its flora pertains to that part of the American tropics or to the West Indies. A study of the remainder of the plants makes it very evident that the flora still retains its general character in that the majority of the species are common both to the West Indies and to South America. The exceptions to this are worth noting and are as follows: —

Common to West Indies.

Tillandsia Lescaillei
 Epidendrum globosum
 Pelexia adnata
 Peperomia glabella
 Coccoloba excoriata
 Loranthus emarginatus
 Cypselea humifusa
 Annona reticulata
 Oxalis Plumieri
 Castela Nicholsoni
 Heteropteris laurifolia

Common to South America.

Anthurium scandens
 Philodendron eximium
 Aechmea Fendleri
 Gravisia aquilega
 Vriesia scalaris
 Stromanthe tonckat
 Piper pseudo-mollicomum
 Alternanthera canescens
 Alternanthera muscoides
 Loranthus orinocensis
 Steriphoma elliptica

Common to West Indies.

Adelia Ricinella
 Argithamnia candicans
 Croton helicoideus
 Croton populifolius
 Abutilon umbellatum
 Wissadula periflocifolia
 Clusia flava
 Cereus caripensis
 Cereus Swartzii
 Opuntia leptocaulis
 Pereskia opuntiaeflora
 Daphnopsis americana
 Rotala dentifera
 Myrcia coriacea
 Bumelia cuneata
 Echites secundiflora
 Echites umbellata
 Tournefortia gnaphalodes
 Tournefortia incana
 Tournefortia scandens
 Rauwolfia Lamarkii
 Drymonia serrulata
 Psychotria glabrata
 Randia aculeata
 Erigeron spathulatus
 Wedelia buphthalmoides

Common to South America.

Bauhinia cumanensis
 Centrosema brasilianum
 Cercidium spinosum
 Myrospermum frutescens
 Esenbeckia pilocarpoides
 Sebastiana corniculata
 Talisia olivaeformis
 Caracasia tremadena
 Hybanthus oppositifolius
 Rinorea marginata
 Cereus eburneus
 Cereus Jamacaru
 Combretum secundum
 Clidemia neglecta
 Vaccinium latifolium
 Tabernaemontana psychotrifolia
 Evolvulus filipes
 Cordia discolor
 Clerodendron molle
 Brunfelsia Hopeana
 Lycium salsum
 Beyrichia scutellarioides
 Macfadyena corymbosa
 Jacobinia pauciflora
 Baccharis rhexioides
 Eupatorium ballotaefolium
 Vernonia scorpioides
 Wedelia caracasana
 Maxillaria virguncula

In this list of the plants of limited distribution there are thirty-seven to be found in the West Indies or Mexico and forty in South America. To this last number there should be added the forty-two endemic species. The flora of Margarita may then be said to consist of the following elements in the given proportions:—

Cultivated plants	40
Cosmopolitan plants	66
Common to tropical America	419
Limited to West Indies	37
Limited to South America	82
	—
Total	644

The great variety of plants in Margarita is for the most part in widely separated genera and families. It is seldom that there are

more than two or three species in any one genus. The well marked exceptions to this are the large tropical genera *Panicum*, *Epidendrum*, *Piper*, *Euphorbia*, *Croton*, *Cassia*, and *Solanum*. The 644 species are distributed among 398 genera and in 98 families, the larger proportion being among the choripetalous groups.

The families having the largest representation in the flora are as follows:—

	Genera	Species
Leguminosae	41	65
Compositae	25	30
Euphorbiaceae	14	31
Gramineae	15	25
Rubiaceae	13	17
Solanaceae	11	23
Verbenaceae	11	19
Bromeliaceae	11	15

Members of the Leguminosae are the most common plants. Everywhere these shrubs and trees with their often numerous small leaflets are to be found. These have also some of the most striking flowers, as the *Poinciana*, the *Caesalpinias*, *Tamarindus*, the *Cassias*, and *Calliandra*.

The paucity of the Compositae, on the other hand, and the inconspicuous character of their flowers are remarkable when compared with the traits of the group in other regions, either tropical or temperate. In Margarita the family is chiefly represented by insignificant weeds.

The lack of grasses and sedges, of course, is very striking to a traveler from the temperate regions. There is no such thing as turf and the few grasses that are to be found are rather scattered.

One of the families that is largely represented in individuals if not in species is the Cactaceae, a group which covers the plains for miles. On Margarita there are twelve species of this family distributed in six genera. Of these, five are more or less tall and candelabra-shaped, with little or no secondary branching; two are melon-shaped, one (*Pereskia*) is a low much-branched tree, and one (*Rhipsalis*) is a small cord-like epiphyte.

Another family, that of the Bromeliaceae, is characteristic not because of its few individuals but because of their striking colors and general appearance. All of the representatives of the eleven genera and fifteen species possess a rosette habit and more or less fleshy leaves. Their colors, too, are attractive.

Other groups characteristic of tropical regions and to be found on Margarita are the Melastomaceae, Aroideae, Piperaceae, Loranthaceae, and such members of the Filices as Trichomanes, Hymenophyllum, and Cyathea.

Thus it may readily be seen that the variety of plants is rather great. One finds all conditions from that in which the halogens and other xerophytes of the seashore and plains are found to that of the mesophytes in the moist mountain regions, and not alone terrestrial plants but also many epiphytes and a few phanerogamic parasites.

FLORA OF THE ISLAND OF COCHE.

Description of the Vegetative Conditions.

The island of Coche is a typical desert island and, so far as reported, had never been visited by a botanist. The conditions existing on such an island were of great interest to me, and the fact that two new species of plants were found together with the fact that few descriptions of such an island are on record, makes it seem desirable to describe the flora of Coche and the vegetative conditions in such detail as may be possible.

It was through the kindness of friends at Porlamar, Margarita, that I was enabled with a companion, Dr. A. F. Blakeslee, to visit Coche. The party, in charge of Sr. Antonio and Sr. Guilarte, left Porlamar at noon, Aug. 4, 1903, in a sloop, and reached San Pedro on the western end of Coche shortly after nightfall. Although the sign over one doorway proclaimed "Restaurant" within, yet the proprietor refused to furnish either food or shelter. Fortunately, our companions had friends there so that rooms in different houses were assigned where hammocks, which had been brought along, could be slung. The meals were picked up as well as could be done at the stores. Drinking water cost two and one-half cents a liter. It was found that this water was brought over from Porlamar and from the mainland. Water was to be had from pits on the shore but it was undesirable for drinking purposes.

On the morning of the 5th of August Dr. Blakeslee and I traversed the low shore of this end from the south point to the north. The beach stretches for a kilometer and a half to the northwest into a narrow spit of land. On this extent of lowland is a salt lake, where great piles of salt are gathered for shipment. Beyond the lake itself for another

kilometer the beach extends eastward, still a dazzling white. In one portion of the lake, the bottom is covered with a pink animal growth while the rest is a clear blue. The presence of quicksands prevented any close examination of the lake.

Inland from the beach on this end the hills rise gradually and are rounded. In general, the hilltops are hard, covered with loose stone and sand. A few hilltops are entirely without soil, merely a mass of loose broken fragments of rock with no vegetation. The surface inland is rolling, there being no level surface of any extent. From the hilltops to the hollows or small valleys, the surface gradually gets sandier until at the bottom it is a clear stretch of sand free from any stones.

The seashore on the southwest side presents a contrast to that on the west. The beach is about a meter in width for three kilometers or more, and gravel and stony cliffs rise abruptly to the height of twenty-five or thirty meters. From the top of the cliffs the inland surface does not rise over thirty meters higher. About three kilometers from San Pedro the cliffs are lower, and here show abundance of hard rock. The lower part of the cliff and also huge boulders broken off are smoothly worn and dark red or brown in color. At the eastern extremity of the south shore, the beach stretches to the southwest in a long narrow spit of land.

The total length of the island is about twelve kilometers, and breadth three kilometers. From almost any of its hills can be seen Margarita, at the nearest point within eight kilometers; and to the south the high mountain ranges show distinctly on the mainland about twenty-four kilometers away. The village of San Pedro is composed entirely of homes of ordinary fishermen and of the pearl fishers. There is a church, a graveyard, and seventy-five to a hundred houses besides several stores. The eastern extremity of the island is used for the pearl-fishing business but there is no village there.

No mention of rain on the island has been made because the existence of any at any time was not apparent. The natives claimed there never was any. As a matter of fact at the time of this visit there was a slight mist in the afternoon during the passing of a heavy thunderstorm on the coast of the mainland. This mist was barely perceptible and of course not sufficient to furnish water in any quantity. No streams or springs exist on the island. The unweathered condition of the rocks suggests the great lack of rain, while the presence of the sand

in the hollows rather than on the hilltops may be entirely accounted for by the wind movements. The rounded hills are wind worn, and there are no gullies due to rushing water. It is noticeable that it is the northern shore that has the gradual slope, and the southern that is precipitous. This of course is due to the fact that the prevalent wind is from the northeast rather than from the south.

As to the vegetation that occurs on such an island it is either adapted to a life on the salt seashore or suited to withstand extreme drought inland. The land spit on the eastern end is bordered on the inside shore by mangroves. The beach about the "salina" or salt lake produces the customary *Batis*, *Salicornia*, *Trianthema*, and *Alternanthera*. On the inland side of the salt plain the bushes of *Castela* are abundant. *Cassia hispidula* is scattered here also. *Pavonia cochensis* is abundant in the sandy valley back of San Pedro. The valleys are characterized by the low *Pereskia* trees, the *Acacias*, and *Gomphia*, *Guaiacum*, *Pithecolobium*, and the largest of the trees, *Bumelia cuneata*, about three meters high. The smaller plants here are *Jatropha gossypifolia*, *Solanum polyacanthos* in the valleys; *Croton*, *Argithamnia*, *Opuntia*, *Melocactus*, and *Waltheria* on the rocky hillsides or hilltops; and in the most rocky as well as in sandy places *Stylosanthes viscosa*, the most abundant plant on the island.

Of all the foregoing plants only one, *Argithamnia cochensis*, is exceptional in color. This is dark red throughout. The other plants are gray at least as to the trunk and stem, and the leaves are a gray-green and either protected by dense pubescence or are leathery.

There appeared to be no plants of economic importance on the island. A few straggling palms are in the village of San Pedro, but they appeared to be neither in flower nor in fruit.

At the time of our visit, the only plants in bloom were *Stylosanthes*, *Caesalpinia*, and *Bumelia*. On *Gomphia* many dried remnants of fruits still remained. This, together with the fact that several trees showed signs of budding, suggests that at another time more flowers and possibly more plants might be found. As a matter of fact no annuals were collected, but all were plants with extremely long and woody roots. Some specimens of *Stylosanthes* which were but 8 cm. in height above ground had roots 22 cm. long.

This collection while meager in its specimens probably represents well the flora of the island. The result may be summarized as follows:—

Species of Plants	37
Genera	33
Families	21
Endemic species	2

Following is a list of the plants of Coche, those numbered being collected and the others merely noted. Citations are given for those plants which I found only on Coche, citations for the others being referred to the list of Margaritan plants.

Catalogue of Plants.

GRAMINEAE.

SPOROBOLUS VIRGINICUS (L.) Kunth.— On Margarita also.

BROMELIACEAE.

TILLANDSIA RECURVATA L.— No. 14. On Margarita also.

T. UTRICULATA L. —No. 15. On Margarita also.

LORANTHACEAE.

PHORADENDRON RUBRUM (L.) Nutt., Journ. acad. Phila., n. s., vol. 1, p. 185 (1848); Griseb., Fl. Brit. W. Ind., p. 314. *Viscum rubrum* L., Sp. pl., vol. 2, p. 1023 (1753).—No. 10. Distribution general in tropical America.

CHENOPODIACEAE.

ATRIPLEX CRISTATA H. & B.— On Margarita also.

SALICORNIA FRUTICOSA L.— No. 9. On Margarita also.

AMARANTHACEAE.

ALTERNANTHERA CANESCENS HBK.— On Margarita also.

GOMPHRENA PILOSA (Mart. & Gal.) Moq.— No. 13. On Margarita also.

BATIDACEAE.

BATIS MARITIMA L.— No. 16. On Margarita also.

AIZOACEAE.

TRIANTHEMA PORTULACASTRUM L.— On Margarita also.

CAPPARIDACEAE.

CAPPARIS SP.—No. 1.

CAPPARIS STENOSEPALA Urb.—No. 2. On Margarita also.

LEGUMINOSAE.

CAESALPINIA CORIARIA (Jacq.) Willd.—No. 3. On Margarita also.

CASSIA HISPIDULA Vahl, Eclog. Am., vol. 3, p. 10 (1807); Mart., Fl. Bras., vol. 15, pt. 2, p. 131.—No. 4. Further distribution, Mexico.

PITHECOLOBIUM UNGUIS-CATI (L.) Benth.—No. 11. A tree, 3 m. high, top wide-spreading. On Margarita also.

STYLOSANTHES VISCOSA Sw.—No. 6. On Margarita also.

ZORNIA BRACTEATA (Walt.) Gmel., Syst., p. 1096 (1791).—*Anonymos bracteata* Walt., Fl. Car., p. 181 (1788).—No. 5. Further distribution, North America and South Africa.

ZYGOPHYLLACEAE.

GUAJACUM OFFICINALE L.—No. 19. On Margarita also.

SIMARUBACEAE.

CASTELA NICHOLSONI Hook.—On Margarita also.

EUPHORBIACEAE.

ARGITHAMNIA COCHENSIS Johnston, Proc. Amer. acad. arts and sci., vol. 40, p. 688 (1905).—No. 12. Endemic.

CROTON FLAVENS L.—No. 7. On Margarita also.

JATROPHA GOSSYPIFOLIA L.—On Margarita also.

J. URENS, var. STIMULOSA Muell. Arg.—On Margarita also.

MALVACEAE.

PAVONIA COCHENSIS Johnston, Proc. Amer. acad. arts and sci., vol. 40, p. 690 (1905).—No. 18. Endemic.

STERCULIACEAE.

WALTHERIA AMERICANA L.—No. 24. On Margarita also.

OCHNACEAE.

GOMPHIA PYRIFOLIA Griseb., Fl. Brit. W. Ind., p. 105 (1859).— No. 20. A tree, about 3 m. high.

TURNERACEAE.

TURNERA DIFFUSA Willd.— No. 21. On Margarita also.

CACTACEAE.

CEREUS MARGARITENSIS Johnston.— On Margarita also.

C. EBURNEUS Salm-Dyck.— On Margarita also.

MELOCACTUS COMMUNIS Link & Otto.— No. 22. On Margarita.

OPUNTIA TUNA Mill.— On Margarita also.

PERESKIA OPUNTIAEFLORE DC.— On Margarita also.

RHIZOPHORACEAE.

RHIZOPHORA MANGLE L.— On Margarita also.

MYRSINACEAE.

JACQUINIA BERTERII Spreng., Syst., vol. 1, p. 668 (1825) — Further distribution, San Domingo. A tree, about 3 m. high.

SAPOTACEAE.

BUMELIA CUNEATA Sw.— On Margarita also.

SOLANACEAE.

LYCIUM SALSUM Ruiz. & Pav.— No. 8. On Margarita also.

SOLANUM POLYACANTHOS Lam., Illust., vol. 2, p. 23 (1793).— No. 17.

COMPARISON OF THE FLORA OF MARGARITA AND COCHE WITH THAT
OF OTHER REGIONS.

Two different points of view may be taken in comparing the floras of various regions: one consists of a study of the lists of plants collected from the regions in question, and the other consists of a study of the types of vegetation. In using the former method one need only

resort to the collection of plants in the various herbariums and to the lists of plants published in various books and journals; in this way the distribution of the plants is discovered, the knowledge of which is valuable both to the taxonomist and the biologist. In this method the research worker must either for himself consult all the plants in the herbariums and represented in the lists and must verify their identification or else depend for their value upon the person identifying the plant or publishing its name. It is not necessary to see the plant growing. The species are all units and are well represented as such by mere names.

In using the second method of comparative study, that of considering types of vegetation, one encounters a very different proposition. Types represent groups of plants and groups which do not necessarily consist of separate species, in fact a type of vegetation may be made up of a number of species. Types of vegetation, then, can be represented only very indefinitely by published lists of names of plants or by the plants themselves as they occur mounted on herbarium sheets. It is true that names are in use to designate certain types of vegetation, terms such as xerophyte, hydrophyte, mesophyte, and others of more restricted meaning; and it is certain that these terms picture to one at all familiar with such work definite features in the vegetation. Moreover, the characteristics of any type of vegetation are often so well shown in the species constituting that type that one can by examining herbarium specimens very commonly determine to what type of vegetation the plant in question belongs.

So far it may be seen that one can by research among collections and lists of plants obtain both a fair idea of the species of plants from any particular region and some knowledge of the type or types of vegetation found in that region. So much can be done at home. The types, however, represent groups, and as the groups are often composed of many species which have one feature in common but often have a wide range in size, outline, method of branching, and color, it is impossible to give a complete and at all real picture of a locality without considering these various features, characteristics which can be ascertained only by traveling among the regions in question and by viewing personally the types of groups or composites of species as they are growing together in the various localities. The modifications of groups are so great that it is necessary to visit many localities and to visit the same localities at various times of the year before one can obtain a true knowledge of the character of the vegetation.

In order then to make an intelligent and thorough comparison of the flora of Margarita and Coche with that of other regions about the Caribbean Sea, it would be necessary for one to have access to specimens of plants and lists of plants collected in all lands bordering the Caribbean and also to have traveled in those regions. So far as the lists of plants and the collections are concerned it must be said that despite the many visits of American botanists to the West Indies and tropical America, and despite their intense activity in the United States, there is yet very much to be known about the plants in those regions. Parts of Mexico and of Central America are being well worked over. Colombia and Venezuela have had so little work done on them that comparison of lists of their plants is almost valueless. The West Indies as a whole have the useful works of Grisebach and of Professor Urban but these contain no lists of plants of the individual islands, so that they are scarcely to be used in comparative work. A few of the American botanists frequent Mexico and parts of Central America, a very few have visited Colombia, still fewer Venezuela, and some frequent Cuba, Hayti, Porto Rico, and Jamaica. Seldom is the traveling extensive or in more than one region. Both plant and animal surveys of the United States are fairly thorough through many parts, but in tropical America and the west Indies, biologically closely related to our southern States, little such systematic work has been done.

In view of the situation as above discussed it is perhaps particularly desirable that I make such a complete comparison of the flora of Margarita and of Coche as may be possible with that of other regions, especially considering that I have what I believe to be a complete list of all plants ever collected in or recorded from Venezuela and also that I have been enabled to visit personally many parts of Venezuela, British Guiana, and Panama, and many of the West Indian islands.

In a preceding chapter on the composition of the flora of Margarita, it would seem that the vegetation of Margarita partook equally of the nature of the West Indian and of the South American elements. This appearance I believe to be due to the large proportion of cosmopolitan plants present. In reality Margarita is, as would be expected, distinctly South American in its flora as will appear in the following pages.

The two islands under discussion, Margarita and Coche, are the

most eastern of all those along the northern coast of Venezuela. The other islands to be considered are Testigos, Blanquilla, Orchilla, Los Aves, Los Roques, Cubagua, Tortuga, Aruba, Buen Ayre, and Curaçoa, the respective positions of which may be seen by referring to the accompanying map of the Caribbean Sea and its surrounding lands (Pl. 23). All of these islands are identical in topographical features with the plains and hills of Margarita.

Of this group Cubagua is eight and one half kilometers (5.25 mi.) from Margarita and twice the distance from Coche, of which it is almost a counterpart in size and physical characteristics. No botanical research has been made upon it, though I have passed very near the shore several times and have observed that it has the same barren features that Coche possesses. There is no water on the island and never has been any within historical time, and though in the early sixteenth century it was the site of a thriving city of Spanish pearl-fishers, at present there may be seen only a few fishers' huts.

The next nearest island is La Tortuga, ninety kilometers (60 mi.) from Margarita and the same distance from the coast of Venezuela. The island is twenty kilometers (12 mi.) from east to west and ten kilometers (6 mi.) from north to south. It is merely a raised coral reef and presents the appearance of a low waste of land with an almost level surface and a very narrow beach. The vegetation as reported by Ernst consists of sixty-nine different species of plants largely common to American tropics of which, however, twenty-three are not to be found on Margarita.

The islands Los Aves, Testigos, and Blanquilla, so far as is known, have never been visited by a botanist. Los Aves consists of a number of small rocky and barren islets midway between Buen Ayre and Los Roques. They have been noted solely as a source of guano. The vegetation would naturally be very scanty. Testigos is a small group eighty kilometers (50 mi.) north of Margarita; and Blanquilla which is somewhat larger, being twenty-five kilometers in circumference, is seventy kilometers north of Margarita. Though there are no recorded visits to these islands, the flora may be assumed to be very scanty and to consist for the most part of cosmopolitan seashore plants.

Los Roques is a group of islands one hundred and thirty kilometers (80 mi.) from the coast of Venezuela and consists of a dozen or more rocky islands none over a kilometer in length. The flora is entirely

that of a tropical seashore, and is similar to that of Tortuga and Coche and the coast of Margarita, though more limited. As reported by Ernst there are twenty-four different species, of which *Cyperus brunneus*, *Cyperus caesioides*, *Eragrostis prolifera*, and *Opuntia spinosissima* have not been reported from either Margarita or Coche. Two of these, *Cyperus caesioides* and *Opuntia spinosissima*, are not found on Tortuga. It will be noticed, however, that these are of wide distribution.

The three western islands lying off the coast of Venezuela belong to the Dutch Republic. The most important work that has been done upon them botanically was by Suringar ('86). He lists, however, scarcely a dozen plants from Aruba and Buen Ayre. From the character of these two islands one is led to expect a flora similar to that of Curaçoa though more limited. Buen Ayre is about forty kilometers (25 mi.) east of Curaçoa and has an area of twenty-four thousand hectares (85 sq. mi.), while Aruba is nearly seventy kilometers west of Curaçoa with an area of seventeen thousand hectares (69 sq. mi.).

Curaçoa is the one of this group upon which some botanical work has been done. Several botanists have visited the islands, the most notable of whom was perhaps Suringar. As determined from his list of Curaçoan plants (117 species), fifty have not been reported from Margarita. To be sure Suringar's list is not taken to be at all complete of the flora of Curaçoa. Simons ('68) has published a much longer list but unfortunately the names are in a great part old ones and quite impossible to identify for certain with those at present in use. Even considering this list, Margarita has over four hundred plants not on Curaçoa. This difference in the flora is due to marked contrast in physical conditions and to their difference in geographical position. In physical condition Curaçoa resembles the plains and hills of Margarita, and has a vegetation similar to theirs, but the heavy woods and the varied vegetation of the mountain tops are to be found in Margarita only. In geographical position, although they are both coastal islands and are on nearly the same parallel, yet they are five hundred kilometers (300 mi.) apart and Curaçoa is ninety kilometers (50 mi.) from the coast of Venezuela. It is probable that complete exploration of both islands would show more resemblances between them, but according to present knowledge, the differences in physical conditions and in geographical situation alone may well account for the differences in the floras.

All of these islands extending along the north coast of Venezuela not only resemble each other very much but they are also like the coast of the mainland. There are to be found much the same species constituting the seashore flora, the flora of the lagoon, of the wild cactus-covered hills, and of the few fertile coconut valleys. This is well illustrated by almost any part of the north coast. Carúpano is in a long narrow valley with arid hills on each side. Cumaná is on a sandy plain at the foot of the hills. Guanta is in a small valley with the appearance of a perpetual drought on every side. La Guaira is on a hillside by the edge of the sea and the hill is a brown and sun-baked exposure although it is broken here and there by green valleys and by a green mountain rising above. A short way inland but still in the coastal region between Caracas and Valencia and about the Lake of Valencia trees are scarce or lacking, the mountains are brown and clothed only in small shrubs or in dry grass, and in the valley are scorching sandy plains with here and there the shade of a tree.

These islands are similar to the coastal land as naturally they should be, having been in early times a part of the coast and yet there is a vast country behind the coast to which they are not at all like. The mountain region of the Andes, anywhere from one thousand to four thousand meters high, the grassy plains of the Orinoco, and the forests to the south present features vastly different in every respect. Unfortunately our knowledge of their flora is very limited. Many plants were described as new from Humboldt's travels, but since that time there have been few collections and fewer plants described. It is known that there are many plants which are common to the rest of the tropics. Altogether our information is one-sided as tending to show the cosmopolitan rather than the characteristic plants. I have compiled a list of all the published names of Venezuelan plants which comprises some three thousand names. That some of these are names which may not be in good standing today cannot be denied, but I have at least made reasonably sure that they represent nearly three thousand different species.

Out of the six hundred and thirty-four Margaritan plants two hundred and ninety-five have not been published as occurring anywhere else in Venezuela. Inasmuch as many of these are cosmopolitan plants it shows not the peculiarity of the Margaritan flora but the small amount of work that has been done on the mainland.

Close to the mainland but yet not considered one of the Venezuelan Islands is Trinidad lying to the northeast of Venezuela. In general the flora and vegetative conditions of the island are similar to those of the mainland. There is a large collection of well identified plants at the St. Clair experiment station at Port-of-Spain and I had the opportunity of comparing my first collection with them. From this I found that one hundred and seventy-nine Margaritan plants were not in the Trinidad herbarium and one hundred and sixty-one were there. Unfortunately it has been impossible for me to compare the remainder of my plants. Of those plants that were not in the Herbarium the majority were of wide distribution. Of the plants of restricted distribution, however, the greater number were Venezuelan rather than pertaining to the West Indies.

Trinidad presents a distinct contrast in the appearance of its vegetation to that of the islands of the north coast. The latter are dry as is the adjacent coast. Trinidad, however, resembles and is really a part of the east coast, characterized by low land, well watered, and heavily wooded. Thus appears the east coast of Venezuela and of British Guiana, green with luxuriant vegetation, broken here and there, to be sure, with sandy stretches and low hills, but in effect with a truly tropical verdure. Trinidad has a series of hills across the low end of the island and a range of low mountains across the northern end. The regions about these hills are in many places heavily covered with forests. Across the middle of the island is a belt of almost unbroken savannah land much used for grazing and for cane crops. Both on the eastern and on the western side are extensive swamp lands. Only in isolated and restricted areas are there any arid districts at all resembling those of Margarita.

The entire chain of small islands extending from Trinidad northward is with few and unimportant exceptions similar in vegetative conditions to Trinidad. For the most part they consist of well cultivated plains and green-clad hills and mountains. Porto Rico at the northern end of this chain of islands and the easternmost of the Great Antilles presents features somewhat different. With the exception of a narrow plain about the island, the surface of Porto Rico is undulating and broken into sharp hills and ridges from one end to the other. In marked contrast to Trinidad, Porto Rico has very little forest land and only a few small savannahs. Moreover, the waste lands, barren or cactus-covered, along the south shore are comparable

with the wastes of Margarita. This northern island is perhaps in a condition midway between that of the coast and coastal islands of Venezuela and that of Trinidad, the former being in a condition of drought and the latter in a state of excessive moisture for much of the year. In regard to the species of plants, there is of course a vast difference. Professor Urban's *Flora Portoricensis* is very complete so far as published. In it are sixty-one plants to be found on Margarita, although the author does not refer more than twenty-five to the island, these references being only from my first collection of plants. As many as this is naturally to be expected from the wide distribution of many of the plants. Moreover, there are fully five hundred plants of Margarita not to be found on Porto Rico, and of course many more on the much larger island not on Margarita.

In the small Cayman Islands farther west in the region of the Great Antilles there is also a diversity from Margarita. These islands consist of Grand Cayman, Little Cayman, and Cayman Brac, two hundred and eighty-nine kilometers (180 mi.) northwest of Jamaica and about the same distance south of the center of Cuba. Grand Cayman is twenty-seven kilometers from east to west, six to eight wide at the eastern end and eleven to thirteen kilometers (7 to 8 mi.) wide at the western end. There is no elevation exceeding fifty meters (150 ft.). Some forest land is present, and in the center is considerable boggy soil suggesting the presence of sufficient moisture for much vegetative growth. Collections of plants have been made on the Caymans by Professor C. F. Millspaugh and by Mr. W. Fawcett. From the total of two hundred and twenty-eight species constituting these lists eighty-four are found on Margarita. Five hundred and eighty Margaritan plants are not found on the Caymans. This suggests a distinctly different flora notwithstanding the presence of so many plants of wide distribution. This difference can be accounted for partially in the vegetative conditions, but in the main it is due to geographical position, the Cayman Islands being some seventeen hundred kilometers northwest of Margarita. Moreover in comparing the flora of the Cayman with that of the other Venezuelan islands or with Trinidad the same result is obtained.

It is impossible to make a definite comparison of the plants of Jamaica and Cuba with those of Margarita, for the lists are so incomplete. It must suffice to say that from the material available for comparison it is certain that a very large part of the plants of Jamaica and

Cuba is not to be found in northern Venezuela excepting of course the flora common to all tropical countries. The vegetative conditions of these islands can be said to differ from portions only of Venezuela. The waste plain west of Kingston is duplicated in the plain of Margarita. The valleys and ridge of the Blue Mountains resemble those of the coast range above Caracas in Venezuela. The barren mountains about Santiago de Cuba are identical in appearance with range after range extending from Caracas to Valencia. The rolling land that occupies the most of Cuba with its cane fields and tobacco fields is similar to that of the interior of Venezuela. There still remains in Cuba some of the virgin forest. In fact there is considerable of it and it suggests that of the more nearly equatorial countries. Only in a limited way, however, does it begin to compare with a truly tropical forest. Such vegetation as is to be found along the shores of the Orinoco, Essequibo, and the Amazon is nowhere to be found among the northern islands.

Further north than the islands of Jamaica and Cuba, in subtropical Florida there are naturally many changes from the tropics. Some districts approach in their wild luxuriance of vegetation that of countries near the equator and on the other hand there are to be found some stretches barren as the desert regions of the Venezuelan islands. As a whole, however, the individual species making up the type of vegetation have changed. The difference in temperature of the regions sets a limit upon the distribution of the species. In passing, it is of interest to note that notwithstanding the great differences in species, exclusive of cultivated plants there are ninety-seven different species occurring in both southern Florida and Margarita.

CONCLUSION.

In writing the foregoing pages three objects have been foremost in my mind: to catalogue the plants of Margarita, to describe its vegetative conditions, and to compare its flora with that of adjacent regions.

The catalogue of the species comprises 644 names, all of the plants that have been reported from Margarita. Collections, however, have been made only on part of the eastern end and during only a part of the year (March, July, August, and the first four days in September) thus leaving opportunity for much additional work. It is doubtful if this catalogue comprises much more than three fourths of the entire

flora of the island. Forty-two new species, including two new genera, have been discovered on the island.

The vegetative conditions of Margarita are much more varied than those of the other islands. Margarita has both a rich mountain flora and also the flora of arid plains and hills. Curaçoa and the others possess only arid vegetative conditions.

In regard to the comparison of the flora with that of adjacent regions, it is much to be regretted that data are so insufficient as to lessen the value of any comparison and in some cases actually to prohibit it. The flora of Margarita comprises all the plants found on Coche with three exceptions. The other small islands are probably similar in this respect. La Tortuga has twenty-three out of sixty-nine plants not to be found on Margarita and Los Roques has four out of twenty-eight not on Margarita. Though it is impossible to speak accurately of Curaçoa, to judge by the references cited on previous pages there are about four hundred plants there of which one hundred are not on Margarita.

Although there is a large list (240) of plants of Margarita not published as occurring in Venezuela, it is probable that a large proportion of them do. The vegetation on the mainland (near Carúpano and Cumaná) opposite Margarita is identical in appearance with that of Margarita.

Trinidad has a very large flora, yet over two hundred Margaritan plants have not been reported from there, and are not in the Herbarium of the Trinidad botanical gardens.

The entire chain of islands to the east of the Caribbean Sea possesses a vegetation consisting of many species not to be found on Margarita. It is of a much more luxuriant character. In the extensive flora of Porto Rico so far as can be ascertained there are less than one hundred Margaritan plants to be found. Most of these are common to the American tropics.

In the flora of the Cayman islands it is seen that out of their two hundred and twenty-eight species only eighty-four are on Margarita. The reference to the plants of the southern United States similarly shows about a hundred from Margarita which are, however, cosmopolitan.

In the comparison of the flora with that of other regions about the Caribbean Sea it is evident that the flora of Margarita is largely composed of plants common to many parts of the American tropics. It

is also seen in studying the distribution of the individual plants that Margarita contains twice as many plants which are characteristic of South America as are characteristic of the West Indies. And finally, it is still as clearly evident from comparing it with other islands about the Caribbean Sea that while Margarita has some plants common to all of the islands, yet as a whole it has a flora quite distinct from the northern islands and at the same time closely approaching that of the Venezuelan islands and the north coast of the mainland.

LITERATURE.

To show the more important publications on the exploration, botanical collecting, and geography of Venezuela, the following bibliography is added.

GEOGRAPHY OF VENEZUELA.

Note.— The following are selected from a list of about fifty books on Venezuela, and include, it is believed, all that are of any value to the botanical worker.

Anonymous.

'24. Letters written from Colombia during a journey from Caracas to Bogotá. G. Corvie & Co.: London, 1824, 208 pp., map.

Gives description of the route as to forests, meadows and cliffs, as to agriculture, towns, etc.

'73. Memoria de la Direccion general de estadistica al Presidente de los Estados Unidos de Venezuela en 1873. Impr. Nacional: Caracas, 1873, 3 vols.

Very complete as to geography and commerce.

André, Eugéne.

'04. A naturalist in the Guianas. Scribner's Sons: New York, 1904, 310 pp., 32 pls., map.

André went on two expeditions up the Orinoco and Caura Rivers.

Bénard, Charles.

'97. Le Vénézuéla. Impr. G. Gounouilhou: Bordeaux, 1897, 106 pp., map.

Gives heights of mountains, length of rivers and drainage area, table of temperatures, agriculture, and animals.

Caulin, Antonio.

1779. Historio coro-graphica natural y evangelica de la Nueva Andalucía, prov. de Cumaná, Guayana y vertientes del rio Orinoco. J. De San Martin: Madrid 1779, 482 pp., 3 pls., map.

A natural history, including descriptions of the rivers.

Cazeneuve, Paul de and François.

'88. Les États-Unis de Vénézuéla. Sauvaitre: Paris, 1888, 300 pp., map.

A good map, a very good guide containing population of many cities, courses and lengths of many rivers, medicinal plants, and history.

Codazzi, Agustin.

'41. Resúmen de la geografia de Venezuela. Impr. de H. Fournier y Compia: Paris, 1841, 648 pp.

The most complete geographical work on Venezuela.

Dauxion-Lavaysse, Jean François.

'20. A statistical, commercial, and political description of Venezuela, Trinidad, Margarita, and Tobago. G. & W. B. Whittaker: London, 1820, 479 pp.

Contains an interesting sketch of Margarita.

Duane, William.

'26. A visit to Colombia in the years 1822 and 1823. Venezuela, p. 1-351. T. H. Palmer: Philadelphia, 1826, 632 pp.

Gives a good description of the hills and the valleys, and the wooded and the barren regions between Caracas and Colombia.

Engel, Franz.

'88. Auf der Sierra Neváda de Merida. A. G. Richter: Hamburg, 1888, 36 pp. Sammlung gemein verständlicher wissenschaftlicher Vorträge, n. f., series 3, no. 58.

Ernst, Adolphus.

'68-'69. Ascension á la Sierra Neváda de Merida, Feb. 18, 1868. Vargasia. Caracas, 1868-69, p. 199-202.

'84-'86. La Exposicion Nacional de Venezuela en 1883. Impr. de la Opinión Nacional: Caracas, 1884-86, 2 vols., map.

Gerstächer, Friedrich.

'68-'69. Neue Reisen durch die Vereinigten Staaten, Mexico, Ecuador, West-indien und Venezuela. H. Castenoble: Jena, 1868-69, 3 vols.

Chapters on La Guaira, Caracas, Valley of Aragua, llanos, San Fernando de Apure, Apure River, Orinoco River, and mines at Angostura.

Goering, Anton.

'93. Vom tropischen Tieflande zum ewigen Schnee. Eine malerische Schilderung des schönsten Tropenlandes. A. Fischer: Leipzig, 1893, 54 text figs., 12 colored pls.

Though rough sketches, the illustrations of this work give some idea of Maracaibo, Merida, and Mucuchies.

Humboldt, Alexander, and Bonpland, Aimé.

'14-'29. Personal narrative of travels to the equinoctial region of the new continent, during the years 1799-1804, translated by Helen M. Williams. Longman, Hurst, Rees, Orme, and Brown: London, 1814-29, 7 vols.

Contains descriptions of the country about Cumaná, Cumanacoa, and San Fernando de Apure.

'14. Voyage aux régions équinoxiales du nouveau continent. F. Schoell: Paris, 1814, 3 vols., 2 atlases.

Contains full description of route.

Kol, H. van.

'04. Naar de Antillen en Venezuela. A. W. Sijthoff: Leiden, 1904, 552 pp.

Description of Curaçoa. Good illustrations of islands.

Landaeta Rosales, Manuel.

- '89. Gran recopilacion geografica, estadistica, é historica de Venezuela. Impr. Bolivar: Carácas, 1889.

Lennepe Coster, G. van.

- '42. Aanteekeningen, gehouden gedurende mijn verblijf in de West Indiën in de jaren 1837-40. J. F. Schleijs: Amsterdam, 1842, 359 pp. Chapters on Curaçoa, Aruba, Bonaire, and Venezuela.

Lével, André Aurelio.

- '81. Esbozos de Venezuela I. Margarita. Caracas, 1881, p. 26-50.

Morisse, Lucienne.

- '04. Excursion dans l'Eldorado (El Callao). Association d'imprimeurs: Paris, 1904, 474 pp., 4 maps, diagram.

Only popular work treating of the country between Ciudad Bolivar and British Guiana. Pertains particularly to the mining regions.

Ober, Fred A.

- '91. The Knockabout club on the Spanish Main. Estes and Lauriat: Boston, 1891, 239 pp.

A story incidentally giving much information valuable to a traveler new to the country.

Paez, Ramon.

- '68. Travels and adventures in South and Central America. C. Scribner & Co.: New York, 1868, 473 pp., map.

Description of llanos and life of llaneros.

Pocaterra, Jaime D.

- '64. Derrotero del Golfo de Venezuela ó soco de Maracaibo. Impr. de S. Hallet: New York, 1864, 32 pp.

Description of shores, winds, and currents of Lake Maracaibo.

Robinson, J. H.

- '22. Journal of an expedition 1400 miles up the Orinoco and 300 up the Arauca. Black, Young, and Young: London, 1822, 397 pp.

Of little value so far as descriptions are concerned.

Roncayolo, L.

- '94. Au Venezuela, 1876-1892. P. Dupont: Paris, 1894, 208 pp. Excellent photographs, chapter on Merida, etc.

Sievers, Wilhelm.

- '88a. Die Cordillere von Mérida nebst Bemerkungen über das karibische Gebirge. Geogr. Abhand., vol. 3, no. 1. Hölzel: Wien, 1888, 238 pp., geolog. chart.

Good chapters on rivers, lakes, climate, vegetation, agriculture, etc. Bibliography especially good on geology.

- '88b. Venezuela. L. Friederichsen & Co.: Hamburg, 1888, 359 pp., map.

Full description of paramo region, of alpine or mountain regions in general, and of llanos. Good geography of Venezuela.

'96. *Zweite Reise in Venezuela in den Jahren 1892-93.* L. Friederichsen & Co.: Hamburg, 1896, 327 pp., map.

Contains a good map of coast and islands from Coro to Trinidad.

MAPS.

The maps in W. Sievers's works noted above are of special value. In addition may be noted the following:—

'88. *Texte et carte commerciale des États-Unis de Vénézuéla avec notice descriptive* Imprimerie Chaix: Paris, 1888.

'97-'98. *Orinoco-Essequibo Region.* Map 2. Senate doc., vol. 9, no. 91, pt. 4, 1897-98.

There are also a number of coast charts issued by the U. S. hydrographic office.

VEGETATION OF VENEZUELA. *more checked*

Anonymous.

'64. *Indicacion de algunos de los principales objetos de historia natural, es decir: minerales, vegetales y animales — para la exhibicion 1864.* Imprenta de lo Estados Unidos de Venezuela, por Felix é Bigotte, Caracas, 1864, 22 pp.

'93. *World's Columbian exposition at Chicago. The United States of Venezuela in 1893.* Pub. by order of government of Venezuela. New York, 1893.

'04. *International bureau of American republics. Venezuela.* Washington, D. C., 1904, 604 pp., map, illustr. Excellent in every way.

Bellermann, F.

'94. *Landschafts- und Vegetations-Bilder aus den Tropen Süd-Amerika's nach der Natur gezeichnet von Prof. F. Bellermann.* R. Friedlander & Sohn: Berlin, 1894, 24 pls.

Illust. of Cumana, La Guaira, Caracas, Merida, and vicinities. Text by H. Karsten.

Braun, A.

'58. *Übersicht der Characeen aus Columbien und Guyana.* Monatsber. königl. preuss. Akad. Wissensch. Berlin, 1858, p. 354-367.

Caulin, Antonio.

1779. *Historio coro-graphica.* Madrid, 1779.

Chapters on the trees, fruits, medicinal plants, gums, resins, balsam, various animals, and rivers.

Dozy, F.

'54. *Prodromus florae bryologicae Surinamensis. Accedit pugillus specierum novarum florae bryologicae Venezuelanae.* Arnz & Co.: Düsseldorf, 1854, 54 pp., 19 pls.

Eaton, Daniel C.

- '61. Filices Wrightianae et Fendlerianae. Mem. Amer. acad. arts and sci., new ser., 1861, vol. 8, pt. 1, p. 192-220.

As an appendix to this is Orchideae Wrightianae et Fendlerianae.

Ernst, Adolphus.

- ✓'65a. On the medicinal plants of Caracas, Venezuela, and their Venezuelan names. Seemann's Journ. of bot., 1865, vol. 3, pp. 143-150, 277-284, 306-322.
- ✓ 201 plants of Venezuela mentioned.
- ✓'65b. Plants growing in the streets of Caracas. Seemann's Journ. of bot., 1865, vol. 3, p. 322-323.
- ✓'66a. Formas características de la flora venezolana. Las palmas. El Porvenir, Caracas, 1866, vol. 1, no. 6; vol. 2, no. 7, vol. 3, no. 8.
- ✓'66b. List of Venezuelan woods, with their Venezuelan names and specific gravity. Seemann's Journ. of bot., 1866, vol. 4, p. 359-360. Gives names of 48 plants, 24 of which are on Margarita.
- ✓'67a. On the plants common to the southern United States and Venezuela. Seemann's Journ. of bot., 1867, vol. 5, p. 290-296.
- ✓ There are 2684 plants in Chapman's Flora; of these 283 are in Venezuela.
- ✓'67b. On the plants cultivated or naturalized in the valley of Caracas, and their vernacular names. Seemann's Journ. of bot., 1867, vol. 5, p. 264-275, 287-290.
- ✓'68-'69a. Los Helechos de la Flora Caracasana. Vargasia, Caracas, 1868-69, p. 100-103.
- ✓'68-'69b. Plantas interesantes de la flora Caracasana. Vargasia, Caracas, 1868-69, p. 178-194.
- ✓'72a. Verzeichniss der auf der venezuelanischen Inselgruppe Los Roques im Sept., 1871 beobachteten Pflanzen. Bot. Zeit., 1872, vol. 30, p. 539-541.
- ✓'72b. Sertulum Naiguatense; Notes on a small collection of alpine plants from the summit of Naiguatá, in the mountains of Caracas. Trim., Journ. of bot., Sept. 1872, vol. 10, p. 261-264.
- ✓'74. Observationes aliquot in plantas nonnullas rariores vel novas florae Caracasanae. Flora, 1874, vol. 57, p. 209-215. Some of these plants were collected by Sr. Fermin Toro of Caracas; 24 plants mentioned, 6 of these new species of Ernst and 1 of Toro.
- ✓'76a. Descriptive catalogue of the Venezuelan department at the Philadelphia International exhibition, 1876. McCalla & Stavely: Philadelphia, 1876, 55 pp.
- ✓'76b. Florula Chelonesiaca. Trim., Journ. of bot., London, 1876, vol. 14, p. 176-179. Thirty-one out of the 69 plants occur also on Margarita.
- ✓'77a. Estudios sobre la flora y fauna de Venezuela. Imprenta Federal: Caracas, 1877, 330 pp. This work is also found in Primer anuario estadístico de Venezuela ano de 1877, Impr. Nacional: Caracas. Lists 412 orchids and 300 ferns and fern allies.

'77b. Várgas consid. como bot., Caracas, 1877. A paper presented to the society of physical and natural sciences in Caracas, 1877.

'79. Enumeracion de las plantas mas notables que fueron observadas en la excursion à Naiguatá. Repertorio Caraqueño, 1879, p. 141-146.

'86. Eine botanische Excursion auf der Insel Margarita. Nederl. kruidk. arch. Nijmegen, 1886, vol. 4.

'92. La vegetacion de los Páramos de los Andes Venezolanos. Boletin del Ministerio de obras publicas, Caracas, 1892, no. 157, p. 159-163, Feb., March.

'00a. Sertulum Aturense, ó sea, lista de una pequeña coleccion den plantas que recojio el Sr. Alfredo John, hijo, en Octubre de 1887 cerca de Atures, Alto Orinoco. Revista cientif. de la Universidad Central de Venezuela, Caracas, 1900, vol. 1, p. 219-223.

'00b. Bibliographia (Prof. Dr. phil. A. Ernst, Caracas, Venezuela, 1865-99) Universitäts-Buchdrucherer, J. Neuenhalm: Jena, 1900 (?)

Goebel, K.

'91. Die Vegetation der venezolanischen Paramos, in Pflanzenbiologische Schilderungen, 1889-93, pt. 2, no. 1. N. G. Elwert: Marburg, 1891. Prof. Goebel visited many of the higher mountains about Merida and collected some plants.

Hampe, E.

'47a. Bericht über die Hepaticae welche Hr. Moritz in Columbiën sammelte und dem königlichen Herbarium in Schönberg überlieferte, nach der Synopsis Hepaticarum und den Moritzschen Nummern aufgeführt. Linnaea, 1847, vol. 20, p. 321-336.

Lists 48 plants of Venezuela.

'47b. Ein Referat über die columbischen Moose, welche von Herrn Moritz gesammelt worden. Linnaea, 1847, vol. 20, p. 65-98.

Lists 70 plants of Venezuela.

Hegelmaier, Friedrich.

'68. Die Lemnaceen. Eine monographische Untersuchung. Wilhelm Engelmann: Leipzig, 1868, 169 pp., 16 pls.

Humboldt et Bonpland.

'08. Plantae aequinoctiales. F. Schoell: Paris, 1808, 2 vols., 140 pls.

Humboldt, Bonpland, et Kunth.

'15-'25. Nova genera et species plantarum. F. Schoell: Paris, 1815-25, 7 vols. Vol. 7 contains summaries entitled "Flora provinciarum Novae Andalusiae Venezuelae, nec non Planitiei Barchinonensis," and "Flora Orinoci et fluminis Nigri" the two containing 1170 Venezuelan plants.

Johnston, J. R.

'05. New plants from the Islands of Margarita and Coche, Venezuela, Proc. Amer. acad. arts and sci., 1905, vol. 40, p. 683-698.

'08. Plants collected in the vicinity of La Guaira, Venezuela. Contrib. U. S. nat. herb., 1908, vol. 12, pt. 2, p. 105-111.

Karsten, H.

- '48. Auswahl neuer und blühender Gewächse Venezuelas. Berlin, 1848, 4to, 12 pls.
 ✓ '58-'69. Florae Columbiae terrarumque adjacentium specimina selecta, etc., 1858-69.

Klotzsch, Joh. Friedr.

- ✓ '47a. Beiträge zu einer Flora der Aequinoctial-Gegenden der neuen Welt. Linnaea, 1844, vol. 18, pp. 515-556, 667-709; 1847, vol. 20, p. 337-432, 446-542.
 ✓ '47b. Nachträge zu den Lycopodineis und Filicibus, welche im 18 Bände der Linnaea p. 515-556 unter der Ueberschrift: "Beiträge zu einer Flora der Aequinoctial-Gegenden der neuen Welt" veröffentlicht wurden. Linnaea, 1847, vol. 20, p. 433-445.
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Kunth, Karl.

- ✓ '39. Bemerkungen über die Familie der Piperaceen. Linnaea, 1839, vol. 13, p. 561-726.

Landaeta Rosales, Manuel.

- '89. Gran recopilacion geografica, estadistica, é historica de Venezuela. Impr. Bolivar: Caracas, 1889, 2 vols.
 Vol. 1, p. 68-72, contains a list of Venezuelan plants under their vernacular names.

Loeffling, Peter.

- ✓ 1776. Reise nach den spanischen Ländern in Europa und America in den Jahren 1751 bis 1756. Berlin und Stralsund, 1766, 406 pp.

Maury, P.

- ✓ '89. Enumération des plantes du Haut-Orénoque récoltées par MM. J. Chaffanjon et A. Gaillard. Journ. de botanique, Paris, 1889, vol. 3, pp. 129, 157, 196, 209, 260, and 266.

Patouillard, N., and Gaillard, A.

- ✓ '87. Champignons du Vénézuéla et principalement de la région du Haut-Orénoque, récoltés en 1887 par M. A. Gaillard. Bull. soc. mycol. de France, 1887, vol. 3, pp. 7-46, 92-129.

The fungi were collected about Caracas, Ciudad Bolivar, and San Fernando de Atabapo, 278 species in all.

Reichenbach, H. G., fil.

- ✓ '54a. Die Wagener'schen Orchideen. Bonplandia, 1854, vol. 2, p. 9-26.
 ✓ '54b. Orchideae Schlimianae. Bonplandia, 1854, vol. 2, p. 277-284.
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 ✓ '58-'00. Xenia orchidacea, Beiträge zur Kenntniss der Orchideen. Leipzig, 1858-1900, 3 vols.

Rusby, H. H.

- ✓ '96. Concerning exploration upon the Orinoco. Alum. journ. coll. pharm., N. Y., 1896, vol. 3, p. 185-191.

Schiller, G. W.

- '57. Catalog der Orchideen-Sammlung von G. W. S. zu Ovelgönne an der Elbe. Hamburg. Ed. 3, 1857.

Seemann, Berthold.

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Simons, G. J.

- '68. Beschrijving van het eiland Curaçou. G. S. Tempe: Oosterwalde, 1868, p. 156.

Suringar, W. F. R.

- ✓ '86. Nederlandsch-West-Indische expeditie, verslag en reisverhaal. Tijdschr. Nederl. aardrijkskundig genootschap. Amsterdam, ser. 2., 1886, pt. 3, afd. versl. en meded., pp. 45-90, 355-394, 511-545.

Villavicencio, R.

- '80. La República de Venezuela, bajo el punto de la geografía y topografía medicas y dela demografía. A Rothe: Caracas, 1880.
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- ✓ '55. Chloris Andina essai d'une flore de la région alpine des Cordillères de l'Amerique du Sud. P. Bertrand: Paris, 1855.

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✓ Grisebach, A. H. R.

- '64. Flora of the British West Indian islands. Lovell Reeve & Co.: London, 1864.

✓ Martius, Karl F. P.

- '40-'06. Flora brasiliensis. Monachii and Lipsiae, 1840-1906, 15 vols., plates.

✓ Millspaugh, C. F.

- '00. Plantae Utowanae. Publ. Field Col. mus., no. 43, bot. ser., 1900, vol. 2, no. 1, p. 1-135.

✓ Pulle, A.

'06. An enumeration of the vascular plants known from Surinam, together with their distribution and synonymy. E. J. Brill: Leiden, 1906, pp. 555, 17 pls., map.

✓ Schomburgk, R.

'47-'48. Reisen in Britisch-Guiana in den Jahren 1840-44. Leipzig: J. J. Weber, 1847-48, 3 vols. illustr., map.

Urban, I.

'03. Flora portoricensis, in Symbolae Antillanae, vol. 4, p. 1-352. Fratres Borntraeger: Lipsiae, 1903.
Only through Euphorbiaceae.

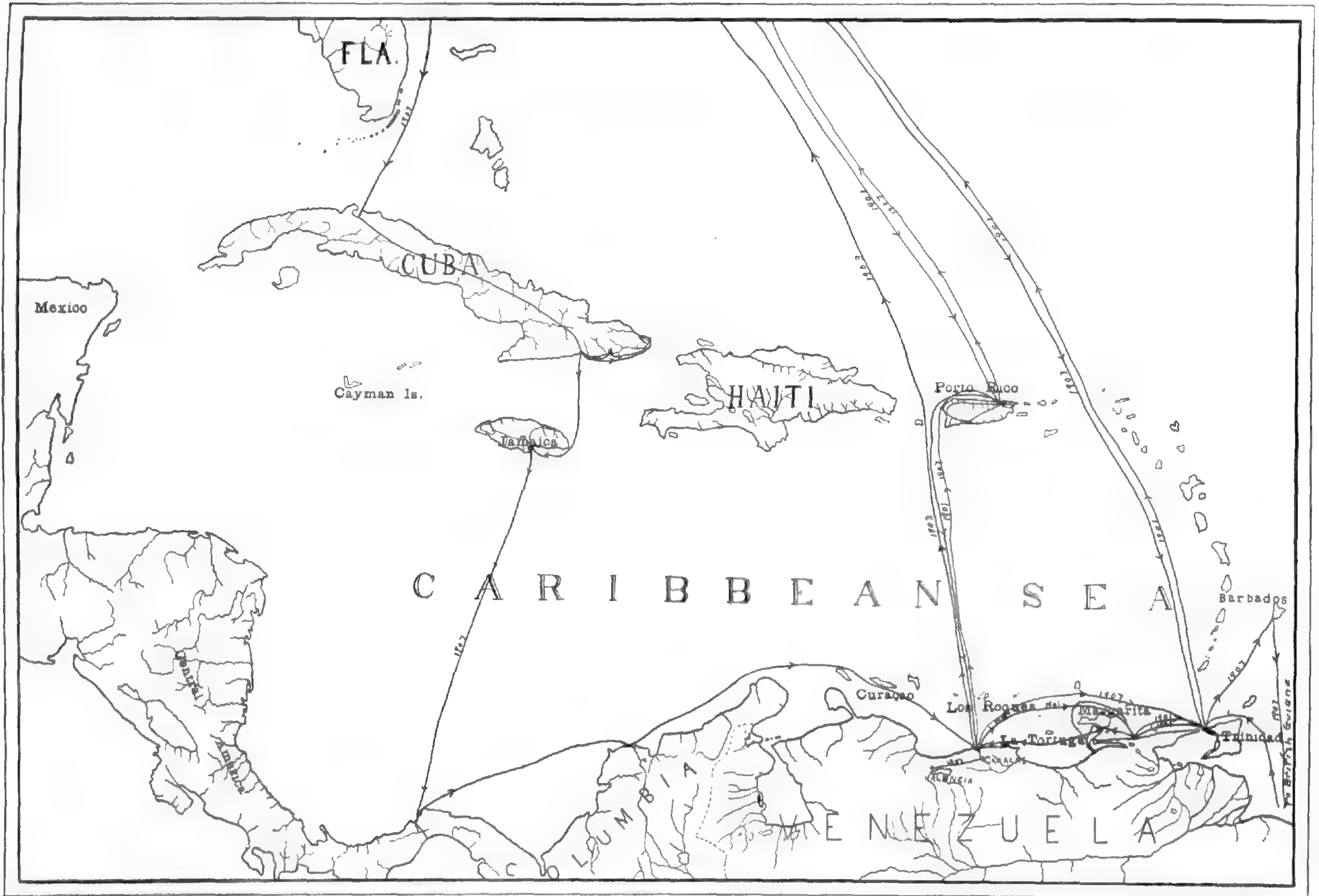
Printed June, 1909.

JOHNSTON.— Flora of Margarita Island.

EXPLANATION OF PLATES.

PLATE 23.

Map of Caribbean Sea and its bordering lands.



JOHNSTON.—Flora of Margarita Island.

PLATE 24.

Map of Margarita, Coche, and Cubagua. Modified from map no. 2035 issued by the U. S. hydrographic survey.

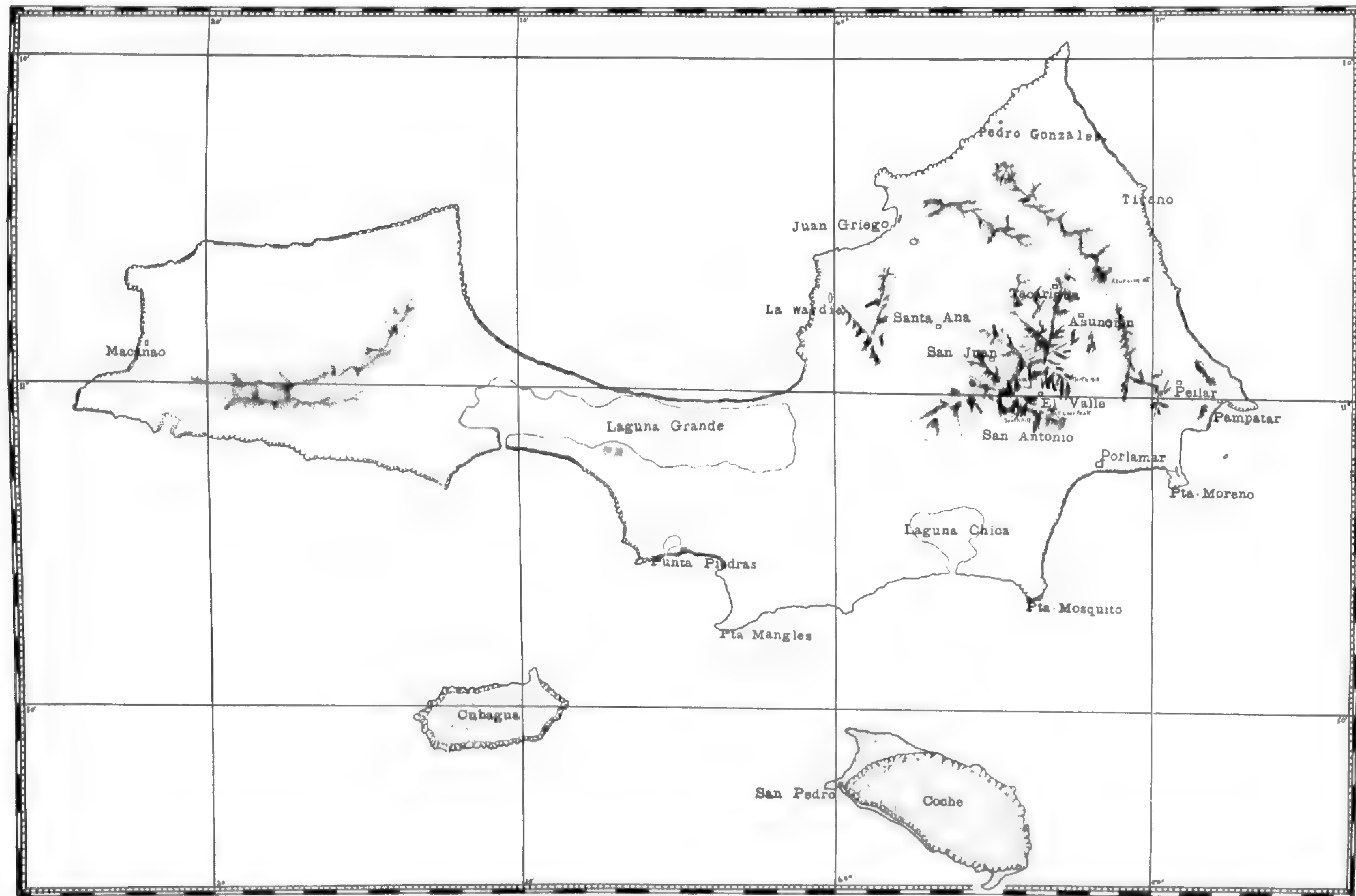


PLATE 25.

- Fig. 1. Road from Asuncion to Juan Griego.
Fig. 2. Road from Porlamar to Asuncion.



1



2

JOHNSTON.—Flora of Margarita Island.

PLATE 26.

Fig. 1. *Renealmia lutea*.

Fig. 2. *Elleanthus attenuatus*.



1



2

JOHNSTON.—Flora of Margarita Island.

PLATE 27.

Fig. 1. *Blakea monticola*.

Fig. 2. *Coccoloba Ernestii*.



1



2

PLATE 28.

- Fig. 1. *Inga macrantha*.
Fig. 2. *Machaerium striatum*.



1



2

PLATE 29.

- Fig. 1. *Bignonia acuminata*.
- Fig. 1a. Corolla opened to show stamens.
- Fig. 1b. Calyx and style.
- Fig. 2. *Solanum margaritense*, a single flower.
- Fig. 3. *Chiococca micrantha*, inflorescence with buds.
- Fig. 3a. Flower minus corolla.
- Fig. 3b. Mature ovary and old calyx.
- Fig. 3c. Interpetiolar stipule.

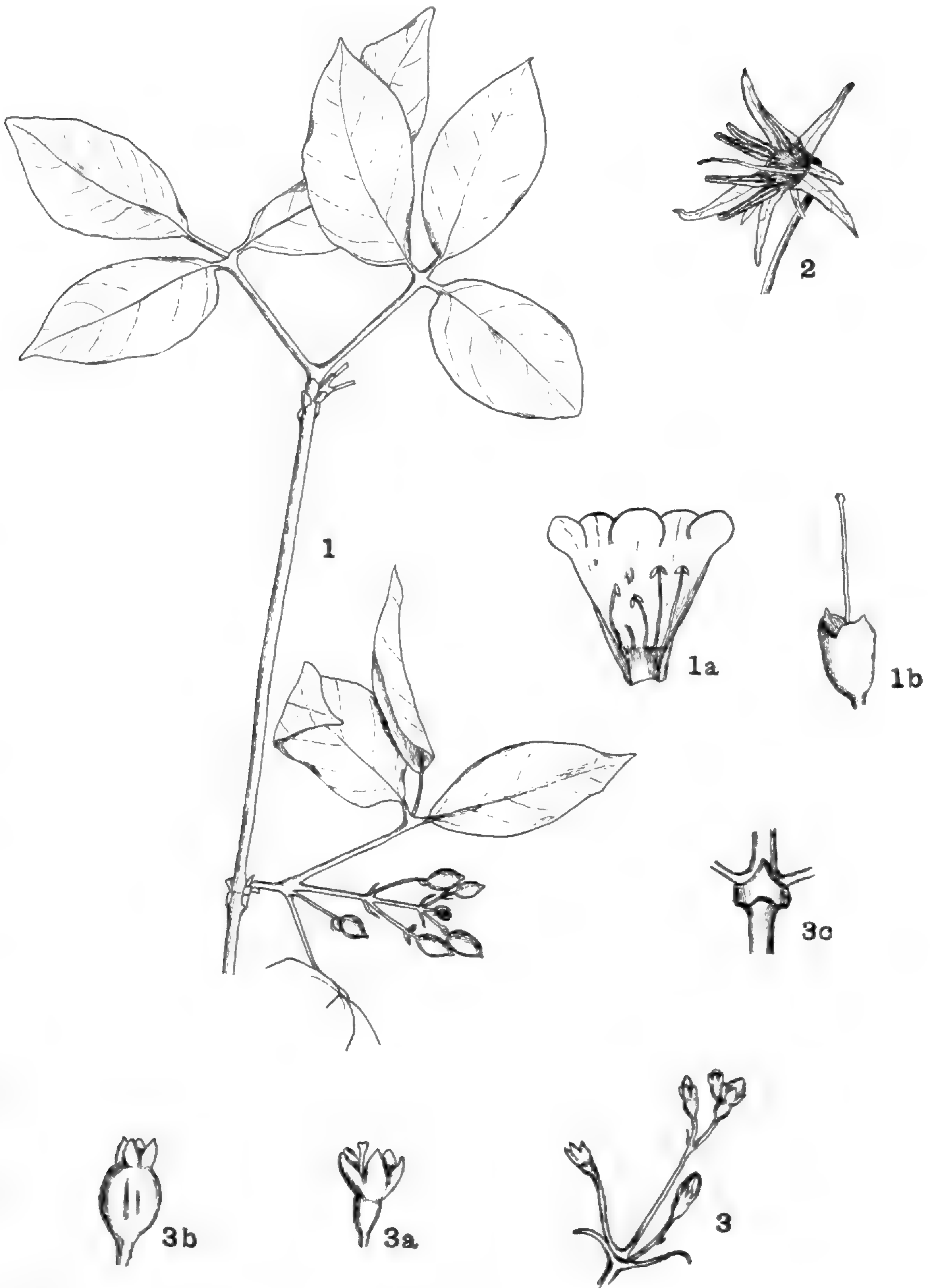
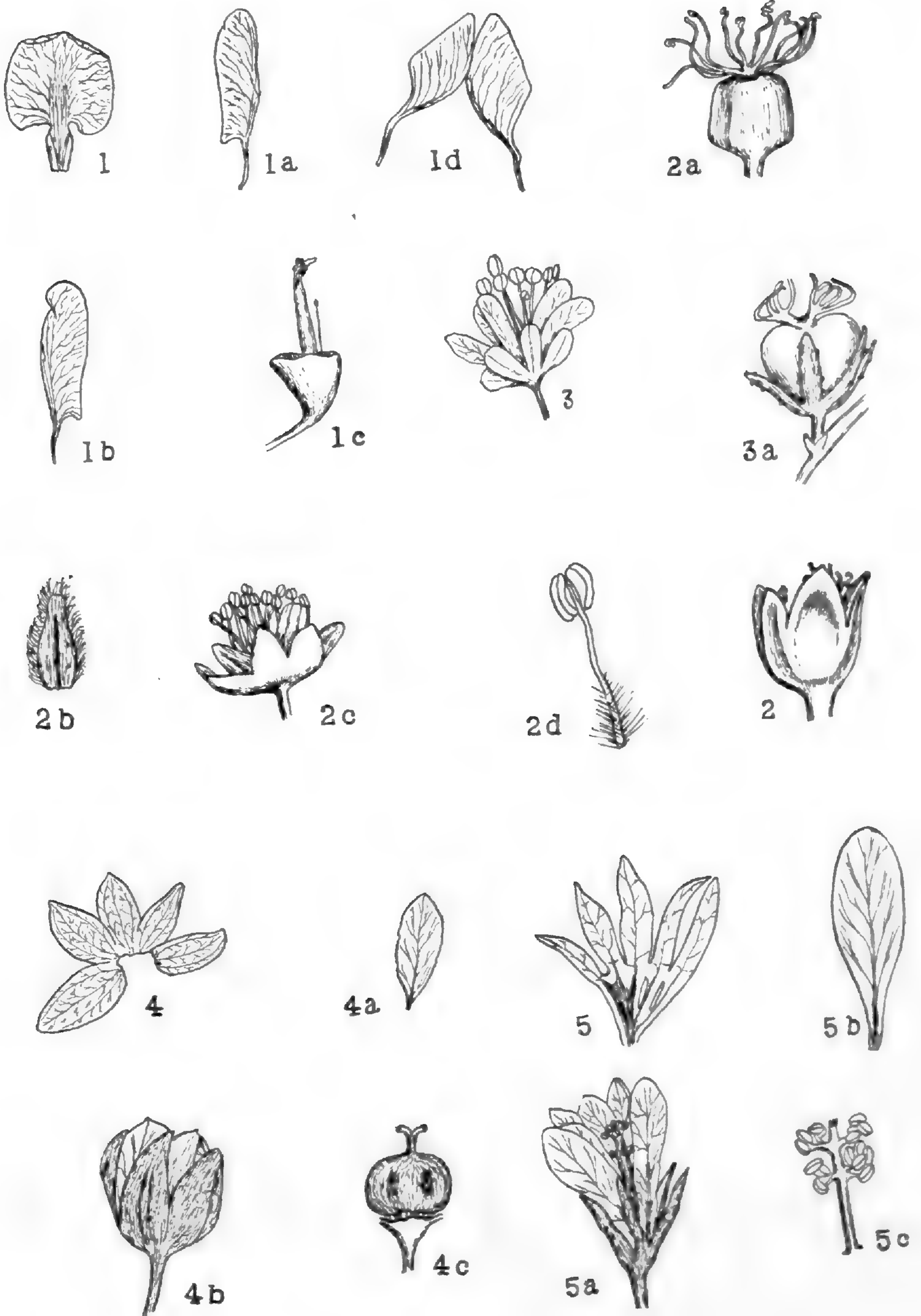


PLATE 30.

- Fig. 1. *Gliricidia lutea*, standard of corolla.
Fig. 1a and 1b. Wings of corolla.
Fig. 1c. Calyx and stamens.
Fig. 1d. Keel of corolla.
Fig. 2. *Croton Milleri*, pistillate flower.
Fig. 2a. Ovary and style.
Fig. 2b. Petal of staminate flower.
Fig. 2c. Staminate flower.
Fig. 2d. Stamens.
Fig. 3. *Croton margaritensis*, staminate flower.
Fig. 3a. Pistillate flower.
Fig. 4. *Argithamnia erubescens*, corolla of pistillate flower.
Fig. 4a. Petal of pistillate flower.
Fig. 4b. Pistillate flower.
Fig. 4c. Ovary.
Fig. 5. Corolla of staminate flower.
Fig. 5a. Staminate flower.
Fig. 5b. Petal of staminate flower.
Fig. 5c. Stamens.



Price list of recent memoirs. 4to.

- No. 6. Monograph of the Acrasieae. By E. W. Olive. 63 pp., 4 pls. 50 cts.
- Vol. VI, No. 1. The anatomy and phylogeny of the Coniferales. Part 2. The Abietineae. By E. C. Jeffrey. 37 pp., 7 pls. \$1.50.
- Vol. V, No. 11. Fossil footprints of the Jura-Trias of North America. By R. S. Lull, Ph. D. 97 pp., 1 pl. \$2.00.
- No. 10. The anatomy and phylogeny of the Coniferales. Part 1. The genus *Sequoia*. By E. C. Jeffrey. 19 pp., 4 pls. \$1.00.
- No. 9. The skeletal system of *Necturus maculatus* Rafinesque. By H. H. Wilder, Ph.D. 53 pp., 6 pls. \$1.00.
- No. 8. Observations on living Brachiopoda. By Edward S. Morse. 73 pp., 23 pls. \$2.00.
- No. 7. Description of the human spines showing numerical variation, in the Warren museum of the Harvard medical school. By Thomas Dwight. 76 pp. \$1.50.
- No. 6. The anatomy and development of *Cassiopea xamachana*. By Robert Payne Bigelow. 46 pp., 8 pls. \$1.40.
- No. 5. The development, structure, and affinities of the genus *Equisetum*. By E. C. Jeffrey. 36 pp., 5 pls. \$1.00.
- No. 4. Localized stages in development in plants and animals. By Robert T. Jackson. 65 pp., 10 pls. \$2.00.
- No. 3. *Synapta vivipara*: A contribution to the morphology of Echinoderms. By Hubert Lyman Clark. 35 pp., 5 pls. \$2.00.
- No. 2. Notes on the dissection and brain of the Chimpanzee "Gumbo." By Thomas Dwight. 21 pp., 4 pls. \$1.00.
- No. 1. On the reserve cellulose of the seeds of Liliaceae and of some related orders. By Grace E. Cooley. 29 pp., 6 pls. \$1.00.
- Vol. IV, No. 14. A bibliography of vertebrate embryology. By Charles Sedgwick Minot. 128 pp. \$2.50.
- No. 13. Fusion of hands. By Thomas Dwight. 14 pp., 2 pls. 75 cts.
- No. 12. The insects of the Triassic beds at Fairplay, Colorado. By Samuel H. Scudder. 16 pp., 2 pls.
- No. 11. Illustrations of the Carboniferous Arachnida of North America, of the orders Anthracomarti and Pedipalpi. By Samuel H. Scudder. 14 pp., 2 pls.
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Presented by B. L. Robinson, January 12, 1910. Received February 15, 1910.

I. A PRELIMINARY SYNOPSIS OF THE GENUS
ECHEANDIA.

BY C. A. WEATHERBY.

THE genus *Echeandia*, founded on *Anthericum reflexum* Cav., was proposed by Ortega in his *Novarum Plantarum Decades* in 1798, and has been generally maintained by botanists since. Kunth, in 1843, recognized three species under it. Baker, monographing the *Anthericeae* in 1877, could find no clear lines of demarcation between these species and referred all the material known to him to the original species. Hemsley, though suspecting that more than one species was concerned, retained Baker's treatment because of insufficient material for a satisfactory revision. Since the date of his work, the increasingly thorough floristic exploration of Mexico has revealed a number of obviously distinct forms, several of which have been singly described by various botanists. The genus can hardly yet be considered as thoroughly understood; but a brief synopsis, which shall contrast the characters of the different species and bring together the existing information concerning them, may be of service, even though it can lay no claim to finality. The following is an attempt at such a synopsis.

Echeandia is, so far as known, a strictly American genus and chiefly confined to Mexico and Central America. The material at hand shows one species collected in Venezuela. The genus is very closely related to *Anthericum* L., from which, indeed, it is separated by only one constant character—its connate anthers. Although the American species of *Anthericum* are more numerous than those of *Echeandia*, the two groups show a distinctly parallel development, both containing species with smooth and with roughened filaments, smooth and scabrous stems and ovoid and oblong capsules. In particular, *E. macrocarpa* and *A. stenocarpum*, and *E. Pringlei* and *A. tenue* are nearly indistinguishable except by the characters of their anthers.

I have preferred, at least for the present, to regard plants which differ only in comparatively superficial foliar and habital characters as varieties of a single species, rather than specifically distinct. I have, however, made an exception in the group of forms closely related to *E. reflexa*. Here, because of imperfect material of *E. reflexa* and *E. paniculata* and of certain puzzling specimens from Yucatan, I have not been able to arrive at a wholly clear conception of the relationships of the different forms; and I have allowed described species to stand as such, rather than make new combinations which later might have to be withdrawn.

For the loan of specimens, and for other kindly assistance in the preparation of this paper, I am indebted to Captain John Donnell Smith, to Mr. Brandegee of the University of California, Dr. Rose of the National Herbarium, and Dr. Greenman of the Field Museum. All specimens cited are in the Gray Herbarium, unless otherwise specified.

ECHEANDIA Ort. Perianth rotate, spreading or reflexed in flower, after anthesis the withered segments cohering above the ovary and persistent until pushed off by the expanding capsule; segments 6, distinct, three-nerved, about equal in length, the inner often broader. Stamens 6, hypogynous, shorter than the perianth; filaments filiform or clavate, smooth or more or less papillose- or crispate-roughened; anthers linear, hastate at base, the filament attached in the sinus, usually equalling or longer than the filaments, connate in a cylindrical tube which surrounds the style, introrse. Ovary sessile, three-lobed; style filiform, a little longer than the tube of anthers; stigma small, capitate. Capsule ovoid or oblong, triangular, locuhicidal. Seeds numerous, angulate-compressed, black, minutely papillose. — Roots fibrous, clustered, often thickened or fusiform. Leaves basal or rarely the lower part of the stem leafy. Stem scapiform, bracted, simple or branched above, the branches virgate. Flowers yellow or white, on usually slender jointed pedicels in clusters of 1–4 on the stem and its branches, in the axils of chartaceous bracts, each pedicel subtended by a similar smaller bractlet; the clusters in virgate racemes.

- a. Filaments smooth; leaves strictly basal, not sheathing the stem, b.
- b. Stem scabrous, 1–4-bracted 1. *E. parviflora*.
- b. Stem smooth, 6–9-bracted, c.
- c. Leaves spreading, falcate, 15 cm. or less long 2. *E. brevifolia*.
- c. Leaves erect, narrowed at base, more than 15 cm. long, d.
- d. Leaves broad, 2 cm. or more 3. *E. nodosa*.
- d. Leaves narrow, not over 1 cm. wide 3. *E. nodosa*, var. *lanceolata*.

- a. Filaments more or less crispate- or papillose-roughened, e.
- e. Leaves broad, 0.8–3.5 cm. wide, membranous in drying, soft, the principal nerves usually connected by conspicuous cross-veinlets, f.
- f. Stem smooth; flowers chiefly yellow, as far as known, g.
- g. Capsule ovoid or short-oblong, 6–9 mm. long, 5–7 mm. broad; inner perianth-segments oblong-lanceolate, little broader than the outer, h.
- h. Leaves lanceolate or even ovate-lanceolate, 20–25 cm. long, 2.8–5 cm. wide, not more than 8 times as long as wide.
 - 4. *E. macrophylla*.
- h. Leaves linear or narrowly lanceolate, 24–42 cm. long, 1.2–2.3 cm. wide, at least 12 times as long as wide.
 - 4. *E. macrophylla*, var. *longifolia*.
- g. Capsule oblong, 1–1.8 cm. long, 4–6 mm. wide; inner perianth-segments ovate or ovate-lanceolate, often much broader than the outer, i.
- i. Leaves for the most part sheathing the stem but confined to its base; stem about 2-bracted, j.
- j. Leaves narrow, 8–13 mm. wide, k.
- k. Leaves usually several (6–10), suberect . 5. *E. macrocarpa*.
- k. Leaves few (2–4), spreading, short in proportion to the stem.
 - 5. *E. macrocarpa*, var. *formosa*.
- j. Leaves broader, 1.5–2 cm. wide 6. *E. reflexa*.
- i. Stem leafy for about a third of its height, the leaves passing gradually into 3–6 reduced bracts 7. *E. paniculata*.
- f. Stem scabrous, at least below; flowers white 8. *E. albiflora*.
- e. Leaves narrow, 2–5 mm. wide or less, firm, closely and prominently veined, mostly without visible cross-veinlets, l.
- l. Leaves 2–5 mm. wide, minutely scabrous beneath; stem 2-bracted; inflorescence mostly branched. 9. *E. flexuosa*.
- l. Leaves 2 (–2.5) mm. wide or less, scabrous-ciliate on the margins. elsewhere smooth; stem 3–6-bracted; inflorescence mostly simple.
 - 10. *E. Pringlei*.

7 1. *E. PARVIFLORA* Baker. Leaves membranous, linear, not very prominently nerved, 4–8 mm. wide, 6–22 cm. long, suberect or somewhat spreading and falcate; stem scabrous or hirtellous at least below, simple or sometimes with as many as 5 branches; pedicels rather short and stout, in fruit 6–8 mm. long, jointed below the middle or toward the base; filaments smooth; capsule (seen on the Pringle specimen only) broadly oblong, 3.5–5 mm. wide, 6–9 mm. long. — Engl. Bot. Jahrb. viii. 209 (1887). — GUATEMALA: Santa Rosa, alt. 900 m., May, 1892, *John Donnell Smith*, Pl. Guat., no. 3528. MEXICO: Mt. Orizaba, Cordoba, 830 m., Aug. 20, 1891, *Henry E. Seaton*, no. 485, in part. State of Guerrero, dry hillsides, near Iguala, alt. 915 m., July 29, 1907, *Pringle*, no. 10,388.

2. *E. BREVIFOLIA* Watson. Leaves membranous, with cross-veinlets,

short, 12–15 cm. long, 6 mm. wide, acuminate, spreading and somewhat falcate, not sheathing the stem; stem about 6 dm. tall, smooth, 6-bracted, with few (3–4) branches; pedicels slender, in fruit 11–14 mm. long, jointed below the middle; filaments smooth; capsule short-oblong, 4–4.5 mm. wide, 7–8 mm. long. — Proc. Am. Acad. xxi. 441 (1886). — MEXICO: State of Chihuahua, Hacienda San Miguel near Batopilas, Sept., 1885, *Palmer*, no. 229.

3. *E. NODOSA* Watson. Leaves membranous, with cross-veinlets, linear-lanceolate, narrowed at base, not sheathing the stem, 18–40 cm. long, 2–2.7 cm. wide; stem smooth, 6–9-bracted, with 6–7 branches, which rarely branch again; pedicels slender, jointed below the middle, in fruit 11–14 mm. long; filaments smooth, shorter than the anthers; capsule oblong, 3.5–4 mm. wide, 8–9 mm. long. — Proc. Am. Acad. xxvi. 156 (1891). ? *Phalangium ramosissimum* Presl, Rel. Haenk. i. 127 (1825). ? *Anthericum ramosissimum* R. & S. Syst. vii. 469 (1829). ? *Echeandia Haenkeana* Kunth, Enum. iv. 629 (1843). — MEXICO: State of Jalisco, near Guadalajara, 12 Nov., 1888, *Pringle*, no. 2151. Dry rocky bluffs of barranca near Guadalajara, 23 Sept., 1891, *Pringle*, no. 3870. — Flowers apparently small as in *E. macrophylla*, the perianth-segments narrow, whitish in drying. From Presl's description it seems highly probable that this plant is the same as his *Phalangium ramosissimum*. In the absence of authentic material, however, I hesitate to make the new combination required by the transfer of Presl's species to *Echeandia*.

Var. *lanceolata*, n. var., a forma typica recedit habitu graciliore, foliis angustioribus 6–10 mm. latis, pedicellis 1 cm. longis, capsulis minoribus 3.5 mm. latis 5–6 mm. longis. — MEXICO: State of Sinaloa, Copradia, Oct. 20, 1904, *Brandeggee*, type (in Herb. Univ. Cal., sheet no. 119,863). Ymala, Sept. 28 to Oct. 8, 1891, *Palmer*, no. 1677. Culiacan, Sept. 17, 1904, *Brandeggee* (in Herb. Univ. Cal., sheet no. 119,856). — The name *lanceolata* was applied to this plant, on herbarium labels, by Mr. Brandeggee, who at that time was inclined to regard it as a good species. It seems, however, hardly specifically distinct from *E. nodosa*. The specimen on sheet no. 119,856 of the University of California Herbarium has broader leaves than the other two plants cited and may be regarded as a transitional form between the extreme development of the variety and typical *E. nodosa*.

4. *E. macrophylla* Rose, in hb., foliis omnino radicalibus caulis basin vaginantibus lanceolatis 20–25 cm. longis 2.8–5 cm. latis in apicem acuminatum angustatis, caule 7 dm. alto glabro 2-bracteato, ramis 5–6 saepe 2 ex axilla unica, pedicellis infra medium vel prope basin articulatis, floribus parvis, perianthii segmentis 1–1.3 cm. longis

lineari-vel oblongo-lanceolatis latitudine subaequalibus, interioribus paulum latioribus acutis, exterioribus obtusiusculis, filamentis clavatis modice crispatis in floribus (novellis) visis quam antherae duplo brevioribus, capsulis ovoideis 7 mm. longis 5 mm. latis. — MEXICO: State of San Luis Potosi, grassy slopes, Las Canoas, 16 June, 1890, Pringle, no. 3183.

➤ Var. longifolia, n. var., foliis late linearibus 24–42 cm. longis 1.2–2.3 cm. latis saepius solum radicalibus, caule 6.2–9 cm. alto, ramis paucis (1–3), pedicellis 1–2 cm. longis, filamentis antheras aequantibus vel eis brevioribus, capsulis ovoideis vel breviter oblongis 7–9 mm. longis 5–6 mm. latis, ceteris praecedentis. — ? *E. terniflora* Lindley, Bot. Reg. xxv. Misc. no. 144 (1839), not Ort. *E. terniflora* Baker, Journ. Linn. Soc. xv. 288 (1877), in part, not Ort.; Hemsl. Biol. Cent.-Am. Bot. iii. 376, in part, not Ort. — MEXICO: State of Oaxaca, vicinity of Choapam, alt. 1150–1400 m., July 28 & 29, 1894, *Nelson*, no. 910, type (in U. S. Nat. Herb.). State of Vera Cruz, Zacuapan, dry sunny fields, Nov., 1908, Purpus, no. 3761. Orizaba, *Botteri*, no. 1185. Ibid., Cordoba, 830 m., Aug. 20, 1891, *H. E. Seaton*, no. 485, in part. Vallée de Cordova, 23 Avril, 1865–66, *Bourgeau*, no. 2307. VENEZUELA: prope coloniam Tovar, 1854–55, *Fendler*, no. 1549. The Bourgeau plant has entirely the habit and the fruit of this species, but the filaments are nearly smooth. It seems somewhat transitional between this and the preceding group. — Flowers yellow according to Lindley's description; white with yellow anthers according to a note on Fendler's label. The plant seen by Lindley was possibly *E. reflexa*, but from his description, seems rather to belong here.

➤ 5. *E. MACROCARPA* Greenman. Leaves chiefly basal, suberect, rather narrowly linear, (6) 8–15 mm. broad, membranous, the cross-veinlets usually prominent, long in proportion to the stem, usually 6–10 in number; stem 1–2-bracted, glabrous, simple or few-branched; pedicels jointed below the middle, rather stout, in fruit 1–1.7 cm. long; flowers apparently rather large, the perianth-segments 1.5–1.7 cm. long, the inner ovate-lanceolate; filaments moderately roughened, equalling or slightly longer than the anthers; capsules oblong, 1–1.8 cm. long, 4–6 mm. wide. — Proc. Am. Acad. xxxix. 73 (1903). *E. terniflora* Hemsl. Biol. Cent.-Am. Bot. iii. 376, in part, not Ort. — MEXICO: State of San Luis Potosi, near Tancanhuitz, May 2, 1898, *Nelson*, no. 4393, type; region of San Luis Potosi, alt. 1850–2450 m., Parry & Palmer, no. 890. “Mexico,” no locality, *Ehrenberg*, no. 31. “Chiapas, etc.,” *Ghiesbreght*, no. 875. Vallée de Mexico, Santa Fé, 6 Juillet, 1865–66, *Bourgeau*, no. 413. Guanajato, 1880, *A. Dugès*. State of Oaxaca, vicinity of Cerro San Felipe, alt. 3000–3400 m., 1894, *Nelson*, no. 1056

(in U. S. Nat. Herb.). — A specimen from Mt. Orizaba, 3000 m., Aug. 5, 1891, *H. E. Seaton*, no. 180, is probably a reduced form of this species. — Flowers yellow according to Ghiesbreght's label. Difficult to separate from *E. reflexa*, except by purely habital characters.

Var. *formosa*, n. var., foliis paucis (circa 4) caulis basin extremam vaginantibus patulis caule duplo brevioribus late linearibus circa 1 cm. latis summum 2 dm. longis, caule simplice, pedicellis gracilibus, floribus magnis aureis, ceteris formae typicae. — MEXICO: State of Chiapas, near San Christobal, alt. 2100–2500 m., Sept. 18, 1895, *Nelson*, no. 3143 (in U. S. Nat. Herb. Sheet no. 233,087). — Flowers "rich yellow" according to Nelson's note.

6. *E. REFLEXA* (Cav.) Rose. Leaves rather closely sheathing the base of the stem, broadly linear, 27–40 cm. long, 1.5–2.2 cm. wide, acuminate, membranous, the cross-veinlets prominent; stem about 7 dm. tall, smooth, rather slender, bearing 2–3 foliaceous bracts, in the single specimen seen with two branches; pedicels jointed below the middle, in fruit 1.4–1.7 cm. long; perianth-segments broad, 1.5 cm. in length; filaments strongly roughened, at least in the young flower shorter than the anthers; capsule (immature) oblong, 1 cm. long, 4 mm. wide. — Contr. U. S. Nat. Herb. x. 93 (1906). *Anthericum reflexum* Cav. Ic. Pl. iii. 21, t. 241 (1795); Willd. Sp. Pl. ii. 140 (1799). *Echeandia terniflora* Ort. Nov. Pl. Dec. 90, 135, & 136, t. 18 (1798); Redouté, Lil. vi. t. 313 (1812); Kunth, Enum. iv. 627 (1843); Baker, Journ. Linn. Soc. xv. 288 (1877), in part; Hemsl. Biol. Cent.-Am. Bot. iii. 376 (1885), in part. *Phalangium reflexum* Poir. Encycl. Meth. Bot. v. 249 (1804). *Conanthera Echeandia* Pers. Syn. i. 370 (1805); Link & Otto, Ic. Pl. Rar. 5, t. 3 (1828). — MEXICO: State of Morelos, ledges, Sierra de Tepoxtlan, near Cuernavaca, alt. 2300 m., August 22, 1906, *Pringle*, no. 10,289. — Although the form represented by Mr. Pringle's plant here cited was the first of the genus to be collected, it seems not to be common. His specimen is the only one I have seen which, in its combination of broad leaves, few-branched stem, yellow, rather broad perianth-segments, strongly roughened filaments and oblong capsules, agrees well with Cavanilles's and Ortega's plates.

7. *E. PANICULATA* Rose. Stem tall, with 6–7 paniced branches, leafy above the base for about a third of its height, the leaves passing gradually into 3–6 reduced bracts; leaves membranous, with cross-veinlets, linear, long-attenuate at apex, up to 5 dm. long, 1.5–3 cm. wide; flowers rather large, yellow; perianth-segments 1.5 cm. long, the outer oblong-linear, the inner ovate, 6 mm. wide; filaments clavate, strongly roughened, about equalling the anthers; capsule not seen. — Contr. U. S. Nat. Herb. x. 93 (1906). — MEXICO: State of Morelos,

near El Parque, Sept. 21, 1903, *Rose & Painter*, no. 844 (in U. S. Nat. Herb., sheets nos. 454,954 & 454,955). — No fruit of this species has been preserved, but its floral characters place it clearly very near *E. reflexa*. So far as the material at hand shows, it differs from that species only in its more leafy stem and more branched inflorescence and may very probably prove to be no more than a variety of it. — Here are doubtfully placed the specimens from two collections of *C. F. Gaumer* namely from Yucatan, Izamal, Sept., 1895, no. 843 and Chicankanab, no. 1995 (the latter in Herb. Field Mus. Nat. Hist., sheet no. 58,793). These specimens have neither fruit nor good flowers and in their absence can hardly be placed definitely. They have mostly a much-branched inflorescence, several(7-8)-bracted stem and the leaves pass abruptly into the much reduced bracts. In this respect they differ from *E. paniculata*; and the branches of the inflorescence are more slender and the flower-buds smaller than in either that species or *E. reflexa*, although the plants are quite as robust.

8. *E. ALBIFLORA* (Schlecht. & Cham.) Mart. & Gal. Leaves basal, several, lanceolate-linear, narrowed to an acute apex, the principal nerves united by transverse veinlets, membranous, glabrous, about 36 cm. long, 1.8-2 cm. wide; stem scabrous or hirtellous below; inflorescence paniculate; pedicels slender, 10 mm. long, jointed below the middle; flowers white; perianth-segments lanceolate; filaments retrorsely papillose-crispate, equalling the anthers; capsule? — Bull. Acad. Brux. ix. 386 (1842); Kunth, Enum. iv. 628 (1843). *Conanthera albiflora* Schlecht. & Cham. Linnaea, vi. 50 (1831). *Echeandia leucantha* Klotzsch, fide Kunth, l. c. — I have seen no material referable to this species. The above description is taken chiefly from that of Kunth.

9. *E. FLEXUOSA* Greenman. Leaves firm, closely and prominently veined, suberect, minutely scabrous beneath, 2-5 mm. wide, variable in length (reaching 8 dm.), long-acuminate; stem 9 dm. high or less, smooth, 2-3-bracted, the lower bract sometimes elongated and setaceous, reaching 15 cm. in length; pedicels jointed near or below the middle, rather stout, in fruit 12-16 mm. long; flowers rather large with lanceolate perianth-segments; filaments moderately roughened, shorter than or nearly equalling the anthers; capsule oblong, 6-9 mm. long, 3-4 mm. wide. — Proc. Am. Acad. xxxix. 73 (1903). — MEXICO: State of Oaxaca, Mts. of Jayacatlan, alt. 1400 m., 10 Sept., 1894, *Lucius C. Smith*, no. 188. State of Jalisco, Rio Blanco, July, 1886, *Palmer*, no. 185; bluffs of the barranca of Guadalajara, 1400 m., 19 July, 1902, *Pringle*, no. 11,197.

→ 10. *E. PRINGLEI* Greenman. Leaves firm, closely and prominently

veined, scabrous-ciliate on the margins, elsewhere smooth, 1.5–2 (2.5) mm. wide, 1–3 dm. long; stem 2.7–6 dm. high, slender, glabrous, simple, bearing 3–6 bracts; pedicels jointed near the base, in fruit 10–14 mm. long; filaments moderately roughened, shorter than the anthers; capsule oblong, 3–3.5 mm. wide, 7 mm. long. — Proc. Am. Acad. xl. 28 (1904). — MEXICO: State of Jalisco, dry calcareous hills above Etzatlan, 2000 m., 24 Oct., 1904, *Pringle*, no. 8812; grassy plains near Guadalajara, 1500 m., 4 Oct., 1903, *Pringle*, no. 11,715; hillsides of Zapotlan, alt. about 1500 m., Aug. 8, 1905, *P. Goldsmith*, no. 122; near Etzatlan, Oct. 2, 1903, *Rose & Painter*, no. 7544 (in U. S. Nat. Herb.).

EXCLUDED SPECIES.

E. eleutherandra K. Koch, Ind. Sem. Hort. Berol. App. 4 (1861) = *Anthericum echeandioides*, acc. to Baker.

E. graminea Mart. & Gal. Bull. Acad. Brux. ix. 387 (1842) = *Anthericum leptophyllum*.

E. leptophylla Benth. Pl. Hartw. 25 (1840) = *Anthericum leptophyllum*.

E. scabrella Walp. Ann. iii. 1010 (1853) = *Anthericum scabrellum*.

E. pusilla Brandegee, Univ. Cal. Pub. Bot. iii. 377 (1909) = form of *Anthericum leptophyllum*.

II. SPERMATOPHYTES, NEW OR RECLASSIFIED, CHIEFLY RUBIACEAE AND GENTIANACEAE.

BY B. L. ROBINSON.

Ranunculus trisectus Eastwood, n. sp.,¹ glaber vel paulo pilosus 1–2 dm. altus simplex vel 2–3-ramosus, ramis ascendentibus; foliis radicalibus orbicularibus trisectis, diametro 2–3 cm., basi reniformibus cum sinu saepissime angusto; segmentis approximatis, medio late cuneato, lateralibus inaequaliter bipartitis, superiore parte trilobata majore; omnibus lobulis similibus oblongis 2–3 mm. latis duplo longioribus, apice et basi callosis, sinibus obtusis; petiolis striatis basi membranaceis dilatatis et persistentibus; foliis caulinis 1–3 sessilibus vel breviter petiolatis 3–5-sectis, segmentis integris vel lobatis, ultimis lobulis oblongo-linearibus ad apicem et sinum callosis, basi petiolorum vel foliorum membranaceo amplexicauli; pedunculis altis, fructiferis

¹ This species, elaborated by Miss Alice Eastwood from material in the Gray Herbarium, is here published at her request.

saepe 5–6 mm. longis, floriferis multo brevioribus; sepalis purpurascensibus orbiculatis 6–7 mm. latis et longis, concavis, cum pilis canis et sericeis parce investis; petalis aurantiacis cuneatis 5–15 mm. latis, sepala multo superantibus, apice undulatis rotundatis, basi cum squamula hemicycla supra brevem unguem; staminibus numerosis, loculis antherarum separatis, dorso filamentis planis; acheniis spicatis, receptaculo subulato albo membranaceo pilosello; stylis purpureis vel flavis rectis vel curvatis et divaricatis, apice saepe deciduis. — Alpine Wallowa mountains, eastern Oregon, altitude 2745 m. growing at base of cliffs, *William C. Cusick*, 16 August, 1907, no. 3200 (type, in Gray Herb.). Under the same species are included with some doubt the following, all collected by Mr. Cusick at the same locality: — no. 3188, strong growing plants, some with smooth, others with hairy akenes but otherwise identical; 3325 d, with akenes all hairy; 3326 with both hairy and smooth akenes. Among the older specimens in the Gray Herbarium are 3219 a collected in 1907 with heads of akenes more globular and hairy, styles purplish, 1513 of 1888 and 2006 of 1898. These all show great variability in size of flowers and height of stems but the plants have an individuality which makes them appear quite distinct from *R. Suksdorfii* with which they have been confused. In general this species differs from *R. Suksdorfii* in having more orbicular leaves with more deeply cut divisions, narrower basal sinus, the ultimate lobules obtuse and narrowing slightly to the base thus making the dividing space rounded rather than acute. The akenes are not angled, hairy instead of smooth, and the style curves outward more noticeably and is less strongly subulate.

Tococa Peckiana, n. sp., fruticosa 3–6 m. alta; ramis valde compressis brunneis fistulosis parce praesertim nodos versus glanduloso-hispidulis; foliis late ovatis modice disparibus membranaceis 5-nerviis supra appresse setulosis rugosis siccitate nigrescentibus subtus tomentellis flavidi-viridibus margine integriusculis hispidulis apice angustissime caudato-attenuatis, majoribus 1.4–2.2 dm. longis 7–12 cm. latis, petiolo crasso hispidulo 2–2.5 cm. longo prope apicem vesciculifero, vesciculis ovoideis subcoriaceis 1–1.2 cm. longis; foliis minoribus 1.2–1.5 dm. longis ab vesciculis destitutis; panicula terminali pedunculata ca. 8 cm. longa, ramis patentibus dichotomo-cymiferis; floribus sessilibus; calycis tubo subgloboso 4–5 mm. diametro parce glanduloso-hispidulo, limbo brevissimo membranaceo obscure 5-lobato; petalis ovatis subcoriaceis minute papillosis. — BRITISH HONDURAS, in thickets, near Manatee Lagoon, 16 July, 1905, *Prof. Morton E. Peck*, no. 68 (type, in Gray Herb.). A species of the § *Hypophysca* and related apparently to *T. guyanensis* Aubl., from which, however, it may be

readily distinguished by its less unequal, more nearly entire leaves, smaller, thicker-walled vesicles, and especially by its sessile flowers.

Cynoctonum oldenlandioides (Wall.), n. comb. *Mitreola oldenlandioides* Wall. Cat. no. 4350 (1828), without description; G. Don, Syst. iv. 172 (1837), where distinctions are slightly indicated; A. DC. Prod. ix. 9 (1845), where described and distinguished chiefly by the widely divergent lobes of the fruit; Hook. Ic. t. 827 (1852), where admirably figured. The change from *Mitreola* to *Cynoctonum* becomes necessary under the Vienna Rules, though it is certainly to be regretted that the well established *Mitreola* was not included in the list of nomina conservanda.

Cynoctonum paniculatum (Wall.), n. comb. *Mitreola paniculata* Wall. Cat. no. 4349 (1828), without description; G. Don, Syst. iv. 171 (1837); A. DC. Prod. ix. 9 (1845); Progel in Mart. Fl. Bras. vi. pt. 1, 266, t. 71 (1868).

Cynoctonum pedicellatum (Benth.), n. comb. *Mitreola pedicellata* Benth. Jour. Linn. Soc. i. 91 (1857).

Centaurium Beyrichii (Torr. & Gray), n. comb. *Erythraea trichantha* β *angustifolia* Griseb. in DC. Prod. ix. 60 (1845). *E. Beyrichii* Torr. & Gray ex Torr. in Marcy, Expl. Red Riv. 291 (1853).

Centaurium cachanlahuen (Molina), n. comb. *Gentiana Cachanlahuen* Molina, Sagg. Chil. 147 (1782); also in the German edition by Brandis, 310 (1786). *G. peruviana* Lam. Encycl. ii. 642 (1786). *Chironia chilensis* Willd. Sp. Pl. i. 1067 (1798). *Erythraea chilensis* Pers. Syn. i. 283 (1805). *E. Cachanlahuan* Roem. & Schultes, Syst. iv. 167 (1819).

CENTAURIUM CALYCOSUM (Buckl.) Fernald, var. *nana* (Gray), n. comb. *Erythraea calycosa*, var. *nana* Gray, Syn. Fl. ii. pt. 1, 113 (1878).

Centaurium floribundum (Benth.), n. comb. *Erythraea floribunda* Benth. Pl. Hartw. 322 (1849).

Centaurium macranthum (Hook. & Arn.), n. comb. *Erythraea macrantha* Hook. & Arn. Bot. Beech. 438 (1841). *E. mexicana* Griseb. ex Hook. & Arn. l. c. 302, 438. *Gyrandra chironioides* Griseb. in DC. Prod. ix. 44 (1845). *Erythraea chironioides* Torr. Bot. Mex. Bound. 156 (1859), in part.

Centaurium madreense (Hemsl.), n. comb. *Erythraea madreensis* Hemsl. Biol. Cent.-Am. Bot. ii. 346 (1882). *Gyrandra chironioides* Griseb. in Seem. Bot. Herald. 318 (1856), not Griseb. in DC. Prod. ix. 44 (1845).

Centaurium micranthum (Greenm.), n. comb. *Erythraea micrantha* Greenm. Proc. Am. Acad. xxxix. 83 (1903).

Centaurium multicaule, n. sp., verisimiliter *bienne multicaule*

caespitosum 5-10 cm. altum basi densissime foliatum; radice simplice 2-6 cm. longa; caulibus 4-22 subsimplicibus 4-angulatis gracilibus apice 1-2 (rarius 3)-floris, ramis 1-2 erectis; foliis radicalibus rosulatis obovato-spatulatis 1-2 cm. longis 4-8 mm. latis apice rotundatis basi in petiolum attenuatis; foliis caulinis 3-4-jugis lineari-oblongis vel linearibus 8-10 mm. longis 1-2.7 mm. latis 1-nerviis crassiusculis; pedunculis 1.5-4 cm. longis erectis nudis unifloris; floribus pentameris; calycis lobis linearibus attenuatis 6 mm. longis margine scariosis quam tubus corollae paulo brevioribus; corolla 1.5 cm. longa tubo constricto flavido, limbi lobis ellipticis 6 mm. longis 2 mm. latis apice rotundatis; filamentis antheras subaequantibus gracilibus; stigmatate capitato-subbilobo. — MEXICO: most meadow, Hacienda of St. Diego, Chihuahua, 2 June, 1891, *C. V. Hartman*, no. 717 (type, in Gray Herb.). This plant of somewhat striking tufted habit was distributed as *Erythraea calycosa*, but differs from that species rather markedly in its lower stature, much smaller flowers, and clustered chiefly 1-flowered stems.

Centaurium nudicaule (Engelm.), n. comb. *Erythraea nudicaulis* Engelm. Proc. Am. Acad. xvii. 222 (1882).

Centaurium pauciflorum (Mart. & Gal.), n. comb. *Erythraea pauciflora* Mart. & Gal. Bull. Acad. Brux. xi. 373 (1844).

Centaurium Pringleanum (Wittr.), n. comb. *Erythraea Pringleana* Wittr. Bot. Gaz. xvi. 85 (1891).

Centaurium quitense (HBK.), n. comb. *Erythraea quitensis* HBK. Nov. Gen. et Spec. iii. 178 (1818). *Cicendia quitensis* Griseb. Linnaea, xxii. 33 (1849). *Erythraea divaricata* Schaffner ex Schlecht. Bot. Zeit. xiii. 920 (1855). *Erythraea chilensis* Benth. Pl. Hartw. 89 (1842), non Pers. *Centaurium divaricatum* Millsp. & Greenm., Field Columb. Mus. Bot. Ser. ii. 309 (1909).

Centaurium retusum (Rob. & Greenm.), n. comb. *Erythraea retusa* Rob. & Greenm. Proc. Am. Acad. xxxii. 38 (1896).

Centaurium setaceum (Benth.), n. comb. *Erythraea setacea* Benth. Bot. Sulph. 128 (1845).

Centaurium tenuifolium (Mart. & Gal.), n. comb. *Erythraea macrantha* β *major* Hook. & Arn. Bot. Beech. 438 (1841). *E. tenuifolia* Mart. & Gal. Bull. Acad. Brux. xi. 372 (1844). *Gyrandra speciosa* Benth. Bot. Sulph. 127, t. 45 (1845).

Centaurium trichanthum (Griseb.), n. comb. *Erythraea trichantha* Griseb. Gen. et Spec. Gent. 146 (1839).

Centaurium venustum (Gray), n. comb. *Erythraea chironioides* Torr. Bot. Mex. Bound. 156, t. 42 (1859), not *Gyrandra chironioides* Griseb. *Erythraea venusta* Gray, Bot. Calif. i. 479 (1876).

LISIANTHUS CUSPIDATUS Bertoloni, Nov. Comm. Bonon. iv. 408, t. 38 (1840). *Leianthus cuspidatus* Griseb. in DC. Prod. ix. 82 (1845). This species is reduced to a synonym of *Leianthus nigrescens* (Cham. & Schlecht.) Griseb. by Hemsley, Biol. Cent.-Am. Bot. ii. 345 (1882) and of *Lisianthus nigrescens* Cham. & Schlecht. by Miss Perkins in Engl. Jahrb. xxxi. 493 (1902). An examination of Bertoloni's excellent plate of his *Lisianthus cuspidatus* leads to the belief that it represents a species markedly distinct from *L. nigrescens*. Conspicuous differences are to be found in the following features. In *L. cuspidatus* the leaves are narrowed to a subcuneate base, the corolla is much more deeply lobed, the lobes distinctly surpassing the pistil, while in *L. nigrescens* the leaves are rounded to a somewhat amplexicaul base and the corolla-lobes are only 4-11 mm. long being somewhat overtopped by the stigma. A specimen, collected in the Sapoti Barranca near the City of Guatemala by Sutton Hayes, July, 1860, and now in the Gray Herbarium, corresponds in all respects to the plate of Bertoloni, and fully justifies the separation of the species. The lobes of its corolla are 1.7 cm. in length. *Lisianthus nigrescens* Hook., in Curt. Bot. Mag. t. 4043, would appear to be *L. cuspidatus* Bert.

Lisianthus oreopolus, n. sp., suberectus 7 dm. vel ultra altus perennis; caule tereti (juventate solum plus minusve tetrangolo) levissime basi lignescenti; foliis sessilibus lanceolato-oblongis acuminatis membranaceis 8-11 cm. longis 1.5-2.4 cm. latis basi amplexicaulibus biauriculatis subtus pallidioribus internodia multo superantibus; panicula laxa 3 dm. longa 2 dm. diametro; ramis ramulisque ascendenti-patentibus saepius alternis; pedicellis propriis (supra bracteolas) brevibus 1-2 mm. longis saepe curvatis; calyce graciliter ovoideo acutiuscule angulato 1 cm. longo fere a basi 5-lobo, lobis tenuibus attenuatis corollae appressis; corolla infundibuliformi 4 cm. longo glaberrima flava, tubo proprio gracili, faucibus longiusculis gradatim ampliatis, lobis 1.4-1.6 cm. longis lanceolatis acutissimis late patentibus; et staminibus et stylo exsertis; stigmatate peltato margine revoluta. — MEXICO: Temperate region, mountain of Chiapas, flowering in June, *Ghiesbreght*, no. 702bis (type, in Gray Herb.). A species in habit similar to *L. nigrescens* Cham. & Schlecht., but differing in its yellow corolla with considerably longer and much more widely spreading lobes.

Lisianthus viscidiflorus, n. sp., erectus 1-1.2 m. altus floribus exceptis glaberrimus; caule subtereti levissimo angulis parvis prominulis 2 e costis mediis foliorum decurrentibus paululo ancipitali; internodiis inferioribus brevissimis 8-12 mm. longis, intermediis 2-6 cm. longis, superioribus ad 19 cm. longis; foliis lanceolato-oblongis

sessilibus amplexicaulibus 7-12 cm. longis 1-2.2 cm. latis acutis crassiusculis basi biauriculatis; panicula laxissima 3 dm. longa 2-3 dm. diametro, ramis patenti-ascendentibus infra nudis apice saepissime trichotomis 3-5-floris, ramulis lateralibus saepius 2-3.5 cm. longis 1-floris apicem versus saepissime arcuatis bibracteolatis; floribus viscosis; calyce herbaceo breviter subcylindrico basi turbinato, lobis juventate acutis mox apice erosis maturitate obtusissimis viscidis; corolla 3-3.5 cm. longa, tubo rectiusculo verisimiliter atrorubenti, limbo ca. 1 cm. diametro viscidissimo, dentibus deltoideis 3 mm. longis viridescentibus; staminibus inclusis; stigmatibus modice exserto peltato. — GUATEMALA: Coban, Dept. Alta Verapaz, alt. 1350 m., August, 1907, *H. von Tuerckheim*, no. II. 1308 (type, in Gray Herb.). Distributed as *Leianthus brevidentatus* Hemsl., a species described as having dense inflorescence, short pedicels, shorter corolla with lobes scarcely 2 mm. long, very acute calyx-lobes appressed to the corolla, etc., differences which would certainly appear to be of specific value. It is, furthermore, scarcely likely that the viscosity which is such a conspicuous feature of the present species could have been present in *L. brevidentatus* in like degree and have escaped mention.

Schultesia Hayesii, n. sp., annua erecta gracilis 3-4 dm. alta glaberrima supra ramosa; radice fibrosa; caule subtereti leviter 6-angulato foliato; foliis linearibus, inferioribus brevibus, superioribus 4-5 cm. longis 2-3 mm. latis angustissime attenuatis basi paulo angustatis sessilibus 3-nerviis subtus pallidioribus; ramis patenti-ascendentibus simplicibus saepissime alternis apice 2-bracteolatis et 1-floris; bracteolis anguste linearibus 3 cm. longis; floribus supra bracteolas sessilibus 4-meris; calyce anguste ovoideo 3-3.6 cm. longo, tubo castaneo levissimo evenio; alis semilanceolatis 3 mm. latis viridibus venosis sursum in dentes calycis subsetaceos gradatim attenuatis; corolla 4 cm. longa verisimiliter purpurea, lobis late ovatis breviter acuminatis 1 cm. longis; ovario 4 angulari 1.4 cm. longo 4 mm. lato. — PANAMA: Rio Grande Station, Panama railway, 13 December, 1859, *Sutton Hayes*, no. 160 (type, in Gray Herb.). This species is closely related to *S. heterophylla* Miq. but differs in several points. The stems are perceptibly 6-angled; the leaves are decidedly longer and relatively narrower than in *S. heterophylla* and the middle ones equal or often exceed the internodes, while in *S. heterophylla* they are much exceeded by the internodes. Finally the lobes of the corolla are only 1 cm. long, i. e. one third the length of the tube, those of *S. heterophylla* on the other hand being 1.6 cm. long, i. e. more than half the length of the tube.

Schultesia Peckiana, n. sp., decumbens, verisimiliter annua, habitu *S. lisianthoidi* similis 6-7 dm. alta laxa ramosa glaberrima; caule

tereti laevissimo; foliis lanceolati-ovatis tenuibus sessilibus acutissimis basi rotundatis; cymis laxe etiam atque etiam dichotomis; floribus in dichotomis solitariis 1.5 cm. longis erectis; pedicellis 8-30 mm. longis rectis nudis; calycis lobis 4 anguste lanceolatis acutissimis in media parte herbaceis margine scariosis vix carinatis ex alatis; corolla rubescenti vel purpurascenti fere ad mediam partem 4-secta; lobis ovatis acutis; filamentis gracilibus, basi exappendiculatis; antheris mucronatis. — BRITISH HONDURAS: about plantations and in the openings of the forests, near Manatee Lagoon, 27 January, 1906, *Prof. Morton E. Peck*, no. 318 (type, in Gray Herb.). A species considerably resembling *S. lisianthoides* (Griseb.) Benth. & Hook. f., but readily distinguished by its pedicelled flowers.

Evolvulus sericeus Sw., var. *glaberrimus*, n. var., ubique glaberrimus gracillimus, caulibus a basi patienti-ramosis suberectis 2.5-3 dm. altis; calyce etiam glaberrimo, aliter formae typicae simillimus. — BRITISH HONDURAS: low pine ridge near Manatee Lagoon, 28 March, 1906, *Prof. Morton E. Peck*, no. 372 (type, in Gray Herb.). A form remarkable for the complete absence of the silky pubescence, which is to some extent present in all other specimens examined, even those of the form *glabratus* Chod. & Hassl., which has decidedly silky-villous calyces.

Schwenkia oxycarpa, n. sp., perennis erecta suffrutescens scoparia 5-6 dm. alta; radice fibrosa; caulibus teretibus cortice fusco-griseo obtectis; ramis gracillimis ascendentibus vel erectis viridibus teretibus; foliis linearibus acutis sessilibus crassiusculis subglabris 5-7 mm. longis vix 1 mm. latis saepissime curvatis vel tortis 1-nerviis; inflorescentia ca. 1 dm. longa gracillima spiciformi; floribus fasciculatis sessilibus parvis; calyce turbinato ca. 1.3 mm. longo obscure strigilloso, dentibus lanceolatis acutis tubum subaequantibus; corolla 4 mm. longa atrocyanea rectiuscula, limbi dentibus 5 clavellatis quam sinuum lobi obovati crassiusculi subbipartiti vix longioribus; staminibus fertilibus 4 didynamis tubo corollae inclusis; capsula lanceolato-ovoidea acuta 2 mm. longa firmisscula minute papillosa. — BRITISH HONDURAS: open damp ground, near Sibune River, 4 May, 1906, *Prof. Morton E. Peck*, no. 417a (type, in Gray Herb.). This noteworthy species, through some accident associated with no. 417 (an *Angelonia*), is clearly of § *Brachyhelus* and most nearly approaches the east Brazilian *S. fasciculata* Benth. It differs, however, in its essentially glabrous stem and rhachises, its never fascicled leaves neither perceptibly cuneate at the base nor revolute on the margin, and finally in its lance-ovoid capsule.

Angelonia ciliaris, n. sp., caulibus gracilibus inaequaliter 4-angulatis in angulis conspicue ciliatis; foliis sessilibus oblongo-lanceolatis

acutis basi vix angustatis rotundatis 2–2.5 cm. longis ca. 5 mm. latis serratis supra laxe villosis margine ciliatis subtus in costa media solum longiuscule ciliatis aliter glabris; foliis floralibus late ovatis acutis subcordatis conspicue longeque ciliatis, inferioribus ca. 1 cm. longis pedicellum subaequantibus, superioribus ca. 3 mm. longis pedicello triplo brevioribus; ramis inflorescentiae ca. 1. dm. longis racemiformibus, pedicellis oppositis ascendenti-patentibus filiformibus ca. 1 cm. longis apice nutantibus; calycis segmentis lanceolatis acuminatis 3.5 mm. longis; corolla ca. 1 cm. diametro, sacco lato, appendice interiori ca. 0.7 mm. longa; capsula depresso globosa 5 mm. diametro. — BRITISH HONDURAS: on open damp ground, near Sibune River, 4 May, 1906, *Prof. Morton E. Peck*, no. 417 (type, in Gray Herb.). This species differs from *A. angustifolia* Benth. in its conspicuously ciliated stem and leaves, broader-based bracts, and smaller flowers; from *A. salicariaefolia* H. & B. it may be readily distinguished by its smaller flowers and much more sparing pubescence of much longer non-glandular hairs.

➤ *Isidorea pungens* (Lam.), n. comb. *Ernodea pungens* Lam. Ill. i. 276 (1791). *E. pedunculata* Poir. Encyc. Suppl. ii. 581 (1811). *Isidorea amoena* A. Rich. Mém. sur les Rubiacées, 204, t. 15, f. 1 (1829), and Mém. Soc. Hist. Nat. Par. v. 284, t. 25 (1834).

Bikkia campanulata (Brong.), n. comb. *Grisia campanulata* Brong. Bull. Soc. Bot. Fr. xii. 406 (1865).

Bikkia Pancheri (Brong.), n. comb. *Bikkiopsis Pancheri* Brong. l. c. 405.

Bikkia retusiflora (Brong.), n. comb. *Grisia retusiflora* Brong. l. c. 407.

Houstonia mucronata (Benth.), n. comb. *Hedyotis mucronata* Benth. Bot. Sulph. 19 (1844). *Houstonia fruticosa* Rose, Contrib. U. S. Nat. Herb. i. 132 (1890), 239 (1893); Greenman, Proc. Am. Acad. xxxii. 292 (1897).

Houstonia umbratilis, n. sp., herbacea repens multicaulis ramosa obscure strigillosa; caulibus gracillimis interplexis subquadrangularibus foliosis, nodis radicanibus, internodiis 2–9 mm. longis; foliis parvis ovatis membranaceis acutiusculis brevissime petiolatis utrinque strigillosis subtus paululo pallidioribus uninerviis obscure reticulato-venosis 2.5–4 mm. longis 1.8–3 mm. latis, stipulis brevissimis; pedunculis filiformibus 1.5 cm. longis terminalibus 1-floris; calyce basi turbinato, tubo lobos ovato-lanceolatos acutiusculos anthesi aequante; corolla infundibuliformi in siccitate nigrescenti, tubo 5 mm. longo, lobis ovatis patentibus; staminibus 4 (eis speciminis observati exsertis, antheris lineari-oblongis filamenta aequantibus); fructu seminibusque ignotis.

— MEXICO : shaded cliffs of mountains, near Monterey, Nuevo Leon, 25 April, 1906, *C. G. Pringle*, no. 13,877 (type, in Gray Herb.). An attractive little matted plant with the habit of *H. serpyllifolia* Michx. and *H. serpyllacea* (Schlecht.) C. L. Sm. but differing from the former in its more shortly petioled, more acute leaves, and much smaller flowers, and from the latter in its membranaceous strigillose but unciliated leaves, more filiform stems, etc. The absence of fruit and seeds naturally throws a slight doubt upon the generic position, but the general habit, as well as such technical traits as are manifest, are those of *Houstonia*.

Neurocalyx calycinus (R. Br.), n. comb. *Argostemma calycinum* R. Br. in Bennett, Pl. Jav. Rar. 97 (1838). *Neurocalyx Wightii* Arn. Ann. Nat. Hist. iii. 22 (1839). *N. Hookeriana* Wight, Ic. i. t. 52 (1840).

Rondeletia leptodictya, n. sp., fruticosa 2 m. alta; ramis gracilibus rubro-brunneis flexuosis teretibus mox glabratis; foliis oppositis obovato-oblongis acuminatis basi modice angustatis tenuibus supra viridibus tenuiter (sub lente) reticulatis glabris vel subglabris subtus juventate griseo-tomentosis 6–11 cm. longis 2.5–5 cm. latis; petiolis gracilibus 5–12 mm. longis pubescentibus; stipulis ovato-lanceolatis acutis brunneis 4 mm. longis erectis; pedunculis terminalibus 4–5.5 cm. longis gracilibus arachnoideis; floribus sessilibus dense capitatis; calycis tubo albo-lanato subgloboso 1.8 mm. diametro, lobis limbi 4 vix inaequalibus oblanceolatis viridibus vix 2 mm. longis; corolla sanguinea, tubo gracili sursum vix ampliata 1.4 cm. longo griseo-arachnoideo, lobis limbi 4 patentibus 2–3 mm. longis, ore nudo; stylo exserto. — MEXICO : banks of the Rio Petatlan near the boundary between Michoacan and Guerrero, alt. 500 m., 24 November, 1898, *E. Langlassé*, no. 666 (type, in Gray Herb.). Near *R. elongata* Bartl., but with calyx-lobes much shorter (scarcely a fifth the length of the corolla-tube), the limb of the corolla smaller, and the stipules much shorter than the petioles.

Rondeletia rufescens, n. sp., fruticosa; ramis teretibus tarde glabratis cortice griseo tectis, ramulis et pedunculis et petiolis dense rufo-tomentosis; foliis lanceolato-oblongis 9–15 cm. longis 3.2–5 cm. latis apice basique acuminatis tenuibus supra obscure reticulatis et molliter puberulis subtus albido-tomentosis, nerviis lateralibus ca. 10-jugis; inflorescentiis terminalibus thyrsoides flexuosis ca. 1.5 dm. longis rufo-tomentosis; cymulis superioribus subsessilibus inferioribus 2–12 mm. longe pedicellatis bracteis lineari-subulatis ca. 3 mm. longis suffultis multifloris; floribus brevissime pedicellatis aut sessilibus; calycis tubo subgloboso minute hirsuto, lobis 4 linearibus inaequalibus

intus glabris; corollae tubo gracillimo in fauces distincte ampliato appresse griseo-puberulo vel arachnoideo 1 cm. longo; limbi lobis 4 suborbicularibus 1 mm. longis extus rufo-hispidulis intus et ore nudis; stylo paulo exserto, apice bifido nigro. — *Rondeletia* J. D. Sm. Enum. Pl. Guat. i. 16 (1889). *R. villosa* J. D. Sm. l. c. ii. 94 (1891), not Hemsl. — GUATEMALA: Coban, Depart. Alta Verapaz, alt. 1475 m., March, 1881, *H. von Tuerckheim*, no. 582 of Mr. J. Donnell Smith's distribution (type, in Gray Herb.). This plant is clearly distinct from *R. villosa* Hemsl., which has considerably broader (ovate) stipules and a very different closely matted white pubescence on the lower surface of the leaves, a more slender and denser inflorescence, etc.

Var. *ovata*, n. var., minus rufescens; foliis ovatis brevioribus 7–9 cm. longis basi rotundatis, aliter formae typicae similis. — *R. villosa*, forma *strigosissima* J. D. Sm. Enum. Pl. Guat. vii. 15 (1905), nomen. — GUATEMALA: Tactic, Depart. Alta Verapaz, alt. 550 m., March, 1903, *H. von Tuerckheim*, no. 8401 of Mr. J. Donnell Smith's distribution.

Rondeletia secundiflora, n. sp., arborescens; ramulis gracilibus teretibus dense griseo-strigillosis; foliis ovato-lanceolatis apice basique acuminatis tenuissimis 7–9 cm. longis 2–3.5 cm. latis utrinque appresse pilosiusculis subtus paulo pallidioribus, nerviis ca. 8-jugis; petiolo gracili 4–6 mm. longo griseo-piloso; stipulis a basi deltoidea subulatis 2 mm. longis; inflorescentiis 6–8 cm. longis spiciformibus plus minusve recurvis valde secundis, rhachi hirsutulo, cymulis parvis subsessilibus paucifloris numerosis; floribus deflexis; calycis tubo subgloboso dense patentimque sordido-hirsuto, lobis 4 modice inaequalibus minus dense indutis 1.4–2 mm. longis erectis spatulato-linearibus vel anguste lanceolatis; corolla 9 mm. longa extus strigillosa, tubo gracili cylindrica, limbo 4-lobo, lobis suborbicularibus patulis 1.3 mm. diametro, ore nudo. — GUATEMALA: in woods, along the road from Patin to Esquintla, 21 July, 1860, *Dr. Sutton Hayes* (type, in Gray Herb.). This species is obviously related to *R. capitellata* Hemsl. but may be readily distinguished by the shaggy-hirsute tube and lance-linear or spatulate lobes of the calyx.

Rondeletia septicialis, n. sp., fruticosa; ramis teretibus plus minusve flexuosis griseo-brunneis; foliis oppositis ovatis vel lanceolato-ovatis apice basique acuminatis firmissculis 11–16 cm. longis 2–7 cm. latis utrinque viridibus subtus pallidioribus supra glaberrimis subtus basin versus obscure pilosulis, nerviis lateralibus ca. 8-jugis, petiolo 1–2.3 cm. longo glabro vel glabriusculo; stipulis anguste lanceolatis glabris 5 mm. longis acutis; inflorescentiis in axillis superioribus spiciformibus 1–1.5 dm. longis, pedunculo 1.5–3.5 cm. longo gracili tereti, rhachi simillimo obscure arachnoideo;

cymulis vulgatim 2-3-floris breviter pedicellatis bracteolis linearibus suffultis; calyce anguste campanulato basi turbinato, tubo griseo arachnoideo, lobis 4 lanceolato-linearibus deflexis modice inaequalibus tubum subaequantibus glabriusculis; corolla coccinea, tubo gracili subcylindrico sursum paulo ampliato basin versus glabriusculo supra cum limbo patente plus minusve arachnoideo ca. 17 cm. longo, lobis 4 orbicularibus ca. 3 mm. diametro tenuiter margine crispulis; ore nudo; staminibus 4 in ore affixis paulo exsertis, antheris lineari-oblongis; capsula subglobosa ca. 4 mm. diametro septicidali, valvis bifidis. — MEXICO: Chicharras, Chiapas, alt. 920-1840 m., *E. W. Nelson*, no. 3755 (type material in U. S. Nat. Mus. and Gray Herb.). This plant possesses so precisely the habit and most of the technical features of a *Rondeletia* that it seems best to refer it to this genus, though it will form an exception among the known species in the fact that its fruit is septicidal.

Hymenodictyon floribundum (Hochst. & Steud.), n. comb. *Kurria floribunda* Hochst. & Steud. Flora, xxiv. pt. 1, Intell. 28 (1841), name only; ibid. xxv. 234 (1842), with description. *Hymenodictyon Kurria* Hochst. Flora, xxvi. 71 (1843).

Bouvardia gracilipes, n. sp., fruticosa; ramis gracilibus teretibus cortice griseo tectis glabris, ramulis valde compressis, internodiis longiusculis glabris, nodis stipulisque puberulis; foliis oppositis breviter petiolatis tenuibus ovatis acuminatis basi rotundatis 5-7 cm. longis 2-3.5 cm. latis supra laete viridibus glabris subtus pallidioribus in costa venisque obscure puberulis; petiolo 2 mm. longo sordide tomentello; ocreis pallidis ca. 1 mm. longis marginem versus tomentellis cum appendicibus filiformibus breviter pubescentibus ca. 2 mm. longis munitis; inflorescentiis terminalibus laxis 8-12-floris glabris; pedunculis 2-4 cm. longis trichotomis, bracteis linearibus 1-3 mm. longis, ramulis lateralibus 3-4 cm. longis vicissim trichotomis; pedicellis filiformibus 1.5-2 cm. longis apice denique uncinatis; calycis dentibus 4 linearibus 1 mm. longis erectis in fructu inflexis persistentibus; corolla non visa; fructu 6 mm. lato 4.5 mm. alto pallide viridi sub lente albido-lineato quasi strigilloso. — MEXICO: Tepic, 5 January to 6 February, 1892, *Dr. E. Palmer*, no. 1971 (type, in Gray Herb.). Although this species is described from fruiting material and without knowledge of the corolla, it is believed that the unusually loose inflorescence with filiform at length hooked pedicels yields characters sufficiently distinctive for ready recognition.

BOUVARDIA LONGIFLORA (Cav.) HBK., var. *induta*, n. var., foliis ovato-rhomboides acutis supra scabriusculo-puberulis subtus tomentosis; corolla extus tomentella. — MEXICO: "Chiapas, etc." *Dr.*

Ghiesbreght, the specimen associated in the Gray Herbarium with Ghiesbreght's nos. 108 and 692 which, however, represent the more typical form of the species, being nearly glabrous. Forms to some extent intermediate in their pubescence and somewhat peculiar in their thinnish mostly obtusish leaves are shown by Langlassé's no. 1049 from near the boundary of Michoacan and Guerrero, as well as by Purpus's no. 1249 from Tehuacan, Puebla.

BOUVARDIA TERNIFOLIA (Cav.) Schlecht., var. **angustifolia** (HBK.), n. comb. *B. angustifolia* HBK. Nov. Gen. et Spec. iii. 384 (1818). *B. triphylla*, var. *angustifolia* Gray, Syn. Fl. i. pt. 2, 24 (1884). Although *B. angustifolia* HBK. has been treated as an independent species in various works of recent date, an increasingly complete series of intergrading specimens leaves no doubt that Dr. Gray was right in regarding this plant as merely a variety. Priority of the specific name of Cavanilles requires the new combination.

Lygistum ignitum (Vell.) Ktze., var. **micans** (K. Schum.), n. comb. *Manettia ignita*, var. *micans* K. Schum. in Mart. Fl. Bras. vi. pt. 6, 171 (1889).

Lygistum Rojasianum (Chod. & Hass.), n. comb. *Manettia Rojasiana* Chod. & Hass. Bull. Herb. Boiss. ser. 2, iv. 91 (1904).

Lygistum Smithii (Sprague), n. comb. *Manettia Smithii* Sprague, Bull. Herb. Boiss. ser. 2, v. 267 (1905).

Gonzalagunia bracteosa (J. D. Sm.), n. comb. *Gonzalea bracteosa* J. D. Sm. Bot. Gaz. xxxiii. 252 (1902).

Gonzalagunia leptantha (A. Rich.), n. comb. *Gonzalea leptantha* A. Rich. Fl. Cub. Phanerog. ii. 16 (1853).

Gonzalagunia ovatifolia (J. D. Sm.), n. comb. *Gonzalea ovatifolia* J. D. Sm. Bot. Gaz. xxvii. 336 (1899).

Gonzalagunia Petesia (Griseb.), n. comb. *Gonzalea Petesia* Griseb. Mem. Amer. Acad. new ser. viii. 504 (1863). *Gonzalagunia hirsuta* γ *Petesia* Ktze. Rev. Gen. i. 284 (1891).

Gonzalagunia thyrsoidea (J. D. Sm.), n. comb. *Gonzalea thyrsoidea* J. D. Sm. Bot. Gaz. xiii. 188 (1888).

Tarennia mollis (Wall.), n. comb. *Rondeletia?* *mollis* Wall. Cat. no. 8454 (1847). *Webera mollis* Hook. f., Fl. Brit. Ind. iii. 104 (1882).

Tarennia mollissima (Hook. & Arn.), n. comb. *Cupia mollissima* Hook. & Arn. Bot. Beech. 192 (1833). *Stylocorine mollissima* Walp. Rep. ii. 517 (1843). *Webera mollissima* Benth. ex Hance, Jour. Linn. Soc. xiii. 105 (1873).

Tarennia odorata (Roxb.), n. comb. *Webera odorata* Roxb. Hort. Bengal. 15 (1814), and Fl. Ind. i. 699 (1832). *Cupia odorata* DC.

Prod. iv. 394 (1830). *Webera macrophylla* Roxb. Hort. Bengal. 85 (1814), and Fl. Ind. i. 697 (1832). *Cupia macrophylla* DC. l. c.

Casasia nigrescens Wright in herb. *Randia nigrescens* Griseb. Cat. Pl. Cub. 123 (1866), where the combination *Casasia nigrescens* Wright is implied though not definitely made. *Randia nigrescens* Wright & Sauvalle, Fl. Cub. 60 (1873). *Randia nigricans* K. Schum. in Engl. & Prantl, Nat. Pflanzenf. iv. Abt. 4, 77 (1891), by obvious clerical error.

Hamelia hypomalaca, n. sp., fruticosa ramosa; ramis curvatis teretibus cortice brunneo-griseo lenticellifero tectis; ramulis dense tomentellis; foliis ternis ovalibus obtuse acuminatis basi brevissime acuminatis saepe inaequilateralibus 6.5–9 cm. longis 4–5.5 cm. latis membranaceis supra laete viridibus obscure puberulis subtus multo pallidioribus molliter griseo-tomentellis vel denique glabrescentibus; petiolo gracili ca. 2 cm. longo tomentello; cymis terminalibus ca. 9-floris modice laxis tomentellis, ramis recurvis, pedicellis 2–9 mm. longis; floribus pro genere majusculis; calyce tomentello, dentibus brevibus subulatis; corolla flava 4 cm. longa, tubo proprio brevi, faucibus longis ampliatis, limbi lobis 5 late ovatis acuminati-mucronatis; fructu immaturo ca. 8 mm. longo. — MEXICO: State of Durango, 15 August, 1897, *Dr. J. N. Rose*, no. 2304 (type, in U. S. Nat. Mus. and Gray Herb.). Closely related to *H. ventricosa* Sw., but readily distinguished by its tomentulose leaves, loose inflorescence, and somewhat smaller flowers.

Hoffmannia Conzattii, n. sp., fruticosa glabra; ramis subteretibus obsolete solum et obtuse subtetragonis apicem versus foliatis deorsum longe floriferis; foliis obovato-vel oblanceolato-oblongis breviter caudato-acuminatis basi longe attenuatis tenuiter membranaceis utrinque glaberrimis supra in siccitate nigrescentibus subtus pallidioribus viridibus 11–16 cm. longis 3.5–6 cm. latis; costa media supra impressa, nerviis lateralibus ca. 8-jugis oppositis vel alternis; petiolo 1.8–2.5 cm. longo glabro; stipulis ovatis caducis; cymis subsessilibus oppositis lateralibus numerosis subapproximatis ca. 6-floris; pedicellis calycem subaequantibus; tubo calycis subgloboso 2.5 mm. longo, limbo breviter patentimque 4-dentato; corolla ca. 6 mm. longa ad mediam partem 4-fida, lobis anguste oblongis saepissime patentibus; antheris anguste oblongis exsertis; fructu ignoto. — MEXICO: Colonia Melchor Ocampo, Canton de Córdoba, Vera Cruz, alt. 1200 m., *Prof. C. Conzatti*, 19 June, 1896, no. 168 (type, in Gray Herb.). This species in foliage closely resembles *H. calycosa* J. D. Sm., but is readily distinguished by its exceedingly short calyx-lobes. From *H. Ghiesbreghtii* (Lem.) Hemsl. it differs in its subterete wingless branches. *H. longepetiolata* Polak

appears by its description to have longer petioles and considerably larger flowers.

Hoffmannia cuneatissima, n. sp., fruticosa; ramis teretibus griseis etiam in lignescentia cum pilis brevibus crispis rufescentibus denique sparsis inconspicuisque tectis; foliis oppositis vel ternis deflexis tenuibus acuminatis oblanceolatis 1–1.6 dm. longis 3–4.5 cm. latis basi longissime cuneatis supra glabriusculis subtus paulo pallidioribus praesertim in nerviis venisque crispe puberulis; cymis axillaribus pedunculatis 4–8-floris; pedunculis ad ca. 1 cm. longis ascendentibus gracilibus rufo-pubescentibus; pedicellis 1–2 mm. longis; calyce turbinate-subtereti 2 mm. longo crispe pubescenti, limbi dentibus 4 lanceolati-deltoideis primo suberectis denique patentibus ca. 1.2 mm. longis cum denticulis 4 minimis glandulosis alternantibus; corolla flavida extus puberula ca. 1 cm. longa ad mediam partem 4-fida; lobis oblongis obtusiusculis in media parte crassiusculis dorso carinatis carina crispe puberula; bacca nigrescenti 5 mm. diametro; seminibus numerosis brunneis compressiusculis foveolatis. — MEXICO: mountain cañon near Cuernavaca, alt. 200 m., 29 May, 1898, *C. G. Pringle*, no. 7662 (type, in Gray Herb.); and previously in the same locality, 20 Nov., 1895, *C. G. Pringle*, no. 7075 (Gray Herb.) and 31 July, 1896, *C. G. Pringle*, no. 7248 (Gray Herb.). This species belongs clearly to the same group as *H. affinis* Hemsl. and *H. lenticellata* Hemsl., but with its thin, thoroughly membranaceous leaves and rufous-pubescent branches cannot well be placed in either of these species.

Hoffmannia Rosei, n. sp., fruticosa 3 m. alta; ramis flexuosis dense pulverulo-puberulis et obscure strigillosis, internodiis brevibus 5–12 mm. solum longis; foliis oppositis oblanceolatis membranaceis acuminatis basi longe attenuatis 6–12 cm. longis 3.4–5 cm. latis utrinque obscure strigilloso-puberulis vel supra glabriusculis subtus in costa et nerviis lateralibus dense minuteque pulverulo-puberulis; cymis axillaribus oppositis graciliter pedunculatis 5–9-floris subcircinatis; pedunculis 1–1.3 cm. longis pulverulis rubescentibus; pedicellis similibus ca. 2 mm. longis; calyce ovoideo strigilloso, dentibus 4 brevibus anguste deltoideis cum glandulis 4 parvis alternantibus; corolla alba 7 mm. longa pulverula ad partem paulo infra mediam 4-fida, lobis limbi oblongis acutis tenuibus nec carinatis nec pubescentibus. — MEXICO: along a brook near Pedro Paulo, Tepic, 3 August, 1897, *Dr. J. N. Rose*, no. 1968 (type, in U. S. Nat. Mus. and Gray Herb.). Very near *H. cuneatissima*, described above, but with opposite leaves, mere puberulence instead of pubescence, and unkeeled corolla-lobes.

Antirrhoea chinensis (Champ.), n. comb. *Guettardella chinensis* Champ. in Hook. Kew. Journ. Bot. iv. 197 (1852).

Timonius polygamus (Forst.), n. comb. *Erithalis polygama* Forst. Prod. 17 (1786). *E. obouata* Forst. l. c. 93, mere mention in index. *Timonius Forsteri* DC. Prod. iv. 461 (1830); Drake del Castillo, Ill. Fl. Ins. Pacif. 193 (1890), which see for further synonymy.

Stylocorine alpestris (Wight), n. comb. *Pavetta* ? *lucens* R. Br. in Wall. Cat. no. 6168 (1828), name only. *Coffea alpestris* Wight, Ic. t. 1040 (1848-1856). *Webera lucens* Hook. f. Fl. Brit. Ind. iii. 106 (1882), as to var. 1. *Stylocorine breviflora* Schlecht. ex Hook. f., l. c. — Foliis oblanceolatis. Var. **grumelioides** (Wight), n. comb. *Coffea grumelioides* Wight, Ic. t. 1041 (1848-1856). *Webera lucens* Hook. f., l. c. as to var. 2. — Foliis obovatis.

Stylocorine longifolia (G. Don), n. comb. *Ixora macrophylla* R. Br. in Wall. Cat. no. 6165 (1828), name only, not Bartl. *Ixora longifolia* G. Don Syst. iii. 573 (1834). *Pavetta longifolia* Miq. Fl. Ind. Bot. iii. 275 (1856-1859). *Webera longifolia* Hook. f. Fl. Brit. Ind. iii. 105 (1882).

Rudgea crassiloba (Benth.), n. comb. *Coffea crassiloba* Benth. in Hook. Jour. Bot. iii. 233 (1841). *Rudgea Schomburgkiana* Benth. Linnaea, xxiii. 459 (1850).

CEPHAELIS ELATA Sw. Prod. 45 (1788). Here apparently belongs *Cephaelis punicea* Vahl, Eclog. i. 19 (1796) and consequently *Uragoga punicea* K. Schum. in Engl. & Prantl, Nat. Pflanzenf. iv. Abt. 4, 120 (1891), a name which, through apparent clerical error, has been cited by Durand & Jackson, Ind. Kew. Suppl. 1, 445 (1906), as "*Uragoga phoenicea* K. Schum.," a combination said by them to equal "*Palicourea punicea* R. & P." However, Ruiz & Pavon do not appear to have created any such binomial, though DeCandolle's *Palicourea punicea* (Prod. iv. 526, 1830) was based upon *Psychotria punicea* R. & P. Fl. Per. ii. 62, t. 212 fig. a (1799), a species obviously not of *Cephaelis*. Schumann's "*Uragoga phoenicea*," which seems never to have been published by its supposed author, appears to have given rise to *Cephaelis phoenicea* J. D. Sm. Pl. Guat. v. 39 (1899), which as to plants cited is clearly *C. elata* Sw.

Cephaelis sphaerocephala (Muell. Arg.), n. comb. *Psychotria sphaerocephala* Muell. Arg. Flora, lix. 550, 553 (1876).

Nertera Arnottiana (Walp.), n. comb. *Leptostigma Arnottianum* Walp. Rep. ii. 463 (1843). *Hedyotis repens* Clos in Gay, Fl. Chil. iii. 208 (1847). *Coprosma calycina* Gray, Proc. Am. Acad. iv. 306 (1860).

Coprosma australis (A. Rich.), n. comb. *Ronabea* ? *australis* A. Rich. Voy. Astrolabe Bot. i. 265 (1832). *Coprosma grandifolia* Hook.

f. Fl. N. Z. i. 104 (1853). *Pelaphia grandifolia* Banks & Soland. ex Hook. f., l. c.

Coprosma quadrifida (Labill.), n. comb. *Canthium quadrifidum* Labill. Nov. Holl. Pl. i. 69, t. 94 (1804). *Marquisia Billardieri* A. Rich. Mém. sur les Rubiacées, 112 (1829), & Mém. Soc. Hist. Nat. Par. v. 192 (1829). *Coprosma Billardieri* Hook. f. in Hook. Lond. Jour. Bot. vi. 465 [bis] (1847). *Coprosma microphylla* A. Cunn. ex Hook. f., l. c.

Richardia muricata (Griseb.), n. comb. *Richardsonia muricata* Griseb. Cat. Pl. Cub. 143 (1866). *Spermacoce* (*Borreria*) *richardsonioides* Wright in Sauv. Fl. Cub. 73 (1873).

Crusea hispida (Mill.), n. comb. *Crucianella hispida* Mill. Diet. ed. 8, no. 4 (1768). *Spermacoce rubra* Jacq. Hort. Schönb. iii. 3, t. 256 (1798). *Crusea rubra* Schlecht. & Cham. Linnaea, v. 165 (1830).

Borreria asperifolia (Mart. & Gal.), n. comb. *Diphragmus scaber* Presl, Bot. Bemerk. 81 (1844), not *Borreria scabra* (Schum. & Thonn.) K. Schum. *Spermacoce asperifolia* Mart. & Gal. Bull. Acad. Brux. xi. pt. 1, 132 (1844).

Borreria nesiotica n. sp., suffrutescens glaberrima 4 dm. vel ultra alta ramosa; ramis ascendentibus subteretibus parte superiori 4-angulatis basim versus foliosissimis saepe purpurascens; foliis oppositis anguste lanceolatis basi apiceque attenuatis laevissimis etiam ad marginem paulo revolutum 2-4.5 cm. longis 3-12 mm. latis modice venosis subtus paululo pallidioribus axillis saepe proliferis; verticillis plerisque 4 distantibus 9-12 mm. diametro hemisphaericis a bracteis 2 majoribus oppositis 1-2 cm. longis ovato-lanceolatis obtusiusculis basi ampliato setoso-dentatis et ca. 4 minoribus ovatis obtusis 5 mm. longis suffultis; calyce glabro breviter et subaequaliter 4-lobato cum dentibus intermediis brevissimis; corolla glabra; staminibus exsertis; stigmate brevissime bilobato; seminibus papillosis nigris non transverse sulcatis. — *Spermacoce* (*Boneria*), sp. Vasey & Rose, Proc. U. S. Nat. Mus. xiii. 148 (1890). *Spermacoce* sp. Brandege, Zoe, v. 27 (1900). — SOCORRO ISLAND (of the Revillagigedo Group), A. W. Anthony, 1897 (type, in Gray Herb.); previously collected by C. H. Townsend, March, 1889; and later by F. E. Barkew, 27 May to 3 July, 1903, no. 208. In habit somewhat resembling *B. verticillata* (L.) G. F. W. Mey., but readily distinguished by its 4-lobed calyx. Also somewhat like forms of the highly variable *B. tenella* (HBK.) Cham. & Schlecht., but having much shorter calyx-lobes (about one third the length of the tube), glabrous foliage, etc.

Borreria rhadinophylla, n. sp., gracillima ramosa prostrata, caulibus elongatis valde flexuosis obsolete quadrangularibus foliosis tenuiter

patenteque pubescentibus plus minusve rubescentibus fere filiformibus sed basim versus induratis et lignescentibus, nodis hirsutulis; foliis anguste linearibus subfiliformibus 1-nerviis glabris margine revolutis apice acutissimis 1-2 cm. longis; vaginis brevissimis pauci- (saepius 2-) setis; verticillis remotis plerumque 2 subglobosis ca. 1 cm. diametro; calyce longe 2-lobato, lobis lanceolato-linearibus acutissimis herbaceis sursum fimbriato-ciliatis, dentibus intermediis multo brevioribus scariosis; corolla alba hypocraterimorpha 4-loba 2.5 mm. longa, lobis ovato-oblongis apicem versus hispidis, tubo intus basim versus pubescente; staminibus 4 in summa parte tubi affixis, leviter exsertis; fructu et seminibus non visis. — BRITISH HONDURAS, on dry sandy pine ridges, 23 October, 1905, *Prof. Morton E. Peck*, no. 180 (type, in Gray Herb.). From its 2-lobed calyx this species would seem to stand near the polymorphous *B. verticillata* (HBK.) Cham. & Schlecht. but with all due recognition of the extraordinary variability of that species, it does not seem possible that this delicate filiform plant should be included among its forms. Among the distinctions noted is the form of the stigma, which in *B. verticillata* is barely lobed, but in *B. Peckiana* distinctly bifid with short but actually filiform lobes.

BORRERIA VERTICILLATA (L.) G. F. W. Mey., var. *thymiformis*, n. var., pumila 6-8 cm. alta subglabra; caulibus multis gracilibus laxis flexuosis a caudice crassa nigrescente oriuntibus; foliis ovato-ellipticis 7-11 mm. longis 2-5 mm. latis; capitibus parvis ca. 8 mm. diametro terminalibus. — MEXICO: about 29 km. southwest of the city of Oaxaca, alt. 2300-2900 m., 10-20 September, 1894, *E. W. Nelson*, no. 1410 (type, in Gray Herb. and Herb. U. S. Nat. Mus.). This plant, although maintaining all the floral traits of the species, is so strikingly different from the usual forms as to be well worthy of varietal distinction. Were it not connected with the more typical forms by such intermediates as L. C. Smith's no. 40 from the Cuilapan Mountains, it could certainly pass as a distinct species.

Erigeron Deamii, n. sp., suffruticulus gracillimus pumilus 1 dm. altus irregulariter a basi ramosus, ramis teretibus strigosis foliosissimis ascendentibus saepius 1-capitatis; foliis linearibus (infimis anguste oblanceolatis) ca. 1 cm. longis ca. 1 mm. latis utrinque strigilloso-hispidulis 1-nerviis saepe in axillis proliferis; pedunculis filiformibus ca. 3 cm. longis rectis vel apicem versus plus minusve nutantibus 1-capitatis subappresse pubescentibus; capitibus hemisphaericis ca. 8 mm. diametro; involucri squamis argute linearibus attenuatis subaequalibus media parte viridibus hirsutulis margine pallidis scariosis ca. 4 mm. longis; flosculis disci numerosis, corollis 2.3 mm. longis apicem versus flavidulis, achaeniis compressis sparse hirsutulis 1.3 mm.

longis, pappi setis ca. 12 tenuibus albis 2.4 mm. longis; flosculis liguliferis ca. 40, ligulis angustis albis vel purpureo-tinctis tubo subaequilongis apice saepissime bidentatis, achaeniis et pappi setis eis flosculorum disci similibus. — GUATEMALA: growing on rocks in bottom of cañon, Fiscal, Guatemala, alt. 1130 m., 3 June, 1909, *Charles C. Deam*, no. 6159 (type, in Gray Herb.). This species is obviously of the affinity of *E. mucronatus* DC., *E. exilis* Gray, and *E. Karwinskianus* DC. From the first of these it differs in having narrower (linear rather than lanceolate) leaves, smaller heads, and relatively as well as absolutely shorter rays (exceeding the disk scarcely by one third). *E. exilis* Gray has the involucre bracts and peduncles very much more closely and finely puberulent, and *E. Karwinskianus* DC. is described as having the leaves glabrous on both surfaces.

Verbesina medullosa, n. sp., frutescens 1.2–1.8 m. alta; caulibus crassiusculis teretibus foliosis medullosis omnino exalatis juventute tomentellis serius subglabratis; foliis alternis ovatis majusculis 1.2–1.5 dm. longis 4–6 cm. latis crenato-serratis penninerviis supra scabris puberulis viridibus subtus griseo-tomentellis apice attenuatis caudato-acuminatis basi in petiolum alatum biauriculatum sensim angustatis, alis petioli transverse valde rugosis margine integriuscula revoluta; capitulis numerosis parvis 9 mm. altis in corymbis compositis planiusculis bracteatis dispositis; involucri subturbinati squamis villosito-tomentellis pallide viridibus apicem versus purpurascentibus; flosculis disci ca. 20, corollis albidis 4 mm. longis tubo extus puberulo dentibus limbi suberectis brevibus deltoideis, flosculis liguliferis ca. 3 fertilibus, ligulis ovalibus parvis albis tubo vix longioribus; achaeniis valde immaturis obovatis valde compressis margine sursum ciliolatis apice biaristatis. — GUATEMALA: along railway, Fiscal, alt. 1130 m., 9 June, 1909, *Charles C. Deam*, no. 6250 (type, in Gray Herb.). This species differs in its wingless stem and branches from such forms of *V. turbacensis* HBK. as have unlobed leaves. From *V. sublobata* Benth., it may be distinguished by its more bluntly toothed (crenate-serrate) unlobed leaves which are more gradually narrowed to the winged petiole.

Trixis Deamii, n. sp., fruticosa 1.5 m. alta laxe ramosa; ramis exalatis teretibus gracilibus griseis glabratis; ramulis striatulis viridibus tomentellis foliosis; foliis rhomboideo-obovatis acute acuminatis basi subabrupte angustatis subintegris tenuibus supra atroviridibus pilosiusculis planis subtus griseo-sericeis 3.5–7 cm. longis 1.5–3 cm. latis nullo modo decurrentibus; petiolo ca. 4 mm. longo gracili villosulo subtus carinato; capitulis prope apicem ramulorum aggregatis ca. 2 cm. longis 12-floris a foliis longioribus plus minusve excessis et obscuratis;

bracteis involucri exterioris ca. 4 elliptico-lanceolatis alternis acuminatis ca. 12 mm. longis tenuibus foliis similibus; squamis involucri proprii 8 lanceolati-linearibus attenuatis ca. 14 mm. longis dorso glanduloso-puberulis medio herbaceis margine subscareosis demum stellatopatientibus divaricatis apice falcatis; corollis ca. 1 cm. longis laete flavis; achaeniis 5 mm. longis columnaribus papilloso-setulosis; pappi setis albo-fulvescentibus ca. 9 mm. longis. — GUATEMALA: along river, alt. 230 m., Zacapa, 19 June, 1909, *Charles C. Deam*, no. 6359 (type, in Gray Herb.). This shrub differs from such related species as *T. megalophylla* Greenman, *T. silvatica* Robinson & Greenman, *T. Nelsonii* Greenman, and *T. rugulosa* Robinson & Greenman, in its much thinner, flatter, softer, and essentially entire leaves of rhombic-obovate form. From *T. frutescens* P. Browne and its relatives the present plant is readily distinguished by its larger outer involucre, the silky under surface of its leaves, etc.

Chaptalia semifloscularis (Walt.), n. comb. *Perdicium semiflosculare* Walt., Fl. Car. 204 (1788). *Chaptalia tomentosa* Vent. Desc. Jard. Cels, t. 61 (1800). *Tussilago integrifolia* Willd. Sp. Pl. iii. 1964 (1804). *Gerbera Walteri*, Sch. Bip. in Seem. Voy. Herald. 313 (1856). *Thyrsanthema semiflosculare* (Walt.) Ktze. Rev. Gen. i. 369 (1891).

III. AMERICAN FORMS OF LYCOPODIUM COMPLANATUM.

BY C. A. WEATHERBY.

Lycopodium complanatum L. occurs in the western hemisphere in two distinct and geographically isolated areas. In the north, it ranges from Newfoundland to Alaska, and southward to northern Idaho and (in its variety *flabelliforme*) to the mountains of North Carolina. It is apparently entirely absent from the United States south of these points; but it reappears in south-central Mexico and extends thence through Central America to Bolivia and southern Brazil. It has also been reported from the West Indies. Specimens from these areas show, on examination, four more or less well-marked variant tendencies — two (one with a subsidiary variation) in the north, and in the south, two others, separable from each other and from both of the northern forms.

The northern forms have been clearly distinguished by Prof. Fernald.¹ The two southern (one chiefly Mexican, the other chiefly

¹ *Rhodora*, iii. 280 (1901).

South American) are connected by various intermediates, but, in their extreme development, are sufficiently diverse to warrant varietal distinction. Indeed, since Humboldt and Bonpland described their *Lycopodium thyoides* in 1810, it has been recognized by most botanists that some, at least, of the tropical material differed from typical *L. complanatum* of northern Europe and North America; and *L. thyoides* has been rather generally maintained as a variety, differently defined by different authors. Neither its relation to the northern forms, however, nor its exact identity in regard to the other tropical form seems to have worked out with entire clearness. Lloyd and Underwood, in their Review of the North American Species of *Lycopodium*,² called attention to the habitual difference between Mexican and Central American, and northern specimens; but, partly owing, no doubt, to their reluctance to describe varieties, carried their studies no further. Dr. Christ,³ in a brief but clear note, has pointed out the distinctions between the two southern forms; but he seems to be in error in referring the prevailing South American form to typical *L. complanatum*. The plant of northern Europe and America which, as Prof. Fernald has shown, should be regarded as the type of the Linnaean species, is low, and habitually as well as in the characters of its branchlets and their leaves, quite different from the taller South American plant. Dr. Christ seems also to have been in error in identifying the other tropical extreme, which has broad branchlets and long leaves with conspicuously spreading tips, with *L. thyoides* H. & B. The original description of this species in Willd. Sp. Pl. v. 18, emphasizes rather strongly the appressed leaves.⁴ In view of the facts that the type specimens were from Venezuela, and that the appressed-leaved form is apparently much the more common throughout South America, it seems best to follow the first diagnosis, and to restrict *L. thyoides* to that form.

In spite of their complete geographic separation, there is nothing to warrant the segregation of the tropical forms as separate species. The characters which distinguish them are of too little importance in themselves and too inconstant. They are rather to be considered as extreme developments of tendencies which are traceable also in occasional specimens of the northern plant, but are there not so strongly developed. The earliest varietal designation of the South American plant and that which, under the Vienna Rules, it should bear, is *L. complanatum*, β *tropicum* Spring, based on *L. thyoides* H. & B. The other, prevalently Mexican, extreme seems to be without an available name.

² Bull. Torr. Bot. Club, xxvii. 165 (1900).

³ Bull. Herb. Boiss., sér. 2, ii. 707 (1902).

⁴ "foliis semper adpressis."

The following synopsis will serve to define these American tendencies of *L. complanatum*, as understood by the writer. The specimens cited are all in the Gray Herbarium.

* Branchlets ascending, or, if spreading, lax and irregular; ultimate branchlets often more or less elongated.

+ Ultimate branchlets comparatively broad, 2–5 mm. wide, conspicuously flattened, usually ascending and only moderately elongated; their leaves 3–5 mm. long.

LYCOPODIUM COMPLANATUM L. Branches mostly not over 3 dm. long; peduncles bearing 1–2(–4) spikes; tips of the lateral leaves usually appressed or incurved. — Sp. Pl. 1104 (1753), excl. citation of Dill. Musc. t. 59 f. 3. — NORTH AMERICA: Newfoundland to Alaska, south to Maine and northern Idaho. Also in Eurasia.

Var. **validum**, nom. nov. More robust; branches usually 3–4.5 dm. long; peduncles bearing 4–6(–9) spikes; tips of the lateral leaves conspicuously spreading. — *L. complanatum* Fourn. Enum. Pl. Mex. i. 146, at least in part, not L.; Hemsl. Biol. Cent.-Am. Bot. iii. 701, at least in part, not L. *L. complanatum*, var. *thujoides* Christ, Bull. Herb. Boiss. sér. 2, ii. 707 (1902), not *L. thuyoides* H. & B. — MEXICO: Chiapas; Bergwald zwischen San Cristobal Las Casas und Huitztan, *C. & E. Seler*, no. 2273; Chiapas "etc.," *Ghiesbreght*, no. 600; Oaxaca, Cerro San Felipe, alt. 2000 m., *Gonzalez & Conzatti*, no. 889; region d'Orizaba, *Bourgeau*, no. 3159, in part; Hidalgo, Trinidad, *C. G. Pringle*, no. 11,856 (a form with the ultimate branchlets lax, elongated, and somewhat attenuate at tip). No. 3196 in John Donnell Smith's Plants of Guatemala shows a form intermediate between this and the following variety.

+ + Ultimate branchlets narrow, not more than 2 mm. wide, less conspicuously flattened, somewhat convex above, sometimes much elongated (to 12 cm.) and loosely spreading; their leaves 2–3 mm. long, the tips usually closely appressed.

Var. **TROPICUM** Spring in Mart. Fl. Bras. i. pt. 2, 116 (1840). *L. thuyoides* H. & B. in Willd. Sp. Pl. v. 18 (1810); ? HBK. Nov. Gen. et Sp. i. 38 (1815); Presl, Rel. Haenk. 77 (1825); Raddi, Fil. Bras. 80 (1825), at least in part. *L. complanatum* β *adpressifolium* Spring, Monog. Lycopod. i. 102 (1842), excl. syn. *L. anceps* Wallr. *L. complanatum*, "var. *L. thuyoides* HBK." Baker, Handb. of the Fern Allies, 28 (1887). *L. complanatum*, var. *thuyoides* Hieron. Engl. Bot. Jahrb. xxxiv. 576 (1905). — COLOMBIA: *Moritz*; Santa Marta, *Purdie*. ECUADOR: in Andibus quitensibus, *Jameson*; Andibus, *Spruce*, no. 5412 (a doubtful plant which seems to have suffered some injury to its leaves). PERU:

Andes, *Jameson*. BOLIVIA: Yungas, *Bang*, no. 395. BRAZIL: *Riedel*; *Claussen*; Herb. U. S. So. Pac. Expl. Exp., no. 27; Prov. Minas Geraes, *Widgren*, no. 984½. Burchell's no. 2223, from Brazil, of which the specimen in the Gray Herb. shows only the tip of a stem, is perhaps referable to var. *validum*.

** Branchlets spreading or recurved, forming a regular flabelliform spray; ultimate branchlets usually short, 0.5 to 4 cm. long, broad as in *L. complanatum* but with shorter leaves.

Var. FLABELLIFORME Fernald. Peduncles usually bearing 4 spikes. — *Rhodora*, iii. 280 (1901). *L. complanatum* Amer. auth. in part. — NORTH AMERICA: Nova Scotia to the mountains of North Carolina, Kentucky, Iowa, and Minnesota.

Var WIBBEI Haberer. Peduncles 1-spiked. — *Rhodora*, vi. 102 (1904). NORTH AMERICA: northern Vermont and central New York.

IV. NEW AND LITTLE KNOWN MEXICAN PLANTS, CHIEFLY LABIATAE.

BY M. L. FERNALD.

Juncus albicans, n. sp., caespitosus; caulibus 5–7 dm. altis tenuibus striatis albido-viridibus; vaginis basilaribus laxis albicantibus demum fuscis, auriculis cartilagineis, laminis subteretibus anguste canaliculatis; inflorescentiis decompositis 2–6 cm. longis, ramis suberectis, floribus subremotis vel aggregatis; bractea infima frondosa inflorescentiam plerumque superante; floribus 4–5 mm. longis albido-stramineis; bracteolis tenuibus albicantibus; sepalis petalisque subaequilongis patentibus lanceolatis apice subulatis anguste membranaceo-marginatis; staminibus 6 sepalis circa dimidio brevioribus, antheris filamentisque aequantibus; fructibus trigono-ellipsoideis truncatis breve mucronatis 3–4 mm. longis pallide stramineis nitidis; seminibus 0.5 mm. longis oblique ellipsoideis brevissime albo-caudatis. — CHIHUAHUA: vicinity of Chihuahua, altitude about 1300 m., May 1–21, 1908, *Edward Palmer*, no. 161 (type, in Gray Herb.). [It should be noted that two plants have been distributed under no. 161, but, as the other belongs in the *Cruciferae*, little confusion is likely to result.] Nearly related to *J. dichotomus* Ell. of the southern and eastern United States. Differing in its very pale color, the softer texture of the prophylla, perianth, and capsule, and the distinctly white-caudate longer seeds.

Palmer's no. 253, collected May 28–31, 1906, at Tobar, Durango, is provisionally placed with *Juncus albicans*, though it may eventually

prove to be distinct. It has less cartilaginous auricles, smaller flowers, and more ascending sepals, but the material at hand is over-mature and has lost all its seeds.

Juncus Pringlei, n. sp., dense caespitosus; caulibus erectis gracilibus rigidis 1.5–2.5 dm. altis sulcatis; cataphyllis basilaribus mucroniferis stramineis, supremis laminigeris lamina 4–10 cm. longa; inflorescentia densa 3–7-flora a bractea infima vix superata; floribus 4.5–5 mm. longis; sepalis lanceolatis petala subaequantibus apice subulatis dorso crassis viridibus lateribus castaneis marginibus membranaceis pallidis; staminibus 6, antheris linearibus flavidis quam filamentum longioribus; fructibus trigono-ellipsoideis mucronatis nitidis pallide castaneis vel olivaceis 5–6 mm. longis; seminibus 0.4 mm. longis ellipsoideis mucronatis. — OAXACA: Cuesta de San Juan del Estado, altitude 2125 meters, August 31, 1894, *C. G. Pringle*, no. 5818 (type, in Gray Herb.). An interesting addition to the little group of species, *J. Drummondii* E. Meyer, *J. Parryi* Engelm., and *J. Hallii* Engelm., all of which are confined to the cordillera of western North America. *J. Pringlei* closely simulates *J. Hallii* of Colorado and Utah, but differs in its blunt-pointed, not retuse, capsule; and, unlike any of its three allies, it has mucronate instead of caudate-appendaged seeds.

Scutellaria spinescens, n. sp., fruticosa 1–2 dm. alta; caule crasso tortuoso cortice cinereo, ramis implicatis rigidis spinescentibus cinereo-hirtellis, pilis minutis; foliis ellipticis vel oblongis integris breve petiolatis rugosis cinereo-hispidulis, majoribus 1 cm. longis; floribus axillaribus; pedicellis 5 mm. longis; calyce 2.5–3 mm. longo glanduloso-hispido; corolla curvata pilosa 2 cm. longa flava vel rubella, tubo anguste cylindrico. — COAHUILA: by a brook in San Lorenzo Cañon, near Saltillo, September 21–23, 1904, *Edward Palmer*, nos. 392 (type, in Gray Herb.) and 394. A characteristic dwarf shrub closely simulating *S. suffrutescens* Watson, which, however, has very minutely pulverulent glandless branches, leaves, and calyx. The corolla of *S. spinescens*, as shown by Dr. Palmer's material, is very variable in color (as is that of *S. suffrutescens*); the material under no. 392 having the corolla canary-yellow passing to salmon, with the galea reddish; while no. 394 has the corolla of various shades of red, with yellow only on the sides of the galea.

SALVIA SANCTAE-LUCIAE Seem. Bot. Herald, 327 (1856). In the writer's synopsis of Mexican Salvias (Proc. Am. Acad. xxxv. 514), this plant was placed in the *Vulgares* and was taken to be the same as a plant of that section collected by Dr. Edward Palmer in Tepic. Subsequently the writer has studied Seemann's original material at Kew and it proves to be, not a plant of the *Vulgares* as stated by Seemann in the

original description, but a characteristic member of the *Membranaceae*. It is identical with the Tepic plant which the writer has described as *S. cladodes* (Proc. Am. Acad. xxxv. 497).

Salvia (*Membranaceae*) *Langlassei*, n. sp., suffruticosa; caule gracile duro flexuoso obtuse quadrangulato, ramis sordido-villosis; foliis ramorum membranaceis lanceolatis vel anguste ovatis basi rotundatis apice acuminatis 3–4.7 cm. longis 1.3–1.8 cm. latis acute serratis supra strigosis venis subtus pilosis, petiolis 5–10 mm. longis; racemo elongato; verticillis 9–14-floris demum 2–2.5 cm. distantibus; bracteis reniformibus acuminatis 6–9 mm. longis glabris lucidis purpurascens; pedicellis 4 mm. longis glanduloso-hispidis; calyce campanulato purpurascens glanduloso-hispido fructifero 8 mm. longo, labiis subaequalibus, superiore late ovato 1.5 mm. longo, inferiore cum lobis ovatis mucronatis; corolla violacea. — MICHUACAN or GUERRERO: in argillaceous soil of the Sierra Madre at 1700 meters altitude, January 27, 1899, *Langlassé*, no. 805 (type, in Gray Herb.). Closely related to *S. Sanctae-Luciae* Seem., but with slender stems said by M. Langlassé to be "volubile," thinner leaves with very different pubescence, and with shorter, broader calyx-lobes.

Salvia (*Angustifoliae*) *urolepis*, n. sp., herbacea circa 1 m. alta; caulibus gracilibus retrorse pubescentibus, pilis brevibus cinereis; foliis late lanceolatis vel anguste ovatis basi subcuneatis apice acutis 3.5–5 (–9) cm. longis crenato-serratis supra viridibus puberulis subtus albobannosis, petiolis gracilibus 1–2 cm. longis pilosis; racemis gracilibus, primariis 1.2 demum 3 dm. longis; bracteis lanceolato-attenuatis 9–13 mm. longis deciduis; verticillis 12-floris demum 3–3.5 cm. distantibus; calyce tubuloso-campanulato fructifero 6–7 mm. longo caerulescente albido-piloso, labiis subaequalibus, superiore late ovato mucronato, inferiore cum lobis deltoideo-ovatis subaristatis; corolla azurea 12–16 mm. longa, tubo exserto, galea oblonga 4–6 mm. longa pilosa, labio inferiore 6–9 mm. longo cum lobo medio valde majore; stylo piloso. — NUEVO LEON, by brooks of the Sierra Madre above Monterey, August 25, 1903, September 4, 1904, and September 19, 1907, *C. G. Pringle*, nos. 11,906, 13,281, and 13,978 — all collected from the same colony (type, in Gray Herb.). Apparently most nearly related to *S. oblongifolia* Mart. & Gal., which differs in its narrower glabrous leaves, shorter and broader bracts, and the greener somewhat viscid puberulence of the calyx.

SALVIA LAVANDULOIDES HBK., var. *LATIFOLIA* Benth. Pl. Hartw. 21 (1839), and in DC. Prodr. xii. 303 (1848) as *nomen nudum*; Fernald, Proc. Am. Acad. xxxv. 506 (1900). A fine collection of this plant, made by Mr. E. W. Nelson at an altitude of 2125–3040 m. on Mt.

Patamban, MICHOACAN, January 28-31, 1903 (no. 6575), exactly matches Hartweg's no. 171 which is the type of the variety. In studying the variety in the light of this more adequate material an important character is noted in the glabrous or glabrate lower surface of the leaves, those of typical *S. lavanduloides* being canescent-tomentose beneath.

Salvia (Angustifoliae) moniliformis, n. sp., caulibus altis minute pilosis; ramis elongatis valde ascendentibus; foliis ramorum lanceolatis utrinque acutis 3-4 cm. longis crenato-serratis supra viridibus trigosis subtus pallidis pilosis; racemis spiciformibus demum 3-4 dm. longis; verticillis 10-40-floris demum 8-9 cm. distantibus; bracteis lanceolato-ovatis attenuatis caeruleis albido-pilosis deciduis; pedicellis 1-2 mm. longis; calyce cylindrico albido-caeruleo piloso costato fructifero 8 mm. longo, labiis subaequalibus lanceolato-attenuatis 3 mm. longis; corolla caerulea circa 8 mm. longa, tubo paulo exserto, galea puberula, labio inferiore multo longiore. — MEXICO: open woods on hillside at 2735 meters altitude, Iztaccihuatl, January, 1906, C. A. Purpus, no. 1720 (type, in Gray Herb.). Distributed as *S. lavanduloides* HBK., but more nearly related to *S. remota* Benth., which, however, has much smaller calyces (in maturity 4 mm. long) which are less prominently bilabiate.

Salvia (Vulgares) lilacina, n. sp., herbacea 1-1.5 m. alta; caulibus minute puberulis valde sulcatis purpurascens; foliis ovatis acuminatis basi rotundatis 4-6 cm. longis serratis supra minute strigosis venis subtus strigosis, petiolis 5-10 mm. longis; racemis gracilibus permultis 6.5-12.5 cm. longis; verticillis 10-20-floris approximatis demum 1 cm. distantibus; bracteis lanceolato-aristatis 1.5 mm. longis caducis; pedicellis 2-3 mm. longis; calyce purpurascens tubuloso-campanulato 3-3.5 mm. longo strigoso, labio superiore ovato acuminato 1 mm. longo, labio inferiore cum lobis subaristatis; corolla lilacina 12 mm. longa pilosa, tubo ventricoso exserto, galea labiam inferiorem subaequante; stylo piloso. — MICHOACAN: near Uruapan, October 15, 1904, C. G. Pringle, no. 13,279 (type, in Gray Herb.). Closely related *S. Ghiesbreghtii* Fernald, which has the midrib of the leaf densely lanate beneath, the puberulence of the branches coarser, and the few racemes more elongate.

Salvia (Vulgares) uruapana, n. sp., herbacea annua, 7 dm. alta; caule gracile minute piloso, pilis retrorsis appressis, internodiis 3.5-10 cm. longis; foliis ovatis subcordatis acuminatis 4-5 cm. longis 2.6-3.5 cm. latis crenato-serratis supra pallide viridibus minute puberulis vel glabratibus subtus cinereis minute pilosis vel glabratibus, margine pilosociliato; racemis elongatis, primariis 3 dm. longis; verticillis 3-10-floris

demum 3 cm. distantibus; bracteis lanceolato-caudatis demum 7-10 mm. longis; pedicellis demum 6-7 mm. longis tenuibus albido-pilosis; calyce tubuloso-campanulato fructifero 9 mm. longo 3 mm. diametro cinereo-piloso valde bilabiato, labio superiore oblongo acuminato 2.5 mm. longo, inferiore rectiusculo 4 mm. longo cum lobis lanceolato-aristatis; corolla azurea 12 mm. longa, tubo vix exserto, galea brevissima pilosa, labio inferiore multo longiore; stylo glabro. — MICHUACAN: lava fields, Uruapan, October 16, 1904, *C. G. Pringle*, no. 13,280 (type, in Gray Herb.). Strongly simulating *S. leptostachys* Benth., from which it differs in its much longer, more slender, and unequally cleft greener calyx, the longer, more pubescent pedicels, and the more copiously pilose leaf-margin.

Salvia (Vulgares) *lenta*, n. sp., caulibus lentis gracilibus 5 dm. altis pilosis, pilis cinereis nodulosis; foliis ovatis acuminatis basi subcuneatis 6.5-9 cm. longis 3.5-4 cm. latis argute serratis utrinque pilosis; petiolis 1-1.5 cm. longis; racemo elongato 2 dm. longo; verticillis 8-12-floris demum 1.5-2 cm. distantibus; bracteis lanceolato-ovatis acuminatis pilosis deciduis; pedicellis demum 2-3 mm. longis pilosis; calyce tubuloso-campanulato circa 4 mm. longo dense piloso, pilis albidis nodulosis, labio superiore ovato obtuso 1 mm. longo, inferiore brevior cum lobis deltoideis acutis; corolla caerulea minute pilosa 1 cm. longa, tubo exserto, labiis subaequalibus; stylo piloso. — MICHUACAN OR GUERRERO: in granitic soil, at 1100 meters altitude, Real de Guadalupe, September 10, 1898, *Langlassé*, no. 343 (type, in Gray Herb.). Nearly related, apparently, to *S. Warszewicziana* Regel, which has broad cordate acuminate bracts, a secund inflorescence, and the lips of the corolla very unequal, the upper glandular.

Salvia (Vulgares) *fallax*, n. sp., fruticosa; ramis gracilibus elongatis lignosis brunnescentibus juventate dense sordido-villosis, pilis nodulosis; foliis ovatis acuminatis basi subcuneatis 6-11 cm. longis 3.5-6 cm. latis argute serratis utrinque pilosis, pilis albidis nodulosis; petiolis gracilibus villosis 2-5 cm. longis; racemis gracilibus 1-1.5 dm. longis; verticillis 3-6-floris demum 1 cm. distantibus; bracteis atropurpureis anguste ovato-caudatis deciduis; pedicellis demum 2 mm. longis; calyce atropurpureo tubuloso-campanulato hirsuto fructifero 5-6 mm. longo, labio superiore ascendente ovato acuminato, labio inferiore rectiusculo 1.5 mm. longo cum lobis deltoideo-aristatis; corolla azurea 9 mm. longa, tubo vix exserto, galea villosa, labio inferiore paulo brevior; stylo piloso. — *S. Sanctae-Luciae* Fernald, Proc. Am. Acad. xxxv. 514 (1900), not Seemann. — TEPIC: near the town of Tepic, January and February, 1892, *Edward Palmer*, no. 1964 (type, in Gray Herb.). Closely related to *S. lenta* Fernald

and apparently also to *S. Warzewicziana* Regel. In the writer's synopsis of *Salvia* published in 1900 he mistook this plant, from the description alone, for *S. Sanctae-Luciae* Seem.; but he has since examined Seemann's type and finds that it is not this plant but a species of the *Membranaceae* (see above).

Salvia (Scorodoniae) rupicola, n. sp., fruticosa; ramis gracilibus subteretibus lignosis albescentibus cortice fibrilloso, juventate brunnescentibus glanduloso-pilosis; foliis oblongis vel anguste ovatis crenatis utrinque obtusis 1-2 cm. longis supra rugosissimis viridibus hispidis glandulosisque subtus pallidis glanduloso-pilosis, petiolo 2-3 mm. longo; racemis gracilibus 4.5-9 cm. longis; rhachi purpurascente glanduloso-hispidulo; verticillis circa 8-floris remotis demum 1.5-2 cm. distantibus; bracteis ovatis 2 mm. longis; pedicellis 2 mm. longis; calyce tubuloso-campanulato livido fructifero 6 mm. longo glanduloso-hispido, labio superiore obtuso 1.5 mm. longo, labio inferiore obtuso vix 1 mm. longo; corolla circa 1 cm. longa, tubo ventricoso exserto; galea pilosa, labio inferiore paulo brevior; stylo piloso. — HIDALGO: on rocks, Ixmiquilpan, 1903, *C. A. Purpus*, no. 431 (type, in Gray Herb.). In habit similar to *S. fruticulosa* Benth., which has the branchlets, lower leaf-surfaces, calyces, etc., stellate-pannose; nearer related, apparently, to *S. Gonzalezii* Fernald, which is less fruticose, with darker branches, glandless softer pubescence, broad-ovate leaves, and larger calyx.

Salvia (Scorodoniae) tepicensis, n. sp., caulibus gracilibus obtuse angulatis dense piloso-hispidis, pilis viscidis; foliis oblongo-ovatis obtusis supra viridibus rugosis setosis subtus albo-villosis 3-3.5 cm. longis basi subcordatis, petiolo brevi gracili viscido-hispido; racemis simplicis elongatis 1.5 dm. longis; verticillis 6-10-floris remotis demum 2.5-3 cm. distantibus; bracteis lanceolato-ovatis acuminatis dentatis 4 mm. longis; calyce azureo anguste campanulato fructifero 7-8 mm. longo valde costato, costis glanduloso-setulosis, labio superiore obtuso 3 mm. longo, inferiore obtuso 2 mm. longo; corolla azurea 1.5 cm. longa, tubo paulo ventricoso exserto, galea pilosa, labio inferiore multo longiore; stylo villosissimo. — TEPIC: near the town of Tepic, January 5-February 6, 1892, *Edward Palmer*, no. 1984 (type, in Gray Herb.). Related to *S. Gonzalezii* Fernald and *S. rupicola* Fernald. From the former distinguished by its characteristic glandular spreading pubescence, the long lip of the corolla, and the villous style; from the latter by its more herbaceous character, its much longer pubescence (of branches, leaves, and calyx), its larger prominently costate calyx, and the longer corolla with a comparatively long lip.

Salvia (Scorodoniae) dasycalyx, n. sp., fruticosa 1.5 m. alta; ramis gracilibus valde quadrangulatis superne decussatim bifariam pilosis; foliis ramorum lanceolatis acuminatis basi subcuneatis 3.5–5.5 cm. longis paulo rugosis utrinque glabris vel venis supra pilosis venis subtus albidis, petiolis 2–5 mm. longis pilosis; paniculis densis thyrsoides, secundariis 3.5–5 cm. longis; bracteis lanceolato-attenuatis 3–4 mm. longis; calyce turbinato circa 3 mm. longo purpurascete dense villosa, pilis albidis planis, lobis brevissimis latis; corolla violacea 7–8 mm. longa, tubo incluso, galea pilosa labiam inferiorem subaequante. — MICHUACAN or GUERRERO: in argillaceous soil at 1800 meters altitude, Sierra Madre, January 23, 1899, *Langlassé*, no. 779 (type, in Gray Herb.). Closely simulating *S. thyrsoiflora* Benth., from which it differs in its glabrous leaves and smaller shaggy-villous calyces.

Salvia (Cyaneae) umbratilis, n. sp., fruticosa 1 m. alta; ramis gracilibus puberulis; foliis membranaceis glabris rhomboideo-ovatis acuminatis basi cuneatis 8 cm. longis crenato-serratis, dentibus mucronatis; petiolis gracilibus 1.5–3.5 cm. longis; racemo 1.5 dm. longo; verticillis 2–6-floris demum 2 cm. distantibus; bracteis ovato-acuminatis 2 mm. longis subpersistentibus; pedicellis filiformibus 5–6 mm. longis divergentibus minute hispidis; calyce campanulato demum 11 mm. longo valde 9-costato costis setulosis, labio superiore ascendente late deltoideo mucronato, labio inferiore 4 mm. longo cum lobis porrectis anguste deltoideis aristatis; corolla cyanea 2.5–3 cm. longa pilosa rectiuscula, tubo paulo ventricoso, galea 7 mm. longa, labio inferiore paulo brevior; stylo glabro. — MICHUACAN or GUERRERO: in argillaceous soil of damp forests, at 1200 meters altitude, Sierra Madre, February 19, 1899, *Langlassé*, no. 904 (type, in Gray Herb.). Nearest related to *S. phaenostemma* Donnell Smith, which has the leaves more rounded at base, the calyx longer and purberulent (with subequal lobes), and the pedicels ascending.

Salvia (Tubiflorae) arbuscula, n. sp., arborea vel fruticosa circa 2.5 m. alta; ramis lanatis, pilis brunneis; foliis ovatis oblique subcordatis acuminatis circa 1 dm. longis crenato-serratis supra viridescensibus tomentosus cum pilis stellatis subtus albido-pannosis cum pilis stellatis; petiolis 1–1.5 cm. longis stellato-tomentosis; racemis densis primario 2.5 dm. longo; verticillis 20–30-floris demum 3 cm. distantibus; bracteis minutis deciduis; calyce tubuloso-campanulato valde costato 5 mm. longo albido-lanato, labio superiore late deltoideo cuspidato 1 mm. longo, inferiore cum lobis anguste deltoideis mucronatis; corolla purpurea curvata 2.5–3 cm. longa vix ventricosa villosa, galea rectiuscula 7 mm. longa, labio inferiore 4 mm. longo; stylo glabro. —

MICHOACAN or GUERRERO: at 1500 metres altitude in the Sierra Madre, January 20, 1899, *Langlassé*, no. 767 (type, in Gray Herb.). A handsome species nearest related to *S. Rosei* Fernald, but abundantly distinct in the pubescence of its branches, calyx and corolla, as well as the small calyx and the glabrous style.

Hyptis (*Hypenia* § *Longiflorae*) *Langlassei*, n. sp., fruticosa circa 2 m. alta; ramis glabris rufescentibus; foliis crassis coriaceis glabris lanceolatis acuminatis basi subcuneatis, superioribus 1–1.7 dm. longis 2–3.5 cm. latis acute dentatis; panicula trichotoma ramis 1.5–2.7 dm. longis cymulas item semel vel bis trichotomas 2–7 cm. longas laxepatentes gerentibus, rhachi glanduloso-puberulo; bracteis ovato-lanceolatis acuminatis integris puberulis, inferioribus 2.5 cm. longis, superioribus 1 cm. longis; pedicellis demum 4–11 mm. longis; calyce campanulato anthesi 4–5 mm. fructifero 8–9 mm. longo glanduloso-puberulo et glanduloso-hispido, pilis brevibus albidis squamosis; labiis patentibus lanceolato-aristatis; corolla sanguinea puberula 2 cm. longa, tubo infundibuliforme, galea 2–3 mm. longa lobis rotundis labiam inferiorem subaequante; staminibus stiloque exsertis glabris. — MICHOACAN or GUERRERO: in granitic soil at 1800 m. altitude, Sierra Madre, February 10, 1899, *Langlassé*, no. 854 (type, in Gray Herb.). Closely related to *H. Nelsoni* Fernald, of the mountains of Jalisco, which has the leaves broad and clasping at base, the pubescence much finer (that of the calyx merely a fine puberulence), and the hardly aristate calyx-lobes much shorter.

V. MEXICAN PHANEROGAMS — NOTES AND NEW SPECIES.

BY C. A. WEATHERBY.

Anthericum tenue, n. sp., gracillimum scaposum, radicibus fasciculatis nonnullis apice nonnullis basin versus tuberoso-incrassatis, foliis marcidis in collo laxe fibroso 3 cm. longo supra radicem persistentibus foliis suberectis pluribus radicalibus subulatis duris glabris marginibus minute ciliolatis exceptis 1.5–2.8 dm. longis circa 1 mm. latis caule paulum brevioribus in apicem longum acicularem productis, caulibus gracilibus glabris 6–9-bracteatis ex speciminibus visis simplicibus 2.8–3.6 dm. altis, floribus in bractearum axillis 2–3-fasciculatis, pedicellis 7–10 mm. longis infra medium articulatis, perianthii segmentis 1 cm. longis albis (fide Nelsonii), staminibus quam perianthium tertiam partem brevioribus, antheris 3 mm. longis liberis, filamentis 4 mm. longis muricatis, capsulis immaturis ovoideis quam perianthium mar-

cescens duplo brevioribus. — GUERRERO: between Ayusinapa and Petatlan altitude 1500–2000 m., Dec. 14, 1894, *Nelson*, no. 2120 (in hb. U. S. Nat. Mus.). Near *A. leptophyllum* Baker, from which it differs in its even more slender habit, narrower and longer leaves, and several-bracted stem. Very similar also to *Echeandia Pringlei* Greenman, but with free anthers.

Anthericum uncinatum, n. sp., scaposum, radicibus medio incrassatis, collo radice dense fibroso, foliis (6–7) 8–12 cm. longis 6–10 mm. latis pallide viridibus saepius patentibus valdeque falcatis in siccis conduplicatis membranaceis marginibus manifestis albis cartilagineis ciliolatis lente nervatis, caulibus circa 3 dm. altis simplicibus scabris vel hirtellis 1–2-bracteatis bracteis setaceo-acuminatis chartaceis, pedicellis floriferis 5–7 mm. longis infra medium articulatis, perianthii flavi (?) segmentis 8–12 mm. longis, filamentis papilloso-crispatis circa 5 mm. longis antheris longioribus, capsulis immaturis brevibus ovoideis. — DURANGO: Otinapa, July 25–Aug. 5, 1906, *Palmer*, no. 437. Near *A. scabrellum* Baker, from which it differs in its cartilaginous-margined and strongly falcate leaves, similar to those of *A. drepanoides* Greenman. From the latter species it differs in its scabrous stem, smaller size, and fewer, chartaceous bracts. In *A. drepanoides* the bracts are about 5, and the lower are foliaceous and falcate, like the root-leaves.

Nemastylis (§ *Chlamydestylus*) *latifolia*, n. sp., bulbo ovoideo tunicis brunneis friabilibus, caule simplici subflexuoso in speciminibus visis circa 4.5 dm. alto folium unicum erectum bracteamque vaginantem gerente, folio radicali uno lineari-lanceolato longe acuminato apice setaceo 3 dm. longo 1–1.5 cm. lato plicato valde nervato, folio caulino simili inflorescentia brevior vel eam aequante ejus vagina 3–3.5 cm. longa scariosi-marginata, bractea acuminata scariosi-marginata 7.5–8.5 cm. longa, spatha 5.3 cm. longa valvis acuminatis aequilongis vel exteriori paulum longiore, floribus in spatha 4, pedicellis filiformibus spatham aequantibus vel exsertis, perianthiis albis marcescentibus paulum caerulescentibus 3 cm. (?) latis, filamentis brevissimis minus quam 1 mm. longis, antheris 1 cm. longis connectivis angustis, styli ramis filiformibus antheras subaequantibus parte indivisa circa 1 mm. longa, fructu non viso. — GUERRERO: hills, near Iguala, alt. 915 m., July 29, 1907, *Pringle*, no. 10,391. Distinguished from all the other Mexican species hitherto described by its very short, almost obsolete filaments. In this respect it resembles some of the South American species, but is not satisfactorily referable to any of them.

Quercus (§ *Erythrobalanus*) *rysophylla*, n. sp., arborea magna, cortice nigricante aspera vel profunde sulcata, foliis integris ovato-

lanceolatis 14–21 cm. longis 4.5–8 cm. latis basi cordatis vel rarius truncatis in apicem acutum sensim angustatis apice (in foliis immaturis) arista gracili 3–4 mm. longa munitis coriaceis glabris vel subtus in axillis nervorum barbatis pallide viridibus subnitidis valde reticulato-rugosis nervis supra impressis subtus prominentibus marginibus leviter incrassatis durisque sicut nervis marginalibus, petiolis 5–7 mm. longis crassis supra planis tomentosis vel glabratis, stipulis persistentibus linearibus 1.2–1.5 cm. longis, floribus femineis 2–4 folii in axilla singula sessilibus, cupulae immaturae squamis late ovatis obtusis glabris vel minute furfuraceis, glandibus non visis. — NUEVO LEON: Sierra Madre, Monterey, *Pringle*, nos. 10,225, 10,226, 10,379. A well-marked species, nearest *Q. nectandraefolia* Liebmann.

Mirabilis Pringlei, n. sp., caulibus herbaceis circa 1 m. altis ramosis, ramis dense glanduloso-puberulentibus, foliis late ovatis vel suborbiculatis 7–10 cm. longis 5–9 cm. latis integris cordatis acutis vel breviter acuminatis ciliolatis praeter nervos glanduloso-puberulentibus subtus sparse et minute pubescentibus pilis brevibus adpressis, inflorescentiae foliis parvis subsessilibus, inflorescentia divaricato-cymosa non congesta, cymis breviter pedunculatis, involucris unifloris campanulatis glandulosis ejus laciniis ovatis obtusis in anthesi tubam subaequantibus, perianthiis pallide roseis 2.5–3 cm. longis cylindraceutis basi paulum dilatatis et quam ovarium latioribus limbo angusto, staminibus 5 longe exsertis perianthii tubo duplo longioribus, anthocarpis glabris tuberculatis circa 7 mm. altis 5 mm. latis pentagonis in angulis costatis basi late truncatis. — GUERRERO: under limestone cliffs, Iguala Cañon, alt. 915 m., July 23, 1907, *Pringle*, no. 10,384. Near *M. exserta* Brandegee, from which it differs in its tuberculate, five-ribbed anthocarp and in the shape of its perianth which, at base, is broader than the ovary. From *M. Jalapa* and its immediate allies it differs, as does *M. exserta*, in its long-exserted stamens and style and in its more open inflorescence.

OXYBAPHUS GLABER Watson. The type material of this species consisted only of a portion of the panicle. The following amplified description, drawn up largely from the specimen of Mr. Pringle's cited below, may, therefore, be of service.

Perennial; stem stout, glabrous, 8 dm. high, simple below, branching above, the lower internodes numerous and short (2 cm. long); leaves linear, 4–8 cm. long, 3–6 mm. wide, thick, glabrous; panicle large and open, its branches opposite and strictly glabrous; involucre somewhat campanulate, 4–8 mm. high, about 1 cm. across when mature, glabrous or minutely strigillose with short yellow hairs, on slender glabrous pedicels 4–8 mm. long; flowers cleistogamous (?),

the perianth inconspicuous, equalling or shorter than the involucre; fruit lance-ovate in outline, acute at the apex, narrowed at the base, with five narrow but prominent smooth ribs, the space between more or less strongly tuberculate, glabrous or minutely strigillose between the ribs.— Am. Nat. vii. 302 (1873). — Kanab, South Utah, *Mrs. A. P. Thompson*. CHIHUAHUA: sand hills near Paso del Norte, Sept. 20, 1886, *Pringle*, no. 1126. A specimen from Kansas, sand hills, Kearny Co., Aug. 29, 1897, *A. S. Hitchcock*, no. 421b perhaps belongs here also.

There is in the Gray Herbarium a plant clearly referable to this species, but differing from the typical form in its pubescent pedicels and involucre. It seems worthy of recognition as: *var. recedens*, n. var., a forma typica differt pedicellis involucrisque pubescentibus. — CHIHUAHUA: between Casas Grandes and Sabinal, altitude 1550–1700 m., Sept. 4–5, 1899, *Nelson*, no. 6351.

In the course of a recent attempt to rearrange, with the aid of Mr. Standley's excellent monograph, the Mexican specimens of *Nyctaginaceae* in the Gray Herbarium, it became apparent that, under the Vienna Rules, several new combinations in the genus *Oxybaphus* were required. They are accordingly proposed here, as follows:

Oxybaphus texensis (Coulter), n. comb. *Allionia corymbosa*, var. *texensis* Coulter. Contr. U. S. Nat. Herb. ii. 351 (1894). *Allionia texensis* Small, Fl. Southeast. U. S. 406 (1903). — *Coulter's* no. 912, from Mexico, but without more definite locality, should apparently be referred here.

Oxybaphus coahuilensis (Standley), n. comb. *Allionia coahuilensis* Standley, Contr. U. S. Nat. Herb. xii. 347 (1909).

Oxybaphus melanotrichus (Standley), n. comb. *Allionia melanotricha* Standley, l. c. 351. The following, not cited by Mr. Standley, belongs here: CHIHUAHUA: mountains near Pilares, 23 Sept., 1891, *C. V. Hartman*, no. 743.

Oxybaphus pseudaggregatus (Heimerl), n. comb. *Mirabilis pseudaggregata* Heimerl, Ann. Cons. et Jard. Genève. v. 183 (1901). *Allionia pseudaggregata* Standley, l. c. 356. — The following specimens belong here: SAN LUIS POTOSI: alt. 1850–2500 m., 1878, *Parry & Palmer*, no. 768; in montibus San Miguelito, 1876, *Schaffner*, no. 177. Vallée de Mexico, Guadalupe, 1er Août, 1865, *Bourgeau*, no. 651.

Urvillea biternata, n. sp., fruticosa 1–2 m. alta glabra vel ramulis minute pulverulentibus, ramis 3–5-costatis costis obtusis interdum rubris inter costas planiusculis vel leviter sulcatis, foliis biternatis, foliolis membranaceis glabris vel subtus praeter nervos sparse pubescentibus punctis lineisque pellucidis minute punctatis ovatis subtus

pallidioribus, terminalibus 11–15 cm. longis 4.5–5.5 cm. latis obtuse acuminatis mucronulatis supra medium paucis dentibus crenatis basi abrupte angustatis sicut in petiolulam alatum 1–2 cm. longam, lateralibus similibus minoribus interdum obliquis acumine brevioribus, inflorescentiae paniculis angustis axillaribus longe (ad 8 cm.) pedunculatis 2-cirrhis, sepalis 5, 3 mm. longis concavis obtusis late ovatis minute pubescentibus duobus exterioribus paulum minoribus, petalis 4, 3 mm. longis obovatis vel suborbiculatis unguiculatis rotundatis, duobus superioribus squamas gerentibus latas cucullatas apice in appendicem longam deflexam productas appendice et marginibus barbatus summo dorso crista dilatata subflabelliforme instructas, duorum inferiorum squamis minoribus margine barbatus summo dorso cuspidatis, disci glandis duobus oblongis basi latioribus et callosis inter callos concavis, staminibus 8, filamentis crassis extra sparse villosis, antheris introrsis, fructu trilobato subobovato 1.8 cm. longo 1.3 cm. lato apice leviter emarginato vel rotundato basi subacuto. — GUERRERO: Iguala Cañon, alt. 915 m., July 24, 1907, *Pringle*, no. 10,380. An anomalous species, distinguished from all the other species of *Urvillea* by its biternate leaves. In habit it resembles some species of *Serjania*, but has the fruit of *Urvillea*.

Euphorbia (§ **Anisophyllum**) **chalicophila**, n. sp., erecta annua (?) basi ramosa, caulibus teretibus gracilibus 3.5–4 dm. altis dichotome ramosis pilis albis crispatis dense vestitis, foliis oppositis lanceolatis basi valde obliquis subcordatis falcatis acutis vel obtusiusculis brevissime petiolatis ab apice fere ad basin serrulatis pilosis, caulinis 15–19 mm. longis 3–5 mm. latis, involucris brevissime pedicellatis in cymosulas paucifloras bracteatas ad apices ramulorum congestis turbinatis 0.6 mm. altis extus glabris intus hirtellis non fissis, lobis ovato-lanceolatis pectinatis, glandulis transverse ellipticis 0.5 mm. longis subconcavis appendice rubra vel rubella 0.5 mm. lata integra vel emarginata, capsulis 1.5 mm. altis brevipedunculatis glabris vel sparse pilosis, seminibus laevibus griseis ovatis haud angulatis 1 mm. longis. — JALISCO: gravelly banks of gullies near Guadalajara, alt. 1525 m., October 12, 1903, *Pringle*, no. 11,846. In habit and in the characters of the involucre very like narrow-leaved forms of *E. brasiliensis* Lam., but differing in being pilose throughout and in its smooth seeds.

Euphorbia (§ **Anisophyllum**) **chamaeocaula**, n. sp., perennis rubescens, caulibus ex apice radicis pluribus prostratis ramosis compressis infra nodos paulum dilatatis glabris, foliis oppositis brevissime petiolatis late ovatis basi subcordatis obliquis apice obtusis integris glabris vel facie superiore sparse pilosis, caulinis 6–8 mm. longis 4.5–6 mm. latis, ramulinis minoribus, involucris in axillis foliorum solitariis vel apicibus ramulorum in cymosulas paucifloras aggregatis pedicellatis

campanulatis extus intusque glabris, lobis parvis ovatis fimbriatis, glandulis ellipticis 0.6 mm. longis, appendice conspicua alba flabelliforme integra vel crenulata 0.5 mm. lata, pedicellis 2.5 mm. longis vel brevioribus, capsulis 2 mm. longis 1.5 mm. latis subacute carinatis omnino glabris, seminibus pallidis oblongis apice apiculatis quadrangularibus inter angulos subtransverse vel irregulariter rugosis. — JALISCO: gravelly plain near Guadalajara, Oct. 14, 1903, *Pringle*, no. 11,848. Near *E. prostrata*, from which it differs as follows: *E. prostrata*, plant green, leaves strictly oblong, abruptly rounded at apex, capsules hairy on the angles, glands with very short or no appendages. *E. chamae-caula*, leaves mostly ovate, tapering somewhat to the obtuse apex, plant reddish, capsule entirely glabrous, glands with conspicuous white fan-shaped appendages.

Manihot intermedia, n. sp., fruticosa erecta 1–2 m. alta omnino glabra, foliis orbiculatis palmatis non peltatis fere ad petiolam profunde 7–8-lobatis, supra viridibus subtus pallidis venis albis reticulatis, lobis medianis foliorum inferiorum lanceolatis sinuata-lobatis infra apicem late et abrupte rhombeo-dilatatis apice setaceo-mucronatis, duobus lobis lateralibus parvis lanceolatis integris, lobis medianis foliorum superiorum leviter sinuatis nec lobatis nec rhombeo-dilatatis, petiolis limbo brevioribus vel eum subaequantibus glaucis, racemis brevibus 3–4 cm. longis 3–4 ad apicem ramulorum fasciculatis patulis, bracteis pedicellas aequantibus vel paulum superantibus lineari-setaceis, pedicellis 5–10 mm. longis saepe bracteas duas oppositas parvas infra medium gerentibus, florum masculorum perianthiis gamophyllis 5-lobatis campanulatis circa 15 mm. altis basi rotundatis extus glaucocaeulescentibus intus flavescensibus venosis extus intusque glabris, laciniis deltoideis tubo triplo brevioribus, staminibus longioribus perianthium aequantibus, capsulis glabris globosis in siccitate rugosis, seminibus laevibus ellipticis latere interiore planis vel obtusissime angulatis exteriori convexis. — GUERRERO; limestone cliffs of Iguala Cañon, alt. 915 m., July 29, 1907, *Pringle*, no. 13,938. Intermediate between *M. carthaginensis* and *M. acutiloba*, having nearly the foliage of the former but the flowers of the latter; and apparently differing from both in its bracted pedicels.

Ipomœa (§ *Pharbitis*) *igualensis*, n. sp., volubilis tota papilloso-hirsuta pilis plus minusve flavescensibus 2–3 mm. longis vel caulibus glabrescentibus, marginibus foliorum bractearum sepalorumque pilis similibus dense papilloso-ciliatis, foliis longe petiolatis (ad 2 dm.) ovato-orbiculatis cordatis breviter acuminatis 7.5–12 cm. longis 7–13 cm. latis, pedunculis petiolos subaequantibus vel superantibus 3-floris, inflorescentia capitata congesta, ejus bracteis duabus late ovatis cuspidatis

venosis membranaceis 17 mm. longis pedicellas brevissimas floriferas sicut involucrium includentibus et occultantibus, sepalis circa 13 mm. longis acutis, duobus exterioribus latioribus ovatis 5 mm. latis intus circa 10-nervatis, tribus interioribus lanceolatis 2-2.5 mm. latis, corolla 5 cm. longa pallide purpurea tubo angusto infundibuliforme, tubo et plicis dense pilosis, limbo glabro, capsulis non visis. — GUERRERO; Iguala Cañon, alt. 760 m., September 21, 1905, *Pringle*, no. 10,054. Apparently near *I. hirtiflora* Mart. & Gal., from which it differs in its almost setose pubescence.

JUSTICIA PACIFICA (Oerst.) Hemsl. Mr. Pringle's no. 10,145, from Balsas in the state of Guerrero, agrees excellently with Oersted's description. The original specimens were in fruit only and the species was doubtfully referred to *Justicia* by Hemsley. Mr. Pringle's plant shows a glabrous corolla 2.5 cm. long with the short tube and broad limb characteristic of *Justicia*. The species would seem, then, to be certainly a *Justicia* and allied to *J. furcata*, but differing from all forms of that species in its grayish-puberulent stem, spicate inflorescence, ciliate bracts and in the very broad white margins of its calyxlobes.

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I. ON THE CLASSIFICATION OF CERTAIN EUPATORIEAE

Ageratum Gaumeri, sp. nov., annum erectum 4 dm. vel ultra altitudine copiose ramosum modice pubescens; caule tereti gracili meduloso; ramis oppositis adscendentibus foliosis; foliis ovatis acuminatis crebre et regulariter crenato-serratis tenuibus 3.5–6 cm. longis 2.5–4 cm. latis utrinque viridibus basi integris rotundatis vix ad insertionem petioli acuminatis, petiolo 1.5–2.2 cm. longo; inflorescentia perlaxa in ramulis singulis racemiformi, pedicellis 2–4 (usque ad 6) cm. longis unicapitulatis cum bracteolis 1–4 filiformibus minimis munitis; capitulis oblate subsphaericis 7–9 mm. diametro; involucri squamis linearibus attenuatis costatis glabriusculis subaequalibus; disco conico; corollis limbum versus caeruleis; styli ramis longe exsertis pulcherrime caeruleis; achaeniis nigrescentibus 5-angulatis vix in angulis obscure hispidulis 1.2 mm. longis; pappi squamis 5, aliis saepissime brevioribus muticis, aliis in aristam longam desinentibus et achaeniam longitudine subaequantibus. — *Ageratum intermedium* Millsp. Field. Col. Mus. Pub. Bot. Ser. iii. 90 (1904), not Hemsl. — Izamal, Yucatan, Dr. G. F. Gaumer, no. 395 (type, in Gray Herb.). From the species here described *A. intermedium* Hemsl. differs in having stems of a decidedly firmer texture, presumably perennial and of a more spreading habit. The leaves are smaller and the heads are borne in rather compact 2–5-headed long-peduncled cymes. Finally the pappus is much shorter. From the common and somewhat variable annual species *A. conyzoides* L., the plant here described differs much in habit, in its more finely serrate leaves, greater smoothness, and especially in its loose open inflorescence, which on the individual branches becomes somewhat racemiform.

Ageratum Peckii, sp. nov., annum erectum fastigiatim ramosum 5 dm. altum foliosissimum glabrum; radice fibrosa; caule subtereti basin versus crassiusculo nodoso, internodiis inferioribus brevibus, superiori-

bus gradatim longioribus gracilioribus atropurpureis folia longitudine superantibus; foliis lineari-oblongis integris 2.5-4.5 cm. longis 2.5-6 mm. latis obtusiusculis vel vix acutis basi subsessilibus vel petioliforme angustatis; cymis inaequaliter trichotomis, ramis lateralibus quam terminali multo longioribus usque ad 8 cm. longitudine; cymulis parvis 1-2.5 cm. diametro 3-7-capitulatis; bracteis subulatis; pedicellis 2-10 mm. longis bracteolatis; capitulis 3.5-4 mm. diametro; involucri squamis ca. 20 glabris anguste lanceolati-linearibus acutissimis plerumque 2-costatis; corollis glabris purpureis; achaeniis nigris acute 5-angulatis 1 mm. longis glabris; pappi squamis 5 lanceolatis scariosis apice setiferis 2 mm. longis. — British Honduras, in sandy open ground, on pine ridge near Manatee Lagoon, 25 July, 1905, *Prof. Morton E. Peck*, no. 80 (type, in Gray Herb.). A very distinct annual species with glabrous narrow entire leaves, commonly proliferous in the axils.

Ageratum radicans, sp. nov., glabrum prostratum ramosum ad nodos et etiam hinc inde inter eos radicans; caule teretiusculo brunneo vel stramineo-brunneo; internodiis 3-8 cm. longis; foliis oppositis anguste elliptico-oblongis integerrimis glabris 3-nerviis supra viridibus et cum nerviis impressis subtus pallidioribus impunctatis 4-8 cm. longis 5-15 mm. latis apice obtusiusculis basi petioliforme angustatis; inflorescentiis longe pedunculatis contractis cymosis paucicapitulatis; capitulis breviter pedicellatis 8-10 mm. diametro; involucri squamis anguste lanceolatis acutissimis plerumque 2-costatis subaequalibus (paucis exterioribus parvis exceptis) maturitate patentibus; flosculis glabris; corollis limbum versus purpurascentibus; achaeniis acute 5-angulatis ca. 1.2 mm. longis; pappi squamis 5 albis plus minusve erosis vel laceratis apice cum seta munitis ca. 2.2 mm. longis. — British Honduras, in fresh water pond near Manatee Lagoon, 4 August, 1905, *Prof. Morton E. Peck*, no. 99 (type, in Gray Herb.). This species, in technical characters exceedingly near *A. Peckii*, differs much in its prostrate and repent habit, its very much larger leaves, and slightly larger heads, flowers, and achenes.

Podophania dissecta (Hook. & Arn.), comb. nov. *Phania? dissecta* Hook. & Arn. Bot. Beech. 433 (1841). *Eupatorium dissectum* (Hook. & Arn.) Benth. Bot. Sulph. 113 (1844). *Podophania Ghiesbreghtiana* Baill. Bull. Soc. Linn. Par. i. 268 (1880). Repeated efforts to discover any distinctions between the types of Hooker & Arnott and of Baillon have failed to disclose any difference, the floral characters, foliage, and even pubescence appearing to be identical.

HOFMEISTERIA FASCICULATA (Benth.) Walp., var. *pubescens* (Wats.), comb. nov. *H. pubescens* Wats. Proc. Am. Acad. xxiv. 54 (1889). The glandular pubescence, although, when copious, as in the original speci-

men upon which Dr. Watson founded his species, becoming a striking feature, seems to be accompanied by no other differential character and is, as shown by later collections, by no means constant.

Trichogonia capitata (Rusby), comb. nov. *Eupatorium capitatum* Rusby, Bull. N. Y. Bot. Gard. iv. 380 (1907). An examination of a cotype of this species (*Bang*, no. 2114) in the Gray Herbarium shows not only that it has the general habit and foliage as in *Trichogonia*, but possesses the plumose pappus characteristic of that genus, to which accordingly it should be referred.

EUPATORIUM BETONICIFOLIUM Mill., var. *integrifolium* (Gray), comb. nov. *E. Hartwegi* Benth. Pl. Hartw. 19 (1839). *Coelestinia Hartwegi* (Benth.) Walp. Rep. ii. 545 (1843). *Conoclinium betonicum* DC., var. ? *integrifolium* Gray, Pl. Wright. i. 88 (1852). *Eupatorium betonicum* (DC.) Hemsl., var. *subintegrum* Gray, Syn. Fl. i. pt. 2, 102 (1884). *Conoclinium integrifolium* (Gray) Small, Fl. S. E. U. S. 1170, 1338 (1903). *Eupatorium betonicum*, var. *intregrifolium* (Gray) Small, ll. cc.

EUPATORIUM COELESTINUM L., var. *salinum* Griseb. Cat. Pl. Cub. 146 (1866). This plant (Wright's no. 2811 from Cuba) though a marked form is described somewhat misleadingly thus: "forma foliis acute dentatis." The teeth of the leaves are in fact by no means acute, being in most instances actually rounded at the tip; but what furnishes the really striking difference between this form and the typical *E. coelestinum* is the fact that the leaves are considerably more deeply and somewhat doubly toothed. The blades also are of a more deltoid outline.

Eupatorium frustratum, sp. nov., perenne 3-9 dm. altum a basi paulo lignescenti ramosum, radice fibrosa, ramis teretibus striatis viridibus patente vel crispe puberulis adscendentibus, internodiis longiusculis folia multo superantibus; foliis oppositis petiolatis ovatis (vel eis ramulorum lanceolato-ovatis) 3-nerviis crenato-serratis obtusiusculis 1.5-3.2 cm. longis 0.8-2.2 cm. latis utrinque breviter pubescentibus; inflorescentia iterum atque iterum cymoso-furcata, axe principali in capitulo quasi abortive terminante (unde nomen); capitulis ovoideo-cylindricis 1 cm. longis 5 mm. diametro, involucri squamis multiseriatim imbricatis arcte appressis viridi-striatis apice rotundatis valde deciduis, receptaculo elevato crassiusculo cylindrico 1.5 mm. alto minute papilloso; flosculis caeruleis; achaeniis olivaceis minute in faciebus sursum strigillosis. — *Ooclinium rigidum* Chapm. Bot. Gaz. iii. 6 (1878), not DC. *Eupatorium heteroclinium* Gray, Syn. Fl. i. pt. 2, 95 (1884), not Griseb. *Osmia heteroclina* Small, Fl. S. E. U. S. 1164 (1903), excl. syn. — South Florida: coral soil, Lignum Vitae Key,

A. H. Curtiss, no. 1195* (type, in Gray Herb.); Key West, *Blodgett*; Jew Fish Key, *Chapman*; rich thicket, Key Largo, June, 1880, *A. H. Curtiss*, no. 171; Upper Metacumbe, 11 April, 1892, *J. H. Simpson*, no. 565. This species, long identified with the Jamaican *E. heteroclinium* Griseb., differs in having decidedly smaller heads, shorter leaves of a more deltoid contour, more obtuse involueral scales, olivaceous instead of dark violet-brown achenes which are strigillose instead of smooth on their faces, and in other minor characters. Were these plants of Florida and Jamaica really identical, it would certainly be strange that their range did not include Cuba.

EUPATORIUM GLABRATUM HBK. Nov. Gen. et Spec. iv. 127 (1820). To the synonymy of this species should be added *E. xalapense* HBK. l. c. 128 (1820), and *E. gonocladum* DC. Prod. v. 171 (1836). The greater part of recently collected material of this affinity has been referred to *E. glabratum*, while *E. xalapense* and *E. gonocladum* have remained obscure. After examining at the herbarium of the Museum of Natural History in Paris original material of *E. glabratum* and *E. xalapense*, and at the De Candollean herbarium in Geneva the exceedingly fragmentary type of *E. gonocladum*, the writer has failed to detect any significant difference. Of the two earlier names, the more commonly used *E. glabratum* happily has priority of position.

Eupatorium iodostylum, sp. nov., fruticosum; ramis teretibus flexuosis brunneo-griseis plus minusve striatulis glabratibus; ramulis foliosis crispe vel patente purpureo-puberulis, pilis sub lente moniliformibus; foliis oppositis oblongo-lanceolatis undulate et subremote serratis tenuibus basi anguste acuminatis ad apicem verum subobtusum gradatim angustatis 10–16 cm. longis 3–3.6 cm. latis utrinque sparse obscureque pubescentibus penninerviis supra austere viridibus subtus vix pallidioribus; petiolo 1.8–2.8 cm. longo patente pubescenti; corymbis terminalibus erectis pedunculatis alternirameis multicapitulatis 6–10 cm. diametro convexis vel planiusculis; bracteis linearibus 1–2 cm. longis; ramulis inflorescentiae crispe purpurascenti-puberulis; pedicellis anthesi 5 fructu saepius ad 10 mm. longitudine; capitulis 26–34-floris graciliter campanulatis anthesi ca. 11 mm. altis 7–9 mm. diametro; involucri squamis ca. triseriatis linearibus ciliolatis laxe imbricatis, exterioribus herbaceis attenuatis 4–8 mm. longis, interioribus ca. 1 cm. longis perangustis tenuibus subscariosis acutis striatulis; corollis graciliter tubulosis 5–6 mm. longis apicem versus pulcherrime roseo-purpureis a basi ad apicem levissime ampliatis, faucibus nullis, limbi dentibus 5 deltoideis 0.8 mm. longis, antheris distinctis anguste oblongis apice appendiculatis basi integris; styli ramis longe exsertis filiformibus laete violaceis; achaeniis 3 mm. longis argute 5-costato-

angulatis glabris basin versus attenuatis; pappi setis gracillimis albis 25-30 corollam subaequantibus. — Limestone rocks, Trinidad Mountains, Santa Clara, Cuba, Arroyo Cimarron, altitude 470 m., *N. L. & E. G. Britton*, 5 March, 1910 (type, in Gray Herb.).

Eupatorium (§ *Imbricata*) *pluriseriatum*, sp. nov., fruticosum inflorescentia excepta glaberrimum; ramis arcuatis pallide griseo-brunnescentibus subteretibus lucidulis; ramulis purpurascens striatulis; foliis oppositis graciliter petiolatis ovatis firmissimis longe falcatis attenuato-acuminatis denticulatis 9-12 cm. longis 4.5-5.5 cm. latis utrinque laete viridibus basi rotundatis sed ad insertionem petioli ca. 2.7 cm. longi in eo plus minusve acuminato-decurrentibus; panicula corymbosa oppositifolia multicapitulata densiuscula, axe et ramulis puberulis; capitulis (infeliciter immaturis) cylindraceis ca. 8 mm. altis 4 mm. diametro 7-10-floris breviter pedicellatis vel in apicibus ramulorum subsessilibus et fasciculatim aggregatis; involucri squamis valde inaequalibus multiseriatim imbricatis glabris subscariosis viridi-striatulis fimbriati-ciliolatis, apice rotundatis, margine saepius brunnescentibus quasi ustis, a receptaculo cylindrico truncato caducis; corollis glabris graciliter tubulosis quam achaenis etiam glabris multo longioribus; pappi setis tenuibus corollas subaequantibus sursum minute scabratis. — On bank; Aguacate, altitude 750-850 m., Trinidad Mountains, Santa Clara, Cuba, 10-11 March, 1910, *N. L. Britton & Percy Wilson*, no. 5407 (type, in Gray Herb.).

EUPATORIUM URTICAEFOLIUM Reichard, var. *tomentellum*, var. nov., formae typicae habitu statura foliis etc. simile; caule ab apice usque infra mediam partem dense breviterque crispe griseo-tomentello; foliis plerumque subtus tomentellis. — Madison, Wisconsin, 28 August, 1893, *Judge J. R. Churchill* (type); Mt. Carmel, Illinois, 1875, *Dr. D. Schneck* (Gray Herb.); edge of maple forest, Marquette, Michigan, 12 August, 1901, *Bronson Barlow* (Gray Herb.). This variety differs from *E. urticaefolium*, var. *villicaule* Fernald of the middle Atlantic States in having a very much shorter closer non-viscid indumentum.

Mikania cristata, sp. nov., robusta scandens; caulibus angulato-striatis puberulo-tomentellis, internodiis usque ad 1.7 dm. longis; foliis oppositis longe petiolatis late ovatis profunde cordatis acuminatis firmissimis integriusculis utrinque breviter velutino-tomentosis a basi 3-5(-9)-nerviis; petiolis robustis recurvatis tortis anguineis ca. 5 cm. longis basin versus crassioribus, eis ejusdem jugi membrana stipulari margine appendicibus caudiformibus conspicue cristata connexis; capitulis 4-floris corymbosis ca. 9 mm. longis breviter pedicellatis, corymbis oppositis pedunculatis ca. 1 dm. diametro, pedunculis (4-6 cm. longis) et inflorescentiae ramulis valde compressis; involucri

squamis oblongis obtusiusculis ca. 6 mm. longis, exterioribus dorso puberulis; corollae tubo cylindrico curvato glabro 3 mm. longo, faucibus nullis, limbi dentibus 5 oblongo-linearibus patentibus 1.8 mm. longis obtusiusculis; achaeniis glabris 5-costato-angulatis deorsum attenuatis 3.6 mm. longis; pappi setis ca. 50 rufis 4.5 mm. longis laevibus. — Bushy places, La Palma, Costa Rica, September, 1898, altitude 1459 m., *Ad. Tonduz*, no. 12,583 (type, in U. S. Nat. Mus., fragm. in Gray Herb.). A species well marked by the conspicuously crested stipular appendages.

Mikania hexagona sp. nov., fruticosa robusta scandens; caulibus lignosis tortis acute et subalato-hexagonis atrobrunneis cavis 1 cm. diametro, internodiis longissimis (3 dm. et ultra); ramis oppositis alato-hexagonis praecipue in angulis tomentellis; foliis late ovatis acuminatis integris 1 dm. longis 7 cm. latis basi rotundatis in petiolum 2.5 cm. longum plus minusve cuneatum decurrentibus paulo supra basin 7-nervatis utrinque scabro-puberulis viridibus infra paulo pallidioribus, superioribus et floralibus multo minoribus subsessilibus; inflorescentiis composite corymbosis ca. 2 dm. diametro densiusculis; bracteis herbaceis ovato-lanceolatis acuminatis tenuibus, ultimis involucri squamas saepe aequantibus dorso obscure puberulis; pedicellis gracilibus 3-5 mm. longis; involucri squamis anguste lanceolato-oblongis acuminatis tenuibus pallide viridibus glabriusculis; corollis 5 mm. longis glabris, tubo proprio 2.5 mm. longo gracili firmissculo, faucibus bene distinctis campanulatis vix 1 mm. altis, dentibus limbi oblongis crispis ca. 2 mm. longis saepe conniventibus; achaeniis 5-angulatis ca. 4 mm. longis deorsum decrescentibus; pappi setis ca. 70 ca. 5 mm. longis rufescentibus; styli ramis filiformibus nec clavellatis 4 mm. longis. — Near Tovar, Venezuela, 1854-55, altitude 1700 m., *A. Fendler*, no. 626 (type, in Gray Herb.). A species seemingly well marked by its very robust hexagonal stem with acute narrowly wing-margined angles.

Mikania leucophylla (Rusby), comb. nov. *Willoughbya leucophylla* Rusby, Bull. N. Y. Bot. Gard. iv. 382 (1907).

Mikania longiflora (Rusby), comb. nov. *Willoughbya longiflora* Rusby, Bull. N. Y. Bot. Gard. iv. 382 (1907).

MIKANIA MYRICAÆFOLIA (Bojer) DC. Prod. v. 188 (1836). *Trixis myricaefolia* Bojer in litt. ex DC. l. c. Examination of the type of this plant of Madagascar, kindly permitted by Mr. Casimir de Candolle, showed that it has alternate thickish leaves narrowed at the base to short but slender petioles, heads (all in bud) nearly cylindrical, involucreal scales 6 to 7, and florets 10 to 11. Although from the very immature heads it is impossible to ascertain satisfactorily the style characters or other details regarding the florets, it is nevertheless cer-

tain from the number of involucreal scales and of the florets in the head that the plant is not a *Mikania*, nor from its habit and alternate leaves does it seem likely that it belongs in the tribe of the *Eupatorieae*.

Mikania paezensis, sp. nov., scandens; caule et ramulis striatis a tomento brevi fusco vel atropurpureo etiam fere nigrescenti tectis; foliis longiuscule petiolatis oppositis ovatis acutis crenato-denticulatis supra bullato-rugosis pubescentibus subtus pallidioribus tomentosissimis basi sinu patenti cordatis ca. 4.5 cm. longis ca. 3.5 cm. latis; petiolo tomentoso 3-3.5 cm. longo; corymbis ad 7 cm. longe pedunculatis 6-10 cm. diametro planiusculis tomentellis, bracteis foliaceis reductis 0.8-1.6 cm. longis ovatis petiolatis, pedicellis gracilibus 4-6 mm. longis; capitulis ca. 12 mm. longis; involucri squamis lanceolato-oblongis acutiusculis dorso fusco-tomentellis 8-9 mm. longis; corollis 5-6 mm. longis, tubo gracili, faucibus campanulatis, limbi dentibus 5 latissime triangularibus erectiusculis apicem versus tomentellis; achaeniis 5 mm. longis atrobrunneis glabris deorsum decrescentibus argute 5-costato-angulatis; costis albidis minutissime scabratis. — Las Escaleretas, Moras Valley, Rio Paez basin, Tierra Adentro, State of Cauca, Colombia, altitude 2500-3000 m., February, 1906, Pittier, no. 1336 (type, in U. S. Nat. Mus., fragm. in Gray Herb.). Notwithstanding its constantly 5-angled achenes this species seems to be suspiciously near the plant described below as *Kanimia violascens*. The two differ sufficiently in leaf-form, indumentum, length of peduncles, size of heads, etc., to be satisfactory as species, but in placing them in different genera (though their technical characters appear to require it) there seems to be some artificiality.

MIKANIA PARVIFLORA (Aubl.) Karst. Deutsche Fl. 1061 (1883); Urb. ex Hieron. in Engl. Bot. Jahrb. xxviii. 579 (1901). *Eupatorium parviflorum* Aubl. Fl. Guian. ii. 797, t. 315 (1775). — To the synonymy of this widely distributed and moderately variable species should be added, in the opinion of the writer, the following: *Mikania olivacea* Klatt, Bull. Soc. Bot. Belg. xxxi. 195 (1892); Rob. & Greenm. Proc. Am. Acad. xxxii. 12 (1896), and *Willoughbya Hieronymi* Rusby, Bull. N. Y. Bot. Gard. iv. 383 (1907). As thus interpreted, this species ranges from Costa Rica to Guiana and Bolivia.

Mikania sulcata (Hook. & Arn.), comb. nov. *Eupatorium sulcatum* Hook. & Arn. Comp. Bot. Mag. i. 243 (1835). *Mikania pentstemonoides* DC. Prod. v. 189 (1836). *M. pentstemonoides* Bak. in Mart. Fl. Bras. vi. pt. 2, 221 (1876).

Mikania sulcata (Hook. & Arn.) Robinson, var. *ambigua* (DC.), comb. nov. *M. ambigua* DC. Prod. v. 187 (1836). *M. pentstemonoides*, var. *ambigua* (DC.) Bak. in Mart. Fl. Bras. vi. pt. 2, 221 (1876).

Mikania ternata (Vell.), comb. nov. *Cacalia ternata* Vell. Fl. Flum. (text) 336 (1825), viii. t. 56 (1827). *Mikania dentata* Spreng. Syst. iii. 422 (1826) presumably, but scarcely of Schlecht. Linnaea, xi. 12 (1837), which notwithstanding the sign of affirmation employed by Schlechtendal can from character hardly have related to the plant described by Sprengel. *M. apiifolia* DC. Prod. v. 202 (1836).

Kanimia corymbiifolia, sp. nov., herbacea perennis erecta rigidula glaberrima 6-7 dm. alta usque ad inflorescentiam corymbosam simplici, internodiis infimis brevibus (2-15 mm. solum longis), supremis usque ad 6 cm. longitudine; foliis oppositis erectis appressis linearibus crassiusculis rigidulis integerrimis 3-nerviis obtusis sessilibus 4-7 cm. longis 1-3 mm. latis superioribus gradatim minoribus; inflorescentia trichotoma 3-11 cm. lata planiuscula 4-20-capitulata; bracteis anguste linearibus plus minusve alternis 8-12 mm. longis; capitulis (quoque cum bracteola unica arcte suffulto) 1.3 cm. altis 4-floris erectis; involucri squamis ovato-oblongis crassiusculis acutiusculis 2-3 mm. latis; corollis 7 mm. longis, tubo gracili 3 mm. longo, faucibus brevissimis, limbi dentibus lineari-oblongis; achaeniis immaturis 4.5 mm. longis summa parte 10-costato-angulatis; pappi setis ca. 44 rufis 6 mm. longis scabridis. — Moist meadows near a brook in the Serradão near Cuyabá, Mattogrosso, Brazil, February, 1889, *R. Pilger*, no. 220 of Dr. Hermann Meyer's second Brazilian journey. Type in the herbarium of the Royal Botanical Gardens, Berlin; fragments and tracing in the Gray Herbarium. A species markedly distinct in habit from its congeners, resembling in its thickish firm ribbed narrow leaves some species of the African genus *Corymbium*.

Kanimia violascens, sp. nov., scandens ubique a hirsutia densa sordida violascenti tecta; caule flexuoso torto multi-angulato, internodiis 6-9 cm. longis; foliis oppositis petiolatis ovalibus grosse crenatis profunde cum sinu angusto cordatis ca. 4 cm. longis ca. 3.5 cm. latis apice rotundatis crassiusculis bullato-rugosis; petiolo 1.5-2 cm. longo; corymbis trichotomis axillaribus erectis ad 2 cm. longe pedunculatis cum bracteis foliaceis suborbicularibus munitis; bracteolis parvis ovalibus; pedicellis 4-8 mm. longis; capitulis 1.2-1.5 cm. altis 4-floris; involucri squamis oblongis apicem versus carinatis plus minusve attenuatis sordide villosotomentosis ca. 9 mm. longis; corollis 7 mm. longis, tubo gracili glabro 4 mm. longo, faucibus campanulatis glabris; dentibus limbi 5 deltoideis erectiusculis apicem versus hispidulis; achaeniis 5.5 mm. longis nigris basin versus decrescentibus, costis plerumque 7-8 (rariter in eodem capitulo achaenio uno vel altero 5-costato) albidis minutissime scabridis, pappi setis ca. 75 rufidulis corollam aequantibus; styli ramis gracillimis filiformibus longe exsertis et recurvatis

antheris linearibus apice cum appendice ovata obtusa scariosa munitis. — Alto del Tabano among the Andes of the southern Cordillera of Colombia, altitude about 3500 m., 4 May, 1876, *E. André*, no. 3123 (type, in Gray Herb.).

Brickellia amplexicaulis, sp. nov., herbacea vel fruticulosa 1.3–1.8 dm. alta; caulibus teretibus medullosis saepe purpureis copiose et patente glandulari-pubescentibus; foliis oppositis oblongis vel saepius ovato-oblongis crenato-serratis vel -dentatis basi arcte sessilibus late cordato-amplexicaulibus ad apicem obtusiusculum angustatis 8–13 cm. longis 2.5–5.8 cm. latis utrinque pubescentibus subtus paulo pallidioribus saepe indumento densiori tectis pinnativenatis et a loco 1–1.5 cm. supra basin 3-nerviis; inflorescentia elongata laxa paniculata folioso-bracteata; pedicellis ad 5 cm. longis filiformibus patente adscendentibus; capitulis 1.2–1.5 mm. altis ca. 13-floris; involucri squamis angustis tenuibus attenuatis valde inaequalibus viridibus vel saepe purpurascenscentibus vel etiam atropurpureis saltem exterioribus patente ciliolatis; corollis 9 mm. longis gracillimis exacte tubulatis glabris, faucibus nullis, limbi dentibus brevissimis erectis; styli ramis erectis nigrescentibus modice clavellatis; achaeniis breviter sed dense hirsutulis; pappi setis 50–60 laete albis quam corolla distincte brevioribus. — *B. Wislizeni* var. Gray, Pl. Wright. ii. 71 (1853). *B. Wislizeni*, var. *paniculata* Gray acc. to Pringle, Pl. Mex. (1885), nomen nudum. — SONORA: near Santa Cruz, 1851, *Charles Wright*, no. 1136 (type, in Gray Herb.); Huchuerachi, 4 December, 1890, *Hartman*, no. 325; Oakridge Pass, *Hartman*, no. 333. CHIHUAHUA: rocky hills near the city of Chihuahua, 8 October, 1885, *Pringle*, no. 609; Sierra en Media, 28 September, 1899, *E. W. Nelson*, nos. 6475 and 6491; near Batopilas, 3–4 October, 1898, *E. A. Goldman*, no. 204. SINALOA: Cerro Colorado, 3 November, 1904, *Brandege*. — This species, though somewhat variable in the breadth and tothing of the leaves, seems to be constant and readily recognizable as to essentials. It is readily distinguished from *B. Wislizeni* by its smaller decidedly fewer-flowered heads, looser inflorescence, and larger leaves.

Var. ***lanceolata*** (Gray), comb. nov., foliis quam eis formae typicae multo angustioribus lanceolato-oblongis minus amplexicaulibus ca. 6 cm. longis 1.2–1.5 cm. latis. — *B. Wislizeni* Gray, var. *lanceolata* Gray, Syn. Fl. i. pt. 2, 107 (1884). — San Francisco Mountains, near Clifton, Arizona, 1 November, 1880, *E. L. Greene* (type, in Gray Herb.).

Brickellia brasiliensis (Spreng.), comb. nov. *Eupatorium brasiliense* Spreng. Syst. iii. 417 (1826); DC. Prod. v. 182. *Clavigera pinifolia* Gardn. in Hook. Lond. Jour. Bot. v. 461 (1846). *Brickellia pinifolia* Gray, Pl. Wright. i. 84 (1852); Bak. in Mart. Fl. Bras. vi. pt.

2, 372 (excl. syn. *Carphephorus coridifolius* DC., which is clearly distinct). *Mikania ericoides* Mart. ex Bak. l. c. (1876).

Brickellia coridifolia (DC.), comb. nov. *Carphephorus coridifolius* DC. Prod. vii. 267 (1838). This species, resting solely upon the original material collected on the Serro do Frio, Minas Geraës, Brazil, in 1833, *Vautier*, no. 314, was placed by DeCandolle in the genus *Carphephorus* doubtless because he found the receptacle chaffy at least to some extent. Dissection of a head from a cotype in the Gray Herbarium shows the receptacle to be chiefly free from chaff. At only one point two narrow scales, like the inner ones of the involucre, were crowded in among the flowers, and formed, as it were, a sort of re-entrant part of the involucre. In all other respects the plant agrees technically with *Brickellia*. Mr. J. G. Baker, in treating the *Eupatorieae* for the Flora Brasiliensis, doubtfully reduces the species to a synonym of *Brickellia pinifolia* (Gardn.) Gray — a species above reduced to *B. brasiliensis* (Spreng.) Robinson — but the plant, when compared with *B. brasiliensis* is obviously distinct. The involucreal scales for instance are very different, being in *C. cordifolius* nearly twice as long as in *B. brasiliensis*. They are furthermore much more attenuate, distinctly 3-ribbed, and dorsally glandular-puberulent, while in *B. brasiliensis* they are glabrous and minutely many-striate. In involucre the plant agrees much better with *Brickellia* than with the North American genus *Carphephorus*. Moreover, the limb of the corolla is very short as in *Brickellia* instead of being rather deeply cleft as in *Carphephorus*. The affinities of the species appear to be with *B. brasiliensis*, though without doubt the plant is specifically distinct. The species being little known it seems worth while to put on record the traits brought out by recent examination. Capitulis 8-floris turbinato-campanulatis 1.2 cm. altis ca. 1 cm. diametro; involucri squamis lanceolatis vel anguste oblongis acutis dorso convexis tomentellis striatulis ca. 3-seriatis valde inaequalibus; receptaculo parvo plano cum paleis paucissimis marginalibus irregulariter munito; pappi setis ca. 30 barbellatis corollas aequantibus; corollis 7-8 mm. longis vix sursum ampliatis, dentibus limbi 5, 0.5 mm. longis; styli ramis clavellatis; antheris anguste oblongis vix connatis apice breviter et late appendiculatis basi integris; achaeniis immaturis 2 mm. longis papillo-sis deorsum decrescentibus 5-costato-angulatis cum nerviis obscuris intermediis.

BRICKELLIA DIFFUSA (Vahl) Gray, Pl. Wright. i. 86 (1852). *Eupatorium diffusum* Vahl, Symb. Bot. iii. 94 (1794). To the synonymy of this species should be added *Eupatorium trichosanctum* A. Rich. Fl. Cub. Phanerog. ii. 41 (1853), the type of which was recently examined by

the writer in the herbarium of the Museum of Natural History at Paris.

BRICKELLIA SCOPARIA (DC.) Gray, var. *subauriculata*, var. nov., foliis basin versus paulo ampliatis ad 7 mm. latitudine subauriculatis, auriculis brevissimis rotundatis, margine revolutis. — Hills of Zacatecas, Mexico, 25 October, 1888, *Pringle*, no. 1766 (type, in Gray Herb.); also en route from San Luis Potosi to Tampico, December, 1878, to February, 1879, *Palmer*, no. 1077. The hitherto unpublished herbarium name of this variety has been on some plant-labels attributed to Dr. Gray, but this seems to have been an error. So far as can be ascertained from the material and records at the Gray Herbarium, Dr. Gray regarded Palmer's no. 1077 as typical *B. corymbosa*, and the Pringle plant was not collected until after Dr. Gray's death. Under these circumstances it seems undesirable, as it is unnecessary, to employ a parenthetical authority in this case.

Kuhnia adenolepis, sp. nov., perennis, caulibus saepe 2 gracilibus e caudice lignescenti oriuntibus erectis summa parte minutissime puberulis 6–8 dm. altis teretibus obscure striatulis purpureis; foliis alternis, infimis ante anthesin delapsis, intermediis anguste lanceolatis integerrimis longe attenuatis 6–7 cm. longis 7 mm. latis saepe falcatis patentibus utrinque viridibus glabris puncticulatis basi 3-nerviis; foliis superioribus gradatim minoribus, eis ramorum floriferum parvis linearibus; capitulis paucis 2–3 in ramis gracilibus elongatis bractiferis solitariis terminalibus erectis vel leviter nutantibus 12–13 mm. diametro 18 mm. altis ca. 10–12-floris; involucri squamis viridibus albido-striatis multiseriatim imbricatis, saltem exterioribus cum glandulis nigrescentibus subsessilibus eleganter ciliolatis; corollis gracilibus apicem versus atropurpurascentibus, dentibus limbi brevissimis suberectis; styli ramis nigrescentibus clavellatis conspicue exsertis; pappi setis valde plumosis leviter fulvescentibus. — Chapala Mountains, near Guadalajara, Mexico, 13 December, 1889, *C. G. Pringle*, no. 2933 (type, in Gray Herb.). A species of graceful habit and seemingly unique in its curiously glandular-ciliolate involucreal bracts.

LIATRIS TENUIFOLIA Nutt., var. *laevigata* (Nutt.), comb. nov., quam forma typica conspicue robustior; foliis 4–8 mm. latis coriaceis; capitulis saepe sed non semper paulo majoribus etiam ad 9 mm. longitudine. — *L. laevigata* Nutt. Trans. Am. Phil. Soc. vii. 285 (1840). *L. tenuifolia* Nutt. β Torr. & Gray, Fl. ii. 70 (1841). *Lacinaria laevigata* (Nutt.) Small, Fl. S. E. U. S. 1175 (1903). *Laciniaria laevigata* (Nutt.) Small, l. c. 1339. — To this variety may be referred Mr. Nash's nos. 1669 and 2599 from Eustis, Florida, while Prof. Hitchcock's no. 154 from Marco, Florida, represents a transition to the more slender typical form. It is

believed that few persons will be disposed to follow the older authors in uniting without distinction of name plants so conspicuously different in their foliage as *L. tenuifolia* and *L. laevigata*, yet on the other hand intergradation seems to be demonstrated and there are no differences of much taxonomic significance. To maintain the larger plant as a distinct species on the sole ground of its greater robustness, seems as undesirable as to suppress it altogether.

II. REVISION OF THE GENUS BARROETEA.

BARROETEA Gray. (Clarissimo G. Barroeta doctori medicinae et professori scholae metallorum ad oppidum mexicanum San Luis Potosi dictum institutae ob amicitiam suam cum collectoribus botanicis doctoribus Parryo et Palmero petito eorum dedicata.) — Capitula medicoria 17–35-flora; involucri campanulati vel turbinati squamis valde inaequalibus appresse imbricatis tenuibus costato-lineatis saepius attenuatis raro obtusis vel apice rotundatis mucronulatisque; receptaculo plano nudo. Corollae tubulatae glabrae pallidae ad insertionem filamentorum plus minusve constrictae, faucibus vix ullis, limbo breviter 5-dentato. Antherae distinctae vel levissime connatae, apice in appendicem latam obtusissimam productae, basi rotundatae integrae. Styli rami clavellati vel apud speciem unicam valde sursum incrassati, paulo exserti. Achaenia valde obcompressa anguste oblonga, margine sursum scabrata vel ciliolata, in facie exteriori vel uninervia vel conspicue unicastata, in facie interiori 2–3-nervia vel -costata. — Proc. Am. Acad. xv. 29 (1879), xvii. 206 (1882); Hemsl. Biol. Cent.-Am. Bot. ii. 102 (1881); Hoffm. in Engl. & Prantl, Nat. Pflanzenf. iv. Abt. 5, 142 (1890). *Barroetia* Hook. f. & Jacks. Ind. Kew. i. 276 (1893); Dalla Torre & Harms, Gen. Siphon. 528 (1905). — Herbae graciles annuae vel perennes nonnunquam basi paulo lignescentes saepius ramosae foliosae crispe puberulae vel tomentellae rarius glanduliferae. Folia vel omnia opposita vel superiora alterna ovata petiolata vel sessilia crenati-vel argute serrati-dentata, apice et dentibus saltim posticis in appendices setiformes desinentibus. Capitula saepius in panicula laxiuscula foliaceo-bracteata disposita.

Genus *Brickelliae* arcte affine et eae habitu, involucri, etc. simillimum differt dentibus foliorum setiferis et praesertim achaeniis valde obcompressis 5–6-costatis.

Species hucusque cognitae 7 omnes mexicanae praecipue montanae et calciphilae locos umbrosos praeferentes, una (n. 1) excepta inter se arctissime affines characteribus quamquam saepe obviis tamen incertis et minus constantibus diagnoscendae.

Clavis specierum.

- a. Pubescentia pedicelli glandulifera. Corolla achaenio distincte brevior. 1. *B. glutinosa*.
- a. Pubescentia pedicelli non glandulifera. Corolla achaenium subaequans vel eo longior, b.
- b. Folia arcte sessilia, c.
- c. Capitula nutantia, involucri squamis subscariosis exterioribus cum ceteris contiguis 2. *B. Pavonii*.
- c. Capitula erecta, involucri squamis majus herbaceis exterioribus subremotis 3. *B. sessilifolia*.
- b. Folia saltim caulina petiolata, d.
- d. Achaenia obscure in faciebus nervata, e.
- e. Folia argute et grosse dentata, dentibus omnibus longiuscule setigeris. Capitula 17-23-flora 4. *B. setosa*.
- e. Folia crenato-dentata, dentibus breviter setigeris vel setis ad apicem et dentes 1-3 posticos restrictis. Capitula 30-35-flora. 5. *B. subuligera*.
- d. Achaenia prominule et conspicue in faciebus 1-3-costata, f.
- f. Inflorescentiae saltim secundariae conspicue dichotomae capitula saepe in dichotomis gerentes; pedicelli capitula longitudine aequantes vel superantes 6. *B. laxiflora*.
- f. Capitula subsessilia in ramis elongatis paniculae. 7. *B. brevipes*.

1. *B. GLUTINOSA* Brandegee, annua subsimplex vel pauciramea 1-2 dm. alta undique breviter denseque glandulo-puberula; caule subtereti purpurascenti; foliis ovatis duplice crenato-serratis omnino esetosis tenuibus utrinque viridibus subtus vix pallidioribus supra minute papillosis subtus resinoso-atomiferis 1-2 cm. longis 8-15 mm. latis basi subtruncatis vel subcordatis, petiolis 1-1.5 cm. longis; capitulis 1-5 in pedunculis axillaribus 4-50 mm. longis erectis vel leviter nutantibus ca. 25-floris; involucri campanulati 9 mm. alti squamis obtusis mucronulatisque oblongo-lanceolatis atropurpureis; corollis 3-6 mm. longis sursum in fauces subdistinctos ampliatis; styli ramis sursum valde incrassatis; achaeniis 4 mm. longis griseis vix costatis scabridis, pappi setis laete albis sursum scabridis achaenio brevioribus. — *Zoe*, v. 262 (1908). — In umbrosis montium Cerros dictorum prope San Luis Tultitlanpa, Puebla, Mexico, *Purpus*, n. 2625. Species generis ob staturam minorem, indumentum purpureum glanduliferum, capitula pauca, styli ramos apice crassissimos distinctissima.

2. *B. PAVONII* Gray, herbacea ramosa; foliis ovatis basi subcordatis vel subtruncatis tenuibus subduplice crenato-serratis ca. 3 cm. longis 2 cm. latis utrinque pubescentibus supra viridibus subtus pallidioribus, apice et dentibus paucis posticis setuliferis; capitulis laxè paniculatis 9 mm. altis ca. 15-floris in apice pedicelli gracilis 1 cm. longi nutantibus; involucri squamis anguste lanceolato-linearibus acutis subglabris

• margine tenuissimis scariosis; corolla achaenium subaequanti; costis achaenii nigrescentis sursum hispidulis, intervallis glabris. — Proc. Am. Acad. xvii. 206 (1882). *Eupatorium setiferum* et *E. cuspidatum* herb. Pavonii ex Grayo, l. c. — Mexico, hb. Pav. nunc hb. Boiss. Species ut videtur nunquam iterum lecta.

➤ 3. *B. SESSILIFOLIA* Greenman, caule erecto tereti crispe pubescenti 6 dm. alto superne oppositirameo; foliis arcte sessilibus late ovatis basi subtruncatis duplice serratis acutis supra laete viridibus subtus paulo pallidioribus 2.5–4.5 cm. longis 1.4–3.5 cm. latis utrinque pubescentibus, dentibus apiceque setuliferis; panicula diffusa; capitulis graciliter et longiuscule pedicellatis ca. 17-floris; involucri squamis anguste lanceolatis attenuatis viridibus albicostatis, margine scariosa; corolla 4.8 mm. longa ad insertionem filamentorum obscure constricta, superne non ampliata; styli ramis leviter clavellatis; achaeniis nigrescentibus 3.5 mm. longis in facie interiori 1- obverse plerumque 3-costatis. — Proc. Am. Acad. xl. 35 (1904). — In collibus calcareis prope pagum Yautepec, Morelos, Mexico, *Pringle*, n. 9865; in rupibus calcareis convallis praeruptae Iguala, Guerrero, altitudine 915 m., *Pringle*, n. 10,322; et prope urbem Acapulco, *Palmer*, n. 625 (expeditionis Oct. 1894–Mar. 1895 factae).

➤ 4. *B. SETOSA* Gray, herba a basi decumbenti suberecta gracilis ca. 6 dm. alta; caule tereti rubescenti minute crispeque puberulo oppositirameo; foliis ovatis argute serrato-dentatis 1.2–3 cm. longis 8–15 mm. latis membranaceis utrinque viridibus tenuiter puberulis, petiolis 4 mm. longis; capitulis ca. 20-floris in axillis foliorum superiorum pedicellatis vel numerosioribus et in panicula plus minusve diffusa dispositis; involucri squamis anguste oblongo-lanceolatis attenuatis saepe purpurascentibus; corolla et pappi setis achaenium superantibus; achaeniis facie interiori planiusculis obscure 1-nervatis dorso 2-nervatis. — Proc. Am. Acad. xv. 29 (1879); Hemsl. Biol. Cent.-Am. Bot. ii. 102 (1881). *Barroetia setosa* (Gray) Hook. f. & Jacks. Ind. Kew. i. 276 (1895). — San Luis Potosi, altitudine 1830–2440 m., *Parry & Palmer*, n. 353; in collibus calcareis prope pagum Cardenas, San Luis Potosi, *Pringle*, nn. 3319, 3320.

➤ 5. *B. SUBULIGERA* (Schauer) Gray, perennis saepe basi suffrutescens; caulibus 1 vel saepe pluribus teretibus suberectis laxè ramosis fere a basi foliatis 4–8 dm. altis crispe tomentellis vel puberulis; foliis deltoideo-ovatis crenato-serratis utrinque pubescentibus vel puberulis 1–3 cm. longis 9–18 mm. latis, apice saepe obtusiusculo et dentibus saltim 1–3 posticis vel saepe omnibus cum setis munitis; capitulis ca. 30-floris 1 cm. altis; involucri squamis linearibus vel lineari-lanceolatis attenuatis plerumque viridibus; corollis gracilibus 5.5–7 mm. longis ad

insertionem filamentorum constrictis, faucibus vix ullis, limbi dentibus brevissimis; achaeniis 3–3.8 mm. longis, faciebus planiusculis vix nervatis. — Proc. Am. Acad. xv. 29 (1879); Hemsl. Biol. Cent.-Am. Bot. ii. 102 (1881). *Bulbostylis subuligera* Schauer, Linnaea, xix. 718 (1847). *Eupatorium? subuligerum* (Schauer) Gray, Pl. Wright. i. 86 (1852) ex Hemsl. l. c. sed combinatio a Grayo non expressim facta est. *Barroetia subuligera* (Schauer) Hook. f. & Jacks. Ind. Kew. i. 276 (1895). — In reipublicae mexicanae late distributa. HIDALGO: ad Zimapan, *Aschenborn*, n. 260 (specimen typicum, hb. Berol., fragmentis a cl. Eichlero benevolente missis in hb. Grayano etiam conservatis). CHIHUAHUA: in montibus Santa Eulalia, *Pringle*, n. 346; in convalle praerupta Bachimba, *Pringle*, n. 111. COAHUILA: ad Soledad, *Palmer*, n. 452 (anno 1880); prope Torreon, *Palmer*, n. 483 (anno 1898). ZACATECAS: prope Arroyo Cedros, *Kirkwood*, n. 35. DURANGO: ad Mapimi, *Palmer*, n. 519 (anno 1898).

➤ Var. *LATISQUAMA* Greenman, foliis majoribus usque ad 5 cm. longis 3.5 cm. latis; capitulis paulo majoribus 30–35-floris; involucri squamis anguste lanceolati-oblongis purpurascens obtusis vel apice rotundatis et mucronulatis. — Proc. Am. Acad. xl. 35 (1904). — In collibus prope Etzatlan, Jalisco, *Pringle*, n. 8773.

➤ 6. *B. LAXIFLORA* Brandegee, annua crispe puberula diffuse oppositiramea, ramis patente adscendentibus gracilibus; foliis late ovatis vel deltoideo-ovatis tenuibus grosse crenatis vel plus minusve argute dentatis utrinque tenuiter pubescentibus vel glabriusculis basi truncatis vel late cordatis ad insertionem petioli saepe breviter cuneatis apice saepe obtuso et dentibus plerisque posticis cum setis munitis; foliis caulinis 4–6 cm. longis 3–5 cm. latis graciliter ad 2.5 cm. longe petiolatis, ramealibus multo minoribus nunc ovato-oblongis nunc triangulari-lanceolatis 3–5 mm. longe petiolatis; capitulis graciliter saepius longiuscule pedicellatis 9 mm. altis 4.5 mm. diametro ca. 23-floris; involucri squamis anguste lanceolatis vel linearibus attenuatis viridibus albo-striatis, interioribus ad 7 mm. longitudine; corollis achaenia longitudine subaequantibus tubulosis sine faucibus ullis distinctis; achaeniis in facie interiori 1-costatis in facie exteriori 2-costatis in costis et etiam saepe inter eas sursum hispidulis. — Univ. Calif. Publ. Bot. iv. 93 (1910). — PUEBLA: Coxcatlan, *Purpus*, n. 4128. OAXACA: in convalle praerupta Tomellin dicta, altitudine 915 m., *Pringle*, n. 5968; Cuicatlan, altitudine 550–600 m., *Pringle*, n. 5799, *E. W. Nelson*, n. 1868. SINALOA: prope Culiacan, *Schaffner*, *Brandegee*. ALAMOS: *Palmer*, n. 677 (anno 1890).

7. *B. brevipes*, sp. nov., oppositiramea; caule tereti purpurascens crispe pubescenti, internodiis folia multo superantibus; ramis elon-

gatis plus minusve flexuosis; foliis triangulari-ovatis late cordatis crenato-serratis apice et dentibus 1-3 latere utroque basin versus setigeris supra viridibus sparse pubescentibus subtus paulo pallidioribus in venis villosulis, caulinis ca. 3 cm. longis 2.5 cm. latis graciliter (praecipue inferioribus) petiolatis, ramealibus 1-2.5 cm. longis subsessilibus; capitulis ca. 18-21-floris numerosis brevissime pedicellatis vel subsessilibus in ramis paniculae longis flexuosis spiciformibus bracteatis interrupte dispositis; involucri squamis viridibus albo-costatis lanceolato-linearibus valde inaequalibus vix subuligeris, interioribus ca. 1 cm. longis; corollis gracillime tubulosis 4.3 mm. longis; achaeniis atrobrunneis valde compressis lineari-oblongis 3.6 mm. longis; pappi setis ca. 18 albis corollas aequantibus. — OAXACA: secundum viam ad Cuicatlan altitudine 2075-2380 m., 3 Oct. 1894, *E. W. Nelson*, n. 1520 (specimen typicum in herb. Grayano conservatum). Species capitulis subsessilibus facile diagnoscenda.

III. ON SOME HITHERTO UNDESCRIBED OR MISPLACED COMPOSITAE.

Microglossa mespilifolia (Less.), comb. nov, *Aster mespilifolius* Less. Syn. Comp. 180 (1832). *Nidorella mespilifolia* (Less.) DC. Prod. v. 321 (1836). *Microglossa mespiloides* Benth. & Hook. f. Gen. ii. 282 (1873), without express combination and with obvious clerical error as to the specific name; Hook. f. & Jacks. Ind. Kew. ii. 229 (1895).

Psiadia Boivini (Klatt), comb. nov. *Pluchea Boivini* Klatt, Ann. Sci. Nat. ser. 5, xviii. 369 (1873). As suspected by Cordemoy, Fl. de l'Île de la Reunion, 526 (1895), this species proves on examination of Dr. Klatt's type (now in the Gray Herbarium) to have the characters of a *Psiadia* and not of a *Pluchea*. The anthers, for instance, are entire and rounded at the base and not caudate. Whether or not Cordemoy's *Psiadia Frappieri* may prove a synonym is a point which cannot be determined from description alone. In any event, however, the earlier specific name of Klatt would have to prevail.

Pluchea rubelliflora (F. v. Muell.), comb. nov. *Eyrea rubelliflora* F. v. Muell. Linnaea, xxv. 403 (1852-53). *Pluchea Eyrea* F. v. Muell. Rep. Babb. Exp. 11, 12 (1858); Benth. Fl. Austral. iii. 528 (1866). — The restoration of von Mueller's earlier specific name becomes necessary under the International Rules of Nomenclature.

Rutidosis multiflora (Nees), comb. nov. *Styloncerus multiflorus* Nees in Lehm. Pl. Preiss. ii. 244 (1846-47). *Pumilo argyrolepis* Schlecht. Linnaea, xxi. 448 (1848). *Actinopappus perpusillus* Hook. f.

and *A. Drummondii* Gray in Hook. Jour. Bot. and Kew. Misc. iv. 226 (1852). *Pumilo Preissii* Sonder, Linnaea, xxv. 487 (1852-53). *Rutidosia Pumilo* Benth. Fl. Austral. iii. 595 (1866). It is obvious that Bentham's specific name *Pumilo*, though long current, cannot stand under the International Rules, since it is antedated by several other names. Of the various designations under which the plant has been described, Nees's *Styloncerus multiflorus* bears the earliest date. It was published in the second fascicle of the second volume of Lehmann's *Plantae Preissianae*, and the preface of this volume, which included three fascicles, was dated November, 1847. Meisner under date of July, 1848, speaks (*Flora*, 1848, p. 496) of the second and third fascicles of the second volume of Lehmann's work as just issued, an expression, which at least so far as it concerns the second fascicle presumably means sometime during the spring or early summer of 1848. Schlechtendal's *Pumilo argyrolepis* was also published in 1848, a circumstance raising no small doubt as to the relative priority of these names. Yet it is to be noted that on a preceding page of his paper (*Linnaea*, xxi. 444) Schlechtendal refers to an article in the issue of the *Botanische Zeitung*, dated 26 May, 1848, proving that Schlechtendal's own publication must have been distinctly later. Indeed, it is shown therein that in the meantime added plants had been found by one of his correspondents, had been sent for identification, were studied, described, and the descriptions had reached print, all of which is not likely to have happened between the end of May and July, when as stated by Meisner fascicles 2 and 3 of the second volume of the *Plantae Preissianae* had already been issued (at what previous date we do not know). There is certainly nothing to show that the paper of Schlechtendal preceded that of Nees. In default of such evidence, precedence may be determined by the second clause of Article 39 of the International Rules, which reads: "In the absence of proof to the contrary the date placed on the work containing the name or combination of names is regarded as correct." This, in the case of Nees's *Styloncerus multiflorus* is, as we have seen, "1846-47," while with Schlechtendal's *Pumilo argyrolepis* it is 1848.

ORIGIN AND IDENTITY OF PHARETRANTHUS. The genus *Pharetranthus* Klatt, published in *Flora*, lxviii. 203 (1885), was founded on specimens collected by Hugh Cuming (no. 2454). These were supposed to have come from the Philippine Islands both by Klatt, who described them, and by Schultz Bipontinus, who seems to have made a preliminary examination of them. The genus was tentatively placed in *Coreopsis* by O. Hoffmann in *Engl. & Prantl, Nat. Pflanzenf.* iv. Ab. 5, 243 (1890), an opinion which he later — *l. c.* iv. Ab. 5, 390 (1894),

and Nachtr. zu iv. Ab. 5, 325 (1897)—revised by referring *Pharetranthus* Klatt to *Petrobium* R. Br. While the name *Petrobium* R. Br. must, according to the International Rules of Nomenclature, give way to the earlier and adequately published name of *Laxmannia* Forst. & Forst. f., the identity of *Pharetranthus*, supposedly of the Philippine Islands, with this peculiar monotypic genus, of the island of St. Helena, presents a taxonomic and geographic problem which seems never to have been discussed. Such an identity is certainly improbable on phytogeographic grounds, especially in the case of a species wholly unknown from intermediate localities. Dr. Klatt's type of his *Pharetranthus ferrugineus* is preserved in the Gray Herbarium, and in fact appears to be identical with *Laxmannia* Forst. & Forst. f., the "White-wood Cabbage-tree" of St. Helena. Examination of accessible works on the Philippine flora, including Mr. Elmer's recent enumeration of the *Compositae* of the Philippine Islands, fails to show any record of the species in question. Under these circumstances it seems highly probable that there was some confusion of labels or other slip or error in attributing the plant of Cuming to the Philippine Archipelago. In this connection it is to be noted with interest that on his return voyage Hugh Cuming stopped at St. Helena, where it is more than likely that he obtained the material upon which Dr. Klatt later founded his genus *Pharetranthus*. At all events such an origin would appear to be a permissible assumption or at least a justifiable working hypothesis until the plant can be re-discovered in the Philippine Islands if this ever happens. The synonymy of the species in question is as follows:

LAXMANNIA ARBOREA Forst. & Forst. f. Char. Gen. 94, t. 47 (1776). *Spilanthus arborea* (Forst. & Forst. f.) Forst. f. Com. Hort. Goett. ix. 67 (1787). *Spilanthus tetrandra* Roxb. in Beatson's Tracts, 301 (1816), which was the sterile plant, and *Bidens arborea* Roxb. l. c. (1816), which was the corresponding fertile plant. *Petrobium* R. Br. Trans. Linn. Soc. xii. 113 (1816). *P. arboreum* R. Br. ex DC. Prod. v. 502 (1836). *Drimyphyllum Helenianum* Burch. ex DC. l. c. (1836). *Pharetranthus ferrugineus* Klatt, Flora, lxxviii. 204 (1885).

TRAGOCERAS SCHIEDEANUM Less. Linnaea, ix. 269 (1834). To the synonymy of this species should be added *Baltimora monocephala* Klatt, Ann. k. k. Naturh. Hofmus. Wien, ix. 360 (1894), a species founded upon a specimen collected by Knechtel at Chapultepec, Mexico, and now in the Gray Herbarium. The identity appears first to have been noted by Dr. J. M. Greenman, but seems not to have been hitherto recorded in print.

Monactis subdeltoidea, sp. nov., fruticosa ramosa; ramis flexuosis crassiusculis subteretibus vix striato-angulatis brunnescentibus tomen-

tellis, indumento e pilis multicellularibus tenuissimis plus minusve inter se implexis composito; foliis alternis subdeltoideo-ovatis acutis nec acuminatis basi subtruncatis glandulari-denticulatis (glandulis inter se 3-5 mm. distantibus) supra tenuiter sed densiuscule pubescentibus subtus molliter tomentosus canescentibus, lamina 5-6 cm. longis 3-3.5 cm. latis paulo supra basin 3-nervata; petiolo cuneato-alato ca. 1.2 cm. longo ad insertionem laminae usque ad 7 mm. latitudine expanso; inflorescentia planiuscula multicapitulata, bracteis lanceolatis subsessilibus; capitulis radiatis 7 mm. altis, disco ca. 7 mm. diametro; involucri campanulati squamis sub-triseriatim imbricatis arcte appressis ovato-oblongis obtusis sordide lanoso-tomentosis; flosculis radialibus ca. 6 ♀, ligulis late oblongis vel ellipticis apice brevissime 3-dentatis 5-7 mm. longis 3-3.6 mm. latis laete flavis, tubo ca. 1.5 mm. longo plus minusve piloso; flosculis disci ca. 25 ♀, corollis flavidis, tubo 1.5 mm. longo faucibus subcylindricis 2 mm. longis, limbi dentibus 5 breviter triangularibus; achaeniis immaturis prismaticis 2.7 mm. longis omnino calvis glabriusculis. — On banks of the Machangara River, near Quito, Ecuador, 2750 m. altitude, 21 January, 1856; *W. Jameson*, no. 162 (type, in Gray Herb.). From the original *M. flaverioides* HBK. of Venezuela, as well as from the recent *M. Jelskii* Hieron. of Peru, the present species differs in its many-flowered heads, the disk-flowers being about 25, while in *M. flaverioides* they are said to be 5-10 and in *M. Jelskii* they are 6-7. Furthermore, the form of the leaf in the Ecuadorean plant is very different from either of the other species, the blade being more nearly deltoid with a truncate base somewhat sharply distinguishable from the cuneately winged petiole.

➤ *Montanoa tehuacana*, sp. nov., fruticosa vel arborescens 3-5 m. alta ramosa; ramis plerisque oppositis divergentibus arcuato-adscendentibus foliosis leviter striatis tenuissime puberulis juventate brunneis deinde griseis; foliis oppositis, supra pallide viridibus scabris et cum pilis brevissimis basi incrassatis munitis, subtus canescenti-tomentellis reticulato-venosis, inferioribus 2 dm. longis 1.6 dm. latis patente trilobatis, lobis lateralibus latis crenato-angulatis, lobo terminali variabili vel obtuso vel acuto vel etiam acuminato in eodem specimine, petiolo usque ad 8 cm. longo in parte superiori cuneato-alato; foliis superioribus, i. e. ramulorum floriferum obovato-oblongis firmissimis obtusis supra rugosis ca. 4 cm. longis ca. 1.5 cm. latis obsolete crenulato-serratis basi brevissime petiolatis et (supra petiolum) cordato-biauriculatis, auriculis rotundatis; capitulis laxe corymbosis graciliter pedicellatis ca. 3 cm. diametro (ligulis inclusis); involucri squamis ovato-lanceolatis anthesi ca. 6 mm. longis griseo-tomentellis; paleis basi late ovata membranacea pallida in apicem longum spinosum

patentem abrupte contractis.—Tufa bluffs near Tehuacan, Puebla, Mexico, 1680 m. altitude, 7 August, 1901, *C. G. Pringle*, no. 8585 (type, in Gray Herb.); in the vicinity of San Luis Tultitlanapa, Puebla, near Oaxaca, August, 1908, *C. A. Purpus*, no. 3105 (Gray Herb.) and no. 3104 (Gray Herb.). The last-mentioned specimen has the upper leaves closely sessile instead of being provided with the usual very short wingless petioles beneath the auricles, but the plant is otherwise so closely identical that it must be inferred that this variation is merely formal and trifling. The affinity of the species is clearly with *M. Pringlei* Robinson & Greenman, Proc. Am. Acad. xxxiv. 512 (1899), which, however, has leaves of quite a different type of serration and the involucre bracts of a peculiar obovate-spatulate form.

LEPIDESMIA SQUARROSA Klatt, Bull. Herb. Boiss. iv. 479, t. 7 (1896). This species, the type of a newly distinguished as yet monotypic genus, was founded upon a plant collected in dry places at Caimanera, Cuba, by von Eggers, May, 1889 (no. 5439). Dr. Klatt was inclined to regard his genus as being of the *Eupatorieae Ageratinae* and very nearly related to *Aschenbornia*. Hoffmann in Engl. & Prantl, Nat. Pflanzenf. Nachtr. 321, 322 places *Lepidesmia* next *Ageratum* and distinguishes it from that genus chiefly by the more imbricated involucre scales. However, even a cursory inspection of the type of *Lepidesmia*, as represented by fragments in the herbarium of the late Dr. Klatt, led the writer to believe that the plant could not belong among the *Eupatorieae*, and a careful dissection has shown that the style-branches, instead of having the clavate unappendaged form found in the *Eupatorieae*, are divided into a basal rather short thickish and somewhat compressed portion surmounted by a rather elongated attenuate and papillose appendage in the manner of many *Heliantheae*. In fact, it seems probable that the genus should be placed near *Isocarpha* R. Br. In habit, as well as in technical characters, it is not very unlike *I. oppositifolia* R. Br., which also possesses opposite leaves, which are lanceolate and sessile, glomerate heads with subscarios involucre and chaffy receptacle. However, the distinct pappus, much smaller heads, and flattish receptacle furnish ample generic distinctions.

IOSTEPHANE TRILOBATA Hemsl. Biol. Cent.-Am. Bot. ii. 169 (1881). With this species the following appear to be identical: *Rudbeckia chrysantha* (Sch. Bip.) Klatt, Leopoldina, xxiii. 143 (1887), page 3 of reprint, and *Echinacea chrysantha* Sch. Bip. acc. to Klatt, l. c. (1887), page 4 of reprint. The species of Schultz Bipontinus seems never to have been described until taken up and transferred to *Rudbeckia* by Klatt. It rested upon Liebmann's no. 575, collected at Cubre de Estepa, Mexico. In the herbarium of the late Dr. Klatt, a collection

now incorporated in the Gray Herbarium, there is a single head and an excellent sketch of Klatt's type, both of which clearly show the species to have been an *Iostephane*, identical so far as can be seen with the earlier *I. trilobata* of Hemsley. Here also should be placed, as it appears, the recently published *Gymnolomia scaposa* Brandegee, Univ. Calif. Publ. Bot. iv. 93 (1910).

Perymenium Peckii, sp. nov., fruticosum gracile 3-9 m. altum in plantis adjacentibus se suffulciens quasi scandens; caule tetragono scabro in speciminibus siccatis 4-sulcato brunneo, internodiis 4-5 cm. longis; foliis oppositis lanceolatis tenuibus graciliter petiolatis acuminatis obscure et remote serrulatis 3-nerviis basi rotundato-subacutis 5 cm. longis 1.5 cm. latis supra viridibus minute et adpresse pilosis subtus distincte pallidioribus molliter pubescentibus fere tomentosus non solum in nerviis sed etiam inter eas; petiolo 7-9 mm. longo; panicula oppositiramea ovoidea foliaceo-bracteata 1.3 dm. longa 1 dm. diametro, ramis curvato-adscendentibus, corymbulis ca. 2 cm. diametro 5-7-capitulatis, pedicellis gracilibus 2-8 mm. longis; capitulis ca. 5-radiatis 6 mm. altis; involucri ovoidei squamis inaequalibus late ovatis obtusis strigillosis; ligulis albidis apice profunde 2-3-dentatis vel etiam lobatis ca. 4 mm. longis fertilibus; flosculis disci ca. 15; achaeniis valde immaturis compressis oblanceolatis; pappi aristis ca. 10 valde inaequalibus stramineis scabridis. — In openings in the forest, British Honduras, *Prof. Morton E. Peck*, no. 284 (type, in Gray Herb.). This species is most nearly related to *P. microcephalum* Sch. Bip., which, however, has longer bright yellow ligules nearly entire at the tip, and leaves of a very different pubescence, the lower surface being nearly smooth except along the strigillose nerves.

VERBESINA CARACASANA Robinson & Greenman, Proc. Am. Acad. xxxiv. 559 (1899). This species, hitherto known only from Venezuela, may be recorded from Colombia, where it was collected in Santa Marta, November, 1898-1901, altitude 460 m., by *H. H. Smith*, no. 510 (Gray Herb.). Mr. Smith's specimen examined is immature (still in bud), but shows clear identity with the Venezuelan plant. It was distributed as *V. diversifolia* DC., a species which has alternate leaves and many other differences.

Verbesina columbiana, sp. nov., ubique griseo-puberula verisimiliter herbacea alta robusta; caule teretiusculo exalato striato-angulato medullosa; foliis alternis pinnatifidis 2-3 dm. longis 1.2-1.7 dm. latis utrinque griseo-viridibus dense et scabriuscule puberulis, lobis ca. 7, oblongis vel oblongo-lanceolatis acuminatis serrulatis 1-7 cm. longis 0.7-2.5 cm. latis; petiolo 6-8 cm. longo bialato 1.5-1.7 cm. latitudine basi biauriculato; inflorescentia composita corymbosa plana

2.5 dm. diametro multicapitulata griseo-tomentella, pedicellis filiformibus 6–8 mm. longis; capitulis ovoideo-subglobosis ca. 38-floris anthesi ca. 5 mm. diametro; involucri squamis oblongis acutis vel acuminatis pallidis dorso molliter puberulis, extimis multo brevioribus apice obtusiusculis vel etiam rotundatis crassiusculis nigrescentibus; flosculis liguliferis ca. 5 pistilliferis, ligulis albis subquadratis 3-dentatis 2.5 mm. longis, tubo 2 mm. longo tomentello; corollis disci 3.5 mm. longis, tubo et faucibus tomentellis; acheniis obovatis late bialatis, faciebus plus minusve in media parte carinatis sursum scabridis vel tuberculatis, pappi aristis 2 subaequalibus. — Santa Marta, Colombia, December, 1898–1901, altitude 75 m., *H. H. Smith*, no. 671 (type, in Gray Herb.); also from the banks of the Magdalena River, Quematido, Colombia, 5 December, 1875, *André*, no. 222 (Gray Herb.). The latter specimen is said to have been herbaceous and 3–5 m. high. Mr. Smith's plant was distributed as *V. gigantea* Jacq., but it differs from that species of the Antilles in having heads about 38-flowered instead of about 20-flowered, in having broadly winged achenes, and in details of foliage and involucre. The related *V. myriocephala* Sch. Bip. of Mexico also has smaller subcylindric about 20-flowered heads and narrowly winged achenes.

Verbesina costaricensis, sp. nov., herbacea vel basi lignescenti alta; caule teretiusculo leviter striato-angulato glabro exalato purpurascenti glaucescenti medullosa; foliis alternis magnis longipetiolatis profunde pinnatifidis 1.5–2 dm. longis 1–1.4 dm. latis supra dense scabro-pubescentibus atroviridibus subtus pallidioribus molliter pubescenti-tomentellis, lobis ca. 11 lanceolato-oblongis acuminatis obsolete subremoteque serrulatis 7–10 cm. longis 2–3.5 cm. latis, rhachi alato 1–1.3 cm. lato, sinibus rotundatis; corymbis compositis terminalibus planiusculis multicapitulatis 1.5 dm. diametro basi foliaceo-bracteatis; capitulis obovoideis discoideis 8 mm. altis 5 mm. diametro; involucri squamis exterioribus valde inaequalibus anguste oblongis apice subherbaceis nigrescentibus rotundatis vel vix mucronulatis 1–4 mm. longis interioribus subaequalibus ca. 6 mm. longis tenuibus diaphanis acutiusculis glabriusculis margine erosis; flosculis liguliferis nullis, eis disci ca. 21; corollis 3.6 mm. longis, tubo proprio plus minusve constricto strigilloso brevi, faucibus cylindricis tubo duplo longioribus, limbi dentibus oblongo-lanceolatis; achaeniis compressis oblanceolatis sursum hispidulis basin versus attenuatis tenuiter costatis marginatis vix alatis; pappi aristis saepius 3 achaenium subaequantibus duabus inter se continguis in angulo interiori, tertia eis opposita. — *V. nicaraguensis* J. D. Sm. Enum. Pl. Guat. v. 44 (1899), not Benth. — Rio Virilla, San José, Costa Rica, altitude 1100 m., December, 1895, *Ad. Tondusa*

no. 9833 herb. nat. Cost. (= no. 7068 distrib. J. D. Sm.). This plant is clearly distinct from *V. nicaraguensis* Benth., which has 8-10-rayed heads, widely winged achenes, and a different leaf-contour.

Verbesina gigantoides, sp. nov., robusta alta; caule crasso teretiusculo purpurascenti glaberrimo plus minusve pruinoso intus cum medulla alba constipato; foliis alternis pinnatifidis longe petiolatis firmissimis supra glaberrimis lucidulis plus minusve ruguloso-bullatis subtus olivaceis molliter pubescentibus 2-3 dm. longis 1-2.5 dm. latis, rhachi alata ca. 2 cm. lata, lobis ca. 11 lanceolatis caudato-attenuatis saepe falcatis integerrimis vel obscure undulatis 8-15 cm. longis 2.5-4 cm. latis, infimis reflexis; sinibus rotundatis; petiolo teretiusculo purpurascenti glaberrimo omnino exalato; panicula ampla valde convexa pubescenti; bracteolis lineari-filiformibus; pedicellis 3-6 mm. longis; capitulis numerosissimis 5 mm. diametro 7 mm. altis ca. 20-floris; involucri squamis obovato-vel oblanceolato-oblongis abrupte acutiusculis margine ciliata excepta glabriusculis; flosculis liguliferis ca. 4-5 pistilliferis; ligulis albis oblongis 3.5 mm. longis apice leviter 3-dentatis; flosculis disci ca. 15, corolla albida subcylindrica, tubo pubescenti, limbi dentibus 5 oblongo-lanceolatis; antheris linearibus nigrescentibus vix connatis; achaeniis 3.5 mm. longis pyriformibus anguste alatis deorsum valde attenuatis, alis ciliato-laceris, pappi aristis 2 subaequalibus ca. 2 mm. longis. — *V. gigantea* Robinson & Greenman, Proc. Am. Acad. xxxiv. 561 (1899), in part, not Jacq. — From near Yajalon, Chiapas, Mexico, 21 November, 1895, *E. W. Nelson*, no. 3423 (type, in Gray Herb.). This is one of several habitually similar plants, which have been in a preliminary way referred to *V. gigantea* Jacq. Happily, through the careful definition and segregation of the West Indian species by Prof. Urban, Symb. Ant. v. 264-265 (1907), it has become possible to interpret more definitely the continental forms of this group.

Verbesina leucactinota, sp. nov., perennis verisimiliter herbacea robusta alta griseo-tomentella; caule subtereti leviter striato exalato; foliis alternis pinnatifidis supra viridibus scabriusculo-puberulis subtus molliter griseo-tomentellis 2 dm. vel ultra longitudine 1.3 dm. latis saepius 9-lobis; lobis lanceolatis 4-7 cm. longis attenuatis 1.3-2.3 cm. latis, sinibus rotundatis; petiolo late bialato basi cum auriculis magnis amplexicauli sed alis in caule non decurrentibus; inflorescentia paniculata magna valde convexa; bracteis foliaceis anguste lanceolato-oblongis acutis integris 4-8 cm. longis ca. 1 cm. latis basi biauriculatis; capitulis ca. 27-floris conspicue radiatis; flosculis liguliferis ca. 5; ligulis ellipticis albis breviter apice 3-dentatis 4 mm. longis; corollis disci albidis 3 mm. longis; antheris nigrescentibus conspicue exsertis;

achaeniis valde immaturis oblanceolatis; pappi aristis 2 subaequalibus achaenium subaequantibus. — *V. diversifolia* Britton, Bull. Torr. Bot. Club, xix. 150 (1892), not DC. — Coripati, Yungas, Bolivia, April, 1894, *Bang*, no. 2135 (type, in Gray Herb.). Though doubtfully referred to *V. diversifolia* DC. by Robinson & Greenman, Proc. Am. Acad. xxxiv. 562 (1899), this plant with wingless stem and about 9-lobed leaves now seems clearly distinct from that Brazilian species. It is nearer *V. gigantea* Jacq., from which, however, it differs in its more numerous rays, more strongly auriculate petioles, harsher pubescence, and in many other details. From *V. columbiana*, here described, it differs in its smaller less numerous flowered heads, more developed rays, etc. It is also near *V. myriocephala* Sch. Bip. of Mexico, but differs in its more convex inflorescence, scabrous-puberulent stem, narrow elongate and entire bracts, etc.

Verbesina (§ Lipactinia) oligantha, sp. nov., fruticosa 2-3 m. alta; caule teretiusculo exalato griseo scabrido-puberulo aetate lenticellis parvis late ellipticis brunneis aspero; foliis oppositis rhomboideo-ovatis 1.2-1.6 dm. longis 5-7 cm. latis acuminatis serratis basi cuneatis integris utrinque viridibus scaberrime puberulis, nerviis lateralibus principibus 3-4 plus minusve ex eodem loco (2-3 cm. supra basin) oriuntibus, ceteris remotioribus et pinnatim locatis; petiolo 1-1.5 cm. longo crispe et scabride puberulo; cymis compositis planis multicapitulatis densiusculis basi foliaceo-bracteatis, pedicellis filiformibus erectiusculis 1-7 mm. longis; capitulis 12 mm. altis 4 mm. diametro saepissime 7-floris; involucri squamis valde inaequalibus, exterioribus multo brevioribus ovatis 2-3 mm. longis interioribus oblongis abrupte acuminatis 6 mm. longis flosculos amplectentibus; corollis omnibus tubulosis flavis; achaeniis valde compressis oblanceolatis olivaceis in faciebus paulo pubescentibus apicem versus angulo interiori anguste alatis. — In granitic soil, Jimalcota, Mexico, altitude 300 m., 18 November, 1898, *E. Langlassé*, no. 644 (type, in Gray Herb.). It is clear that this species is closely related to *V. pauciflora* Hemsl. but it differs markedly in its less conspicuous but more scabrous pubescence, its broadly rhombic-ovate leaves, and in its less herbaceous much smoother involucre.

Calypocarpus blepharolepis, sp. nov., annuus prostratus multicaulis et fere a basi patente oppositirameus; caulibus ramisque gracilibus teretibus striatulis flexuosis cum pilis albis hirsutulo-pubescentibus plerumque bis bifurcatis; internodiis saepe longissimis; foliis oppositis petiolatis spatulato-obovatis integris apice rotundatis mucronulatis utrinque cum pilis albis basi incrassatis strigosis 2-2.5 cm. longis 1.1-1.4 cm. latis subtus distincte pallidioribus, petiolis 1 cm. longis hir-

sutis; capitibus in bifurcis arcte sessilibus 1.4 cm. diametro multifloris; involucri squamis oblongis biserialim imbricatis subaequalibus abrupte acuminatis dorso glabriusculis leviter striatis margine conspicue albociliatis; flosculis liguliferis ca. 8, ligulis brevissimis ovatis crassiusculis albidis viridi-striatulis vix 1.5 mm. longis pistilliferis, achaenio striatulo glabriusculo exalato apice longiuscule divaricatim 3-aculeato; pappi aculeis ca. 3 mm. longis; disci flosculis numerosis, achaeniis muricatis. — Tensaw, Alabama, 18 August, 1904, *S. M. Tracy*, no. 8946 (type, in Gray Herb.). This plant, distributed as *Calyptracarpus tampicanus* Small, differs markedly from that species in its spatulate-obovate leaves, larger closely sessile heads, and especially in its involucreal scales. These are dorsally nearly glabrous but on the edges conspicuously ciliate, while in *Calyptracarpus vialis* Less. (*Oligogyne tampicana* DC., *Calyptracarpus tampicana* Small) the condition is reversed, that is to say the involucreal scales are dorsally strigose-pubescent but the margin nearly or quite free from ciliation. The discovery of a second and clearly distinct species of the hitherto monotypic *Calyptracarpus* is of interest. From the weedlike nature and wide distribution of its Texano-Mexican congener, there must be some doubt whether the plant here described will prove really indigenous in its Alabama habitat, or whether it may not ultimately be found to be an introduction from some other region.

Balduina angustifolia (Pursh), comb. nov. *Bupthalmum angustifolium* Pursh, Fl. ii. 564 (1814). *Actinospermum angustifolium* (Pursh) Torr. & Gray, Fl. ii. 389 (1842). The distinctions by which some recent efforts have been made to separate the genera *Actinospermum* and *Balduina* do not appear to the writer to be of generic validity. The genera being united, priority of specific name requires the new combination here proposed.

Senecio fimbriifera (Cass.), comb. nov. *Eupatorium auriculatum* Lam. Encyc. ii. 411 (1786), a specific name not available because of *Senecio auriculatus* Burm. f. Fl. Ind. 181 (1768). *Eupatorium scandens* Link, Enum. ii. 307 (1822) according to Lessing, Syn. Comp. 392 (1832), this name also not available because of the now valid homonym *Senecio scandens* Buch.-Ham. ex D. Don, Prod. Fl. Nepal. 178 (1825). *Cacalia scandens* Buch.-Ham. ex D. Don, Prod. Fl. Nepal. 178 (1825). *Cacalia fimbriifera* Cass. Dict. xlviii. 460 (1827). *Senecio deltoideus* Less. Syn. Comp. 392 (1832). *Mikania auriculata* Willd. Sp. Pl. iii. 1745 (1804).

Senecio pyrifolius (Bojer), comb. nov. *Trixis pyrifolia* Bojer ex DC. Prod. v. 195 (1836). *Mikania pyrifolia* DC. l. c.; Klatt in Engl. Bot. Jahrb. xii. Beibl. 27, p. 22 (1890). *Senecio curvatus* Bak. Jour. Linn Soc. xx. 190 (1883). The identity of *Mikania pyrifolia* (Bojer) DC.

and the much later *Senecio curvatus* Bak. was recently noticed by the writer on successively examining the types preserved in the DeCandollean and Kew herbaria respectively. The identity appears to have been previously inferred by Dr. F. W. Klatt, for after determining Hildebrandt's no. 3626 as *Mikania pyrifolia* in Engl. Bot. Jahrb. xii. Beibl. 27, p. 22 (1890), he later cites the same number as *Senecio curvatus* Bak. in Ann. k. k. Naturh. Hofmus. Wien, vii. 299 (1892). Although the name *Senecio pyrifolius* was used in manuscript by von Martius for a Brazilian species, it was published only as a synonym of *Senecio ellipticus* DC. Prod. vi. 420 (1837) by Baker in Mart. Fl. Bras. vi. pt. 3, 318 (1884). This use of the name, especially as unaccompanied by independent description and therefore incapable of revival, seems in no way to preclude the new combination here made for the plant of Madagascar.

Saussurea baicalensis (Adams), comb. nov. *Liatris baicalensis* Adams, Mém. Soc. Nat. Mosc. v. 115 (1817). *Carphephorus baicalensis* DC. Prod. v. 132 (1836). *Saussurea pycnocephala* Ledeb. Ic. Fl. Ross. i. 15, t. 59 (1829), Fl. Alt. iv. 14 (1833), & Fl. Ross. ii. 661 (1845-46), which see for detailed synonymy. As Adams's original description of this species is excellent and detailed there seems no reason why according to present nomenclatorial rules the earliest though long-neglected specific name should not be restored as indicated above. The association of the species with *Liatris*, to which it has considerable habitual resemblance, was not unnatural at a time when the relatively obscure tribal distinctions of the *Compositae* were unknown.

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