STUDIES OF MEXICAN AND CENTRAL AMERICAN PLANTS—NO. 6.[a]

By J. N. Rose.

INTRODUCTORY NOTES.

This paper consists largely of descriptions of new species found in the process of naming large collections from Mexico, or in revising various genera of Mexican plants. It forms the sixth of this series and differs little in its scope from previous ones. The collections studied have been chiefly those mentioned in my last paper, together with material received during the year 1906. A somewhat detailed account of my sixth journey through Mexico will not be out of place here.

On July 26 I was authorized by Dr. R. Rathbun, Assistant Secretary in charge of the National Museum, to proceed to Mexico for the purpose of continuing my botanical explorations there. By the kindness of Dr. N. L. Britton, Director of the New York Botanical Garden, who placed a generous sum from the Garden funds at my disposal, I was enabled to take an assistant with me from Washington. I left Washington August 1 accompanied by my son, Joseph S. Rose, for the city of Mexico. En route for that city I made short stops at San Antonio and Laredo, Texas, where small collections were obtained. The City of Mexico was reached August 10, and for several days thereafter I was engaged in establishing suitable headquarters in that city. Some time was also spent at the herbarium of the Instituto Medico Nacional, where every facility was given to help me in my work. A short trip was also made during this time to the pedregal near Tlalpam, where a number of cacti and ferns were obtained. In the city of Mexico I was joined by Dr. C. G. Pringle and his assistant, Filemón Lozano, who accompanied me on various side trips. From the City of Mexico short trips were made to Cuernavaca, El Parque, Querétaro, Pachuca, and various places in the valley of Mexico, including one for water lilies to Lake Xochimilco. Toward the end of August I was joined in the city of Mexico by Dr. D. T. MacDougal and soon afterwards we changed our base to Tehuacán, Puebla. Here we explored the limestone hills on both sides of the town, making large collections

[a] Continued from Vol. X, p. 132, of the Contributions.

of herbarium specimens and selecting exhibition specimens of cacti, which were shipped to the New York Botanical Garden. From Tehuacán side trips were made along the tramway toward Esperanza and to Oaxaca city, and from the latter point Mitla was visited, where two days were spent in and about Tomellín Cañon. A short trip was made to Vera Cruz and also to Leon, after which I closed up my field work and returned to Washington.

The herbarium material collected contains more than 500 numbers (11001–11534), a full set of which has been mounted for the National Herbarium.

In addition to the herbarium material 236 specimens of seeds, bulbs, and succulents (chiefly cacti) were collected and sent to Washington. At the same time a nearly full set of the cacti was selected and shipped to the New York Botanical Garden. Many of these latter specimens were of immense size and form striking exhibition objects.

The following table will show in detail the places visited, the date of each visit, and the number of miles traveled in course of this trip:

ITINERARY.

1906.		Miles.
Aug.	10. City of Mexico to Tlalpam, Distrito Federal and return	15
	13. City of Mexico to Cuernavaca, by rail	74
	14. Cuernavaca to pedregal and return	16
	15. Cuernavaca to City of Mexico and return, by rail	74
	17. City of Mexico to El Parque and return, by rail	114
	20. City of Mexico to Querétaro, by rail	153
	24. Querétaro to City of Mexico, by rail	153
	31. City of Mexico to Tehuacán, by rail	208
Sept.	1. El Riego to hills east of Tehuacán and return	10
	3. Tehuacán to Oaxaca City, by rail	148
	5, 6. Oaxaca city to Mitla and return, by stage	70
	7. Oaxaca city to Santa Catalina, by train	45
	7. Santa Catalina to Tomellín station	22
	8. Tomellín to Tehuacán, by rail	81
	14. Tehuacan toward Esperanza and return, by tramway	30
	17. Tehuacan to Esperanza, by tramway	31
	17. Esperanza to Orizaba, by rail	30
	18. Orizaba to Vera Cruz, by rail	30
	20. Vera Cruz to City of Mexico, by rail	51
	23. City of Mexico to Pachuca, Hidalgo, by rail	61
	24. Pachuca to Sierra de Pachuca and return	10
	24. Pachuca to City of Mexico	61
	26. City of Mexico to Xochimilco and return	15
	28. City of Mexico to Leon Guanajuato, by rail	259
	29. Leon to San Luis Potosí, by rail	244

CYCADACEAE

A NEW SPECIES OF DIOON.

Dioon purpusii Rose, sp. nov.

Trunk short, crowned by numerous leaves, these often a meter or more long, stiff and ascending; petioles somewhat 4-angled; pinnæ 5 to 9 cm. long, stiff, pungent, towards the base, 1 to 1.5 cm. apart, above closely set, entire on the lower margin,

BEAUCARNEA GOLDMANII ROSE.

but usually with 1, 2, or rarely 3 sharp spine-like teeth on the upper margin; male cones 15 to 20 cm. long, the bracts with recurved ovate tips; female cones ovate, 44 cm. long by 20 cm. broad near the base; bracts very woolly, 10 to 15 cm. long; seeds about 4 cm. in diameter.

Collected by D. T. MacDougal and J. N. Rose, September 7, 1906, in Tomellín Cañon, Oaxaca (*Rose* 11352, type), and by C. A. Purpus in Sierra Mixteca, Puebla, in 1908.

Type U. S. National Herbarium no. 454142.

The specimens found by MacDougal and Rose were in a deep canyon well shaded by bushes and small trees. Both male and female cones were taken and also a living plant. The latter is now growing in the conservatory of the New York Botanical Garden, where also are preserved the cones. In 1908 Dr. Purpus collected seeds and bracts.

GNETACEAE.

A NEW SPECIES OF EPHEDRA.

I was much surprised to find an Ephedra on the desert plain about Tehuacán, as none had been reported farther south than San Luis Potosí. This one is so clearly distinct from those of northern Mexico that I do not hesitate to describe it as new.

Ephedra compacta Rose, sp. nov.

A low very compact shrub, 30 to 50 cm. high with many numerous short spinescent branches, at first light green but becoming very pale; leaves opposite, high-connate; male flowers not seen; fruit scales in pairs, high-connate, when mature forming a small red fleshy fruit; seeds 2.

Collected by J. N. Rose and J. S. Rose near Tehuacán, September, 1906 (no. 11274, type), and at same station by Rose and Painter, August and September, 1905 (no. 10023).

Type U. S. National Herbarium no. 454055.

Nearest *E. pedunculata* Engelm., but lower, of much more compact habit, and with paler and less fluted stems.

LILIACEAE.

A NEW SPECIES OF BEAUCARNEA.

Since publishing my enumeration of the species of Beaucarnea in volume 10, page 87, of this publication, an additional species has been sent me by Mr. E A. Goldman, of the Biological Survey, Department of Agriculture, which is here described:

Beaucarnea goldmanii Rose, sp. nov. PLATE XX.

Tall slender tree with swollen base; leaves hanging, 80 to 90 cm. long, 3 cm. broad at the base, 1 to 1.5 cm. broad a short distance above the base, tapering toward the apex into a long acumination 20 to 30 cm. long, smooth on both surfaces, the margin nearly or quite smooth; inflorescence a panicle 30 to 50 cm. long; pedicels 8 to 10 mm. long, jointed near the middle; fruit somewhat glaucous, 18 to 20 mm. long, broadly 3-winged, notched at base and apex.

Collected by E. A. Goldman at San Vicente, Chiapas, April 26, 1904 (no. 887).

Type U. S. National Herbarium no. 566461.

This species resembles somewhat *B. guatemalensis*, but has the leaves larger and the fruit narrower, glaucous, and less notched at apex.

EXPLANATION OF PLATE XX.—Two views of the type tree reproduced from photographs taken by Mr. E. A. Goldman. These are here used through the courtesy of the Biological Survey of the Department of Agriculture.

A NEW SPECIES OF BESCHORNERIA.[a]

Very little is known about the species of Beschorneria in Mexico itself, although I believe the genus is endemic to that country. All the species have been described from greenhouse material. In 1906 Dr. Pringle rediscovered *B. yuccoides* in the mountains above Pachuca and later in the season he took me to the locality, where I collected material both for the herbarium and for the greenhouse. While studying this material I reached the conclusion that certain material from San Luis Potosí, heretofore referred to *B. tubiflora*, represents a new species, and this is here described:

Beschorneria rigida Rose, sp. nov.

Leaves numerous, erect, rather rigid, 30 cm. long, 2 cm. or less broad, narrowing into a long acumination, roughened on both surfaces; inflorescence about a meter long; bracts 15 to 20 cm. long, large, purplish, each subtending 2 to 4 flowers; whole flower 4.5 cm. long; perianth segments dull in color, usually greenish yellow, somewhat scabrous; stamens shorter than the segments; capsule oblong in outline, 3 cm. long; seeds black.

The following specimens have been examined:

San Luis Potosí: Near Alvarez, Palmer & Parry, 1878 (no. 866); same station, Dr. E. Palmer, May, 1905 (no. 593, type).

Guanajuato: Near San Felipe, Dr. G Baroetta, 1904 (Economic herbarium U. S. Department of Agriculture).

The type is U. S. National Herbarium no. 570098.

This has heretofore been taken for *B. tubiflora*, but a careful reading of the original description of *Furcraea tubiflora* clearly excludes it. The leaves are narrower, erect, rough on both surfaces, the flowers more numerous and duller in color.

Dr. G. Barroetta, of San Luis Potosí, reports that this species is a fiber plant.

RAFFLESIACEAE.

THE NORTH AMERICAN SPECIES OF PILOSTYLES.

The first species of Pilostyles found in North America was collected by Dr. Geo. Thurber in 1850 in southwestern Arizona. Between that time and 1890 no additional species were found, but since the latter date much material, embracing several new species, has been received at the National Herbarium, especially from Mexico. Prof. Solms-Laubach, who monographed the genus in 1901, recognized but two species in North America.

The material now on hand contains 8 species, four of which are here first described. All our American species are found on three genera of Leguminosae.

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[a] A. Berger has recently published another new species: *Beschorneria pubescens* Berger, Monatsschr. Kakteenk. **17**: 1. 1907.

A list of these hosts and the localities from which they came is as follows:

HOSTS OF SPECIES OF PILOSTYLES.

Host.	Parasite.	Locality.
Parosela canescens Rose.	Pilostyles glomerata.	Tehuacán, Puebla.
Parosela emoryi (A. Gray) Heller.	Pilostyles thurberi.	Southwestern Arizona.
Parosela formosa (Torr.) Vail.	Pilostyles covillei.	Texas.
Parosela hospes Rose.	Pilostyles pringlei.	Near Monterey, Nuevo Leon.
Parosela leucostoma Rose.	Pilostyles palmeri.	San Luis Potosí.
Parosela microphylla Rose.	Pilostyles sp.	Sierra del Mesa, Hidalgo.
Parosela tuberculata Rose.	Pilostyles sessilis.	Hidalgo and Querétaro.
Bauhinia lunarioides A. Gray.	Pilostyles globosa.	Near Monterey, Nuevo Leon.
Calliandra grandiflora Benth.	Pilostyles mexicana.	Zacualpan, Vera Cruz.

The following are the North American species:

Pilostyles covillei Rose, sp. nov. FIGURE 20.

Similar to *P. glomerata*, but the flowers smaller (2 mm. long), style wanting, stamens in three rows; ovary slightly 4-lobed within; ovules covering the whole wall.

The host is *Parosela formosa* (Torr.) Vail.

Collected by Frederick V. Coville at Matador ranch, Dickens County, Texas, June 14, 1894 (no. 1860, type), between Big Springs and Dorwood ranch, Texas, June 19, 1904 (no. 1891).

Type U. S. National Herbarium no. 500506.

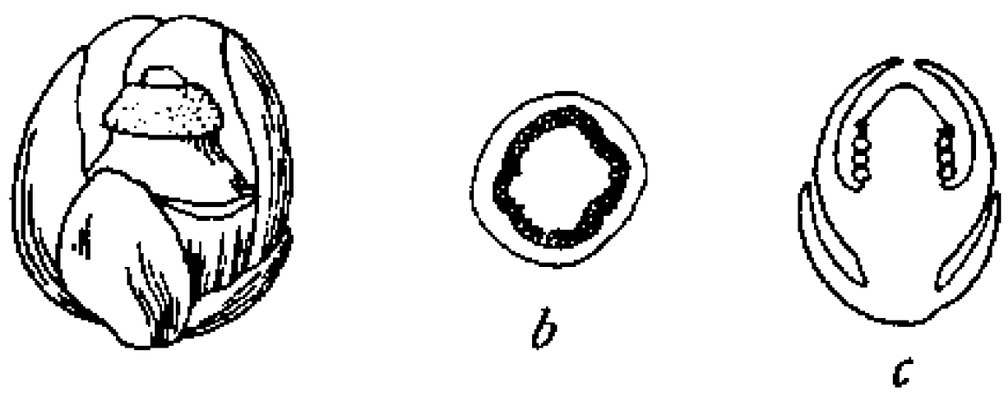


FIG. 20.—Flowers of *Pilostyles covillei*. *a*, Female flower, the ovary exposed; *b*, cross section of ovary; *c*, longitudinal section of male flower. Scale 6.

Pilostyles globosa (S. Wats.) Solms-Laub. in Engler, Pflanzenreich IV. **75**: 14. 1901.

Apodanthes globosa S. Wats. in Robins. Bot. Gaz. **16**: 84. 1901.

Host *Bauhinia lunarioides* A. Gr.

Pilostyles glomerata Rose, sp. nov. FIGURE 21.

Flowers 3 mm. long and nearly as broad at base; female flowers usually on separate host plants; bracts and sepals 4 each, dark brown with lighter margins, more or less unequal, orbicular to shortly oblong, rounded at apex; petals 4, purple, rounded at apex; style short but distinct, stigma cap large, bearing a small cone at apex; ovary one-celled, 4-lobed within, the inner surface covered with ovules; male flowers with similar bracts and perianth parts; stamen column short but distinct, with a broad rounded cap, anthers wanting (apparently few, as the band upon which they stand is very narrow).

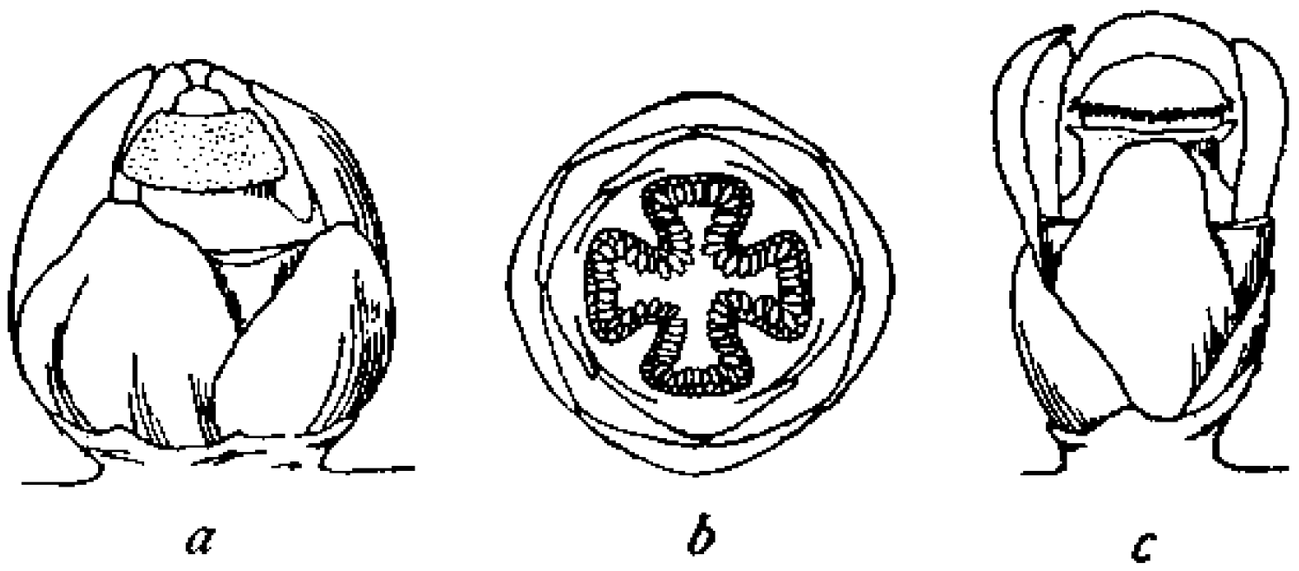


FIG. 21.—Flowers of *Pilostyles glomerata*. *a*, Female flower, the ovary exposed; *b*, cross section of same; *c*, male flower. Scale 6.

The host is a Parosela, perhaps *P. canescens* Rose.

Collected by Rose and Painter in two localities near Tehuacán, Puebla, September 1905 (no. 8942). This species was very common, but collectors might easily overlook it.

Type U. S. National Herbarium no. 453435.

The flowers occur in great masses on the lower parts of the stem and branches of the host, often retarding its growth and doubtless eventually causing its death.

Pilostyles mexicana (Brandeg.) Rose.

Apodanthes mexicana Brandeg. Zoe **5**: 244. 1908.

Host *Calliandra grandiflora* Benth.

Pilostyles palmeri Rose, sp. nov. FIGURE 22.

Somewhat similar to *P. glomerata*, but flowers smaller (2 mm. long), the bracts and sepals deep purple, the petals nearly white or tinged with pink, the style sessile, the ovary with the 4 placentas hardly indented, and the ovules borne in definite lines.

Only the female flowers are known.

The host plant is also a Parosela, probably *P. leucostoma* Rose.

Collected by Dr. E. Palmer near Alvarez, San Luis Potosí, May, 1905 (no. 584).

Type U. S. National Herbarium no. 570088.

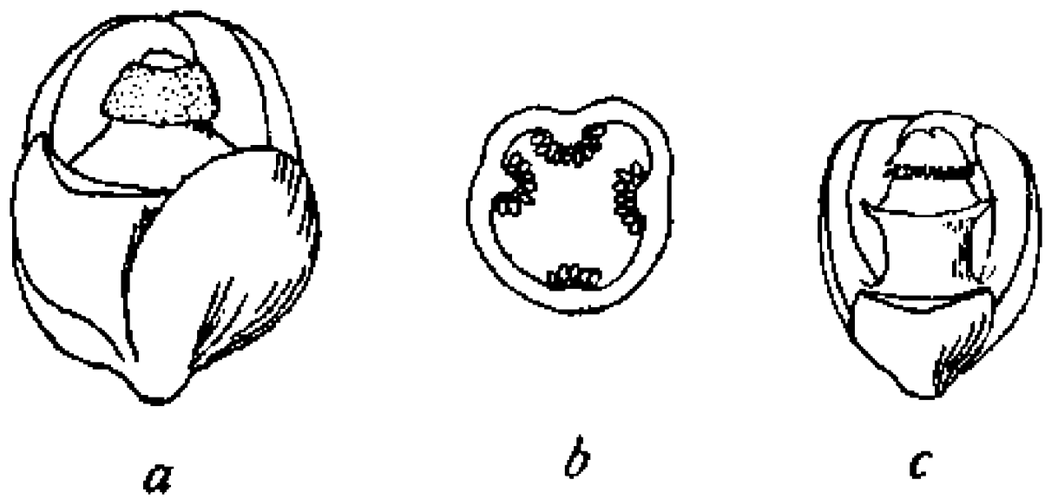


FIG. 22.—Flowers of *Pilostyles palmeri*. *a*, Female flower, the ovary exposed; *b*, cross section of ovary; *c*, male flower, interior exposed. Scale 6.

Pilostyles pringlei (S. Wats.) Rose.

Apodanthes pringlei S. Wats. in Robins. Bot. Gaz. **16**: 83. 1891.

Host *Parosela hospes* Rose.

Pilostyles sessilis Rose sp. nov. FIGURE 23.

Similar to *P. glomerata*, but bract and sepals deep purple, stigma sessile, inside walls of the capsule irregularly rugose, covered with seeds throughout.

The male flowers also have a sessile column and the stamens form a broad band of 4 rows.

The male flowers are described from specimens collected by Mr. Rose near Ixmiquilpan, Hidalgo, in 1905 (no. 9041). Only a single plant infested by this parasite was here found, although diligent search was made for others. The female flowers

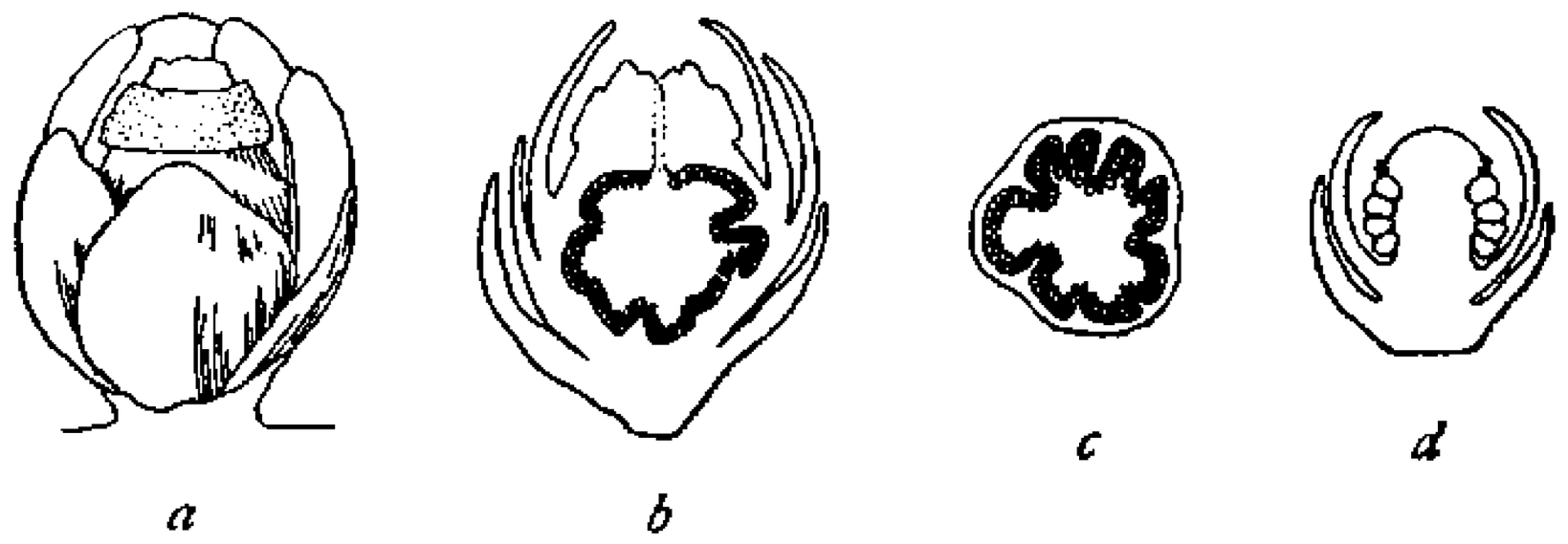
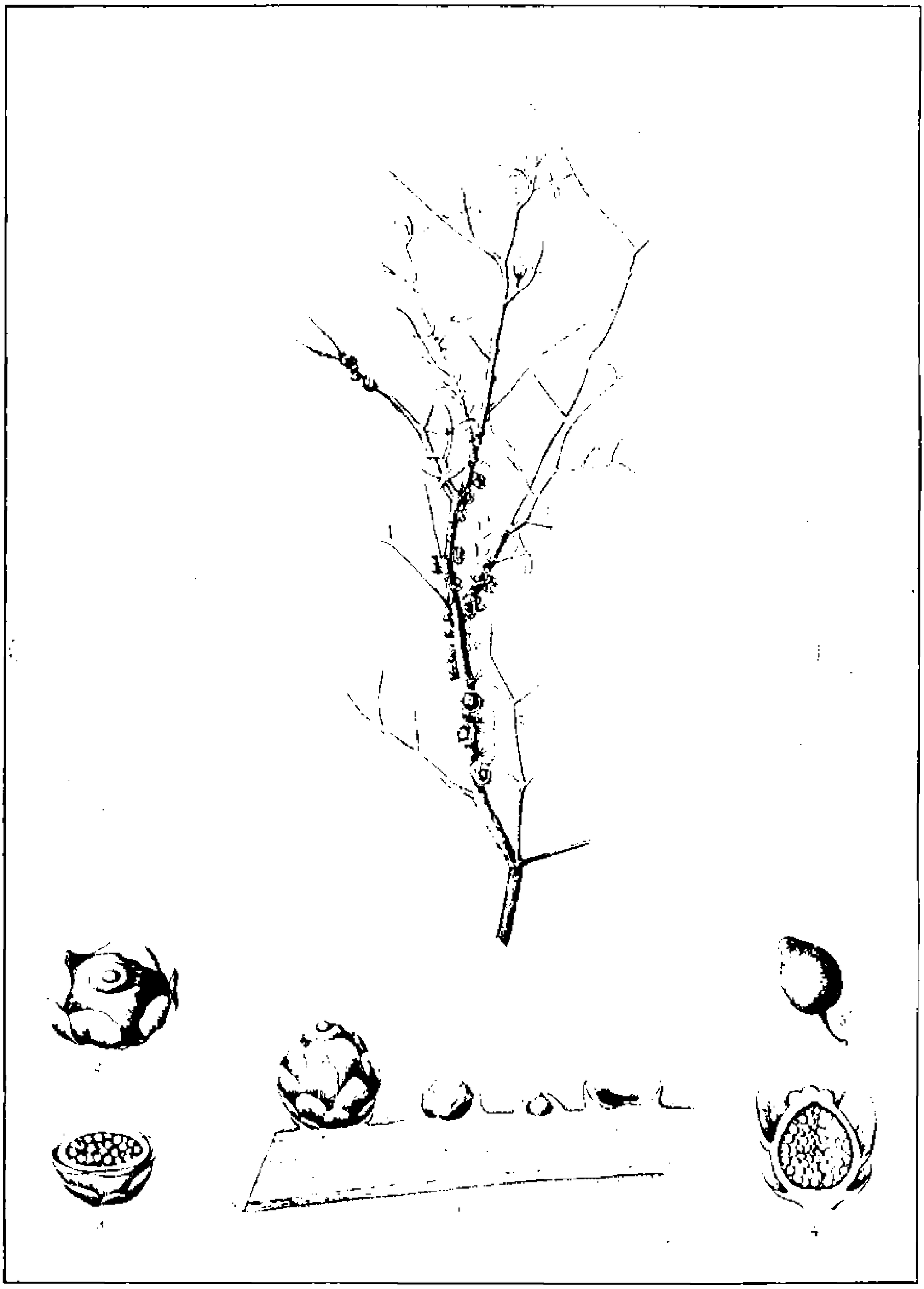


FIG. 23.—Flowers of *Pilostyles sessilis*. *a*, Female flower, the ovary exposed; *b*, longitudinal section of same; *c*, transverse section of ovary; *d*, longitudinal section of male flower. Scale 6.

are described from specimens collected by Rose and Painter on the Hacienda Ciervo, Querétaro, August 20, 1905 (no. 9636). Many specimens of the host were found infested, and a large series of herbarium specimens were collected.

The host in both the cases is a Parosela, probably *P. tuberculata* Rose.

Type U. S. National Herbarium no. 453127.



PILOSTYLES THURBERI A. GRAY.

Pilostyles thurberi A. Gray, Mem. Am. Acad. II. **5**: 326. 1854. PLATE XXI.
Host *Parosela emoryi* (A. Gray) Heller.

EXPLANATION OF PLATE XXI.—Plant of *Parosela schottii* bearing numerous individuals. Fig. 1, longitudinal section of branch showing mode of attachment of the parasite; 2, a fertile flower; 3, transverse section of flower; 4, longitudinal section of the same; 5, an ovule detached, highly magnified. Reproduction of plate 52, Torrey, Botany of the United States and Mexican Boundary Survey.

RANUNCULACEAE.

A NEW AQUILEGIA FROM THE HIGH MOUNTAINS.

Aquilegia madrensis Rose, sp. nov.

Stems 1 to 1.2 meters high, much branched above, pubescent becoming glabrate below; basal leaves long-petioled, triternate; leaflets usually on slender petioles, 2.5 cm. or less long, sometimes sessile, cuneate at base, irregularly cut or lobed, pale green above, much paler beneath, pubescent; flowers nodding; sepals broadly ovate, acuminate, 15 to 18 mm. long, puberulent; petals with a greenish rounded limb, the spur 4 cm. long, very much contracted below the middle, pale red in color; carpels 5, strongly nerved.

Collected by J. N. Rose and E. A. Goldman on the Sierra Madre west of Bolaños, September 15 to 17, 1897 (no. 2954).

Type U. S. National Herbarium no. 301908.

The species while near *Aquilegia skinneri* must be distinct, judging from the descriptions and colored figure of that species. The plant is taller and not glabrous like *A. skinneri*, the sepals broader, the leaf segments different, while the flowers are paler. *Aquilegia skinneri* is a Guatemala species and is perhaps restricted to that country. The Mexican specimens labeled *A. skinneri* which I have seen seem best referable to this species. These are Dr. E. Palmer's no. 336 from Chihuahua, collected in 1885, and Dr. Pringle's no. 1182 from the same State, collected in 1887.

CAPPARIDACEAE.

THE MEXICAN SPECIES OF WISLIZENIA.

Dr. E. L. Greene has published in the Proceedings of the Biological Society of Washington[a] a revision of the genus Wislizenia. Of the ten species enumerated by him five are attributed to Mexico, while two or three of the others may be looked for on the Mexican side of the border. Of the new species distributed three were collected by the writer in Mexico. Of my collections Dr. Greene has this to say in his preface:

"While pursuing this line of research, Mr. J. N. Rose pleasantly surprised me by bringing forth a series of species of his own gathering in Sonora and Lower California, upon which he had undertaken a critical study long since, which study had been interrupted, and these, together with the manuscript on them, he generously submitted to me, as an aid to this general revision. His own Sonoran species, both of them well marked in character, conclude the subjoined list of species, mostly new."

Wislizenia pacalis Greene, Proc. Biol. Soc. Wash. **19**: 131. 1906.

"Branches stout, often tortuous or flexuous, not quite glabrous, red-dotted, or purplish; leaflets always 3, oblong, usually very obtuse or even retuse or emarginate,

[a] Volume 19, pp. 127–132.

2 to 3 cm. long; racemes remarkably short, sessile; fruit short, only 3 to 4 mm. wide; carpels mostly round-obovate, in some specimens longer and subpyriform, the prominent striae 5 only, ending in a more or less distinct low tubercle, the intervening spaces conspicuously reticulate.

"La Paz, Lower California, 1890, Dr. Edw. Palmer, his no. 88 as in U. S. Herb. the type; but collected earlier—namely, in 1889—at San Juanico by Brandegee, and at the same place by Anthony in 1897. Also in 1897 it was collected at La Paz by Mr. Rose, no. 1311 as in U. S. Herb.; but these specimens have longer and even acutish leaflets; but the peculiarly reticulate carpels are about the same in all and are far more like those of the Texan and original *W. refracta* than like those of *W. palmeri;* and Mr. Rose found himself unable to refer them to either species; his label bearing, in his hand, nothing but the name of the genus."

Wislizenia fruticosa Greene, Proc. Biol. Soc. Wash. **19**: 131. 1906.

Only known from a single collection in Lower California.

Wislizenia palmeri Gray, Proc. Am. Acad. **8**: 622. 1873.

Only known from the region at the head of the Gulf of California.

Wislizenia costellata Rose; Greene, Proc. Biol. Soc. Wash. **19**: 132. 1906.

"Growing parts minutely and sparsely scaberulous; whole herbage more than usually glaucous, the branches very leafy, somewhat tortuous; leaves and their petioles of about equal length; leaflets cuneate-obovate, obtuse, only 1.5 to 2 cm. long; racemes subsessile, 1 to 1.5 dm. long; fruit only 3 mm. wide, the carpels at summit almost as thick as long, truncate at both ends, marked longitudinally by 5 or 6 ribs and many intervening closely compacted striæ, the main ribs gradually thicker toward the summit, where each ends in a stout low tubercle.

"Sonora, Mexico, between Nogales and Guaymas, June 4, 1897, J. N. Rose, no. 1294: type specimens in the U. S. National Herbarium. Easily distinct from *W. refracta* by the very short and thick strongly ribbed carpels, which are also truncate at the apex."

Wislizenia mamillata Rose; Greene, Proc. Biol. Soc. Wash. **19**: 132. 1906.

"Glabrous; leaves on slender petioles nearly as long as the leaflets, the latter also conspicuously petiolulate, the blade narrowly oblong, acutish, 2 to 3 cm. long; fruiting raceme stout and elongated, 10 to 20 cm. long, short-peduncled; fruit about 6.5 mm. wide, the carpels shuttlecock-shaped, coarsely and somewhat turgidly striate, not at all reticulate, somewhat constricted above the base, thence abruptly widening to a broad and strongly mamillate-tuberculate summit.

"Guaymas, Sonora, Mexico, June, 1887, Edw. Palmer, no. 74; also by J. N. Rose at the same place, June, 1897, Dr. Palmer's specimens having been distributed for *W. palmeri;* but in characters of fruit the plant is extremely different from *W. palmeri*, and even the foliage is all trifoliolate, while in *W. palmeri* all the leaves are simple, or unifoliolate."

CAESALPINIACEAE.

TWO NEW SPECIES OF CASSIA.

In the last number of these studies I published four species of Cassia. Since then two additional species have been discovered and these are here described.

Cassia articulata Rose, sp. nov.

A shrub, two meters high, the young parts densely stellate-pubescent; leaflets usually 4 pairs, ovate, 1.5 to 3.5 cm. long, acute or obtuse, densely stellate-pubescent

on both surfaces; rachis as well as pedicels and sepals also densely stellate-pubescent; gland between leaflets of lower pair narrow-elongated; pods 6 to 8 cm. long; many-jointed, strongly stipitate.

Collected by C. A. Purpus at San Pablo, near San José del Cabo, Lower California, in 1901 (no. 287, type) and by Nelson and Goldman between Miraflores and San Bernardino ranch, in Sierra La Laguna, Lower California, January, 1906 (no. 7418).

Type U. S. National Herbarium no. 470361.

This species is nearest *C. villosus*, but has small and differently shaped leaflets, a much narrower gland between the leaflets, fewer-flowered inflorescence, and perhaps a longer stipe to the pods.

Cassia macdougaliana Rose, sp. nov.

A low compact shrub, 30 to 60 cm. high; branches puberulent; stipules ovate, acute, dry, subpersistent; leaflets usually 3 or 4 pairs, short-oblong, 3 to 5 mm. long, mucronately tipped, glabrous above, puberulent beneath, thickish, the veins indistinct above, somewhat prominent beneath, rachis puberulent, bearing a stipitate cup-shaped gland; flowers borne toward the ends of the short branches, axillary, solitary; peduncle slender, puberulent; sepals membranaceous, obtuse; petals large, deep yellow, pods 3 cm. long, flat, nearly glabrous.

Collected by J. N. Rose in company with Dr. D. T. MacDougal near Tehuacán, Puebla, September 1, 1906 (no. 11253, type) and near the same locality by Rose and Hay in August, 1901 (no. 5888).

Type U. S. National Herbarium no. 454036.

This species is nearest *C. greggii*, from northern Mexico, but differs in its shorter, less glossy, and less reticulated leaflets.

Cassia greggii was referred by Bentham to his subgenus Chamaecrista, and it has since been transferred to the genus Chamaecrista, but its relationship is clearly not there.

A NEW SPECIES AND TWO CHANGES OF NAME IN CHAMAECRISTA.

A careful review of the various species of Chamaecrista in Mexico has brought to light one undescribed species and revealed the necessity of one change of name and one transfer from Cassia to Chamaecrista.

Chamaecrista amplistipulata Rose, sp. nov.

Suffrutescent and branching at base; stems somewhat zigzag, angled, glabrous, 20 to 30 cm. long; leaves closely set, 4 to 8 cm. long; stipules broadly ovate, tapering into a spinescent point, strongly nerved, long-ciliate; leaflets 30 to 40 or even more pairs, linear, 3 to 7 mm. long, acute, thickish, strongly 3-nerved below, either glabrous or ciliate; gland cup-shaped, sessile; flower buds acuminate; sepals thin, puberulent; petals 12 mm. long; ovary cinereous-pubescent; pod 3 to 4 cm. long, slightly hairy.

Collected by E. W. Nelson near Santa Efigenia, Oaxaca, July 18, 1894 (no. 2850).

Type U. S. National Herbarium no. 229222.

This species belongs in Bentham's series Coriaceae of Chamaecrista, but it seems not very near any species described by him.

Chamaecrista chamaecristoides (Collard.) Rose.

Cassia chamaecristoides Collard. Hist. Cass. 134. 1816.

Cassia cinerea Cham. & Schlecht. Linnaea **5**: 599. 1830.

Chamaecrista cinerea Pollard; Heller, Cat. N. Am. Pl. ed. 2. 5. 1900, as to synonym, not as to plant.

In 1768 Miller described in his Dictionary a plant from Vera Cruz, Mexico, collected by Houston, which he referred to *Cassia chamaecrista* L. In 1816 Collardon

described his *C. chamaecristoides*, basing it on this same plant of Houston's. In 1830 Chamisso & Schlechtendahl described their *Cassia cinerea* from a plant growing in the sands of Vera Cruz, identical with Houston's plant. This name has since been used, but must now give place to the earlier name of Collardon. Bentham has referred *C. chamaecristoides* to *C. procumbens*, but surely this is a mistake. In a note he states that some of the larger specimens seem to approach *C. cinerea*.

Chamaecrista leptadenia (Greenm.) Rose.

Cassia leptadenia Greenm. Proc. Am. Acad. **41**: 238. 1905.

VICIACEAE.

FIVE NEW SPECIES OF BRONGNIARTIA.

The genus Brongniartia is chiefly Mexican and in Mexico is represented by many species. Of these Mr. Hemsley enumerated 17 in the Biologia Centrali-Americana, but at present the number described (including the following) reaches about 30. While a synopsis of the genus was being prepared several additional species were discovered, five of which are here described.

Brongniartia peninsularis Rose, sp. nov.

A shrub, 2 to 3 meters or more high with many slender, more or less zigzag, branches, when young densely silky-pubescent; stipules leaflike, broadly lanceolate, 10 mm. long; leaflets 5 to 13, lanceolate, acute, 1 to 2 cm. long, with appressed cinereous pubescence on both surfaces; flowers axillary; peduncle 2 to 2.5 cm. long, pubescent, bibracteate at base; bracts probably large; calyx tube glabrous, the lobes pubescent on the margin and inner surface; corolla 1.5 cm. or more long; pods glabrous, shining, 4 cm. long.

Collected by E. W. Nelson and E. A. Goldman about 5 miles southwest of El Potrero, Lower California, October 31, 1905 (no. 7236).

Type U. S. National Herbarium no. 565321.

This species is quite unlike *B. trifoliata*, the only other species from Lower California, as well as the other Mexican species.

Brongniartia lasiocarpa Rose, sp. nov.

Low bush, 30 to 40 cm. high; young branches densely pubescent; leaves small for the genus; leaflets 11 to 17, oblong to orbicular, 5 to 7 mm. long, obtuse, mucronate, glabrate and shining above, somewhat hairy beneath, rather thick, more or less reticulate on both surfaces; flowers axillary; fruiting peduncle only 5 to 7 mm. long, bearing small bractlets near the top; calyx tube and lobes very hairy without; pod 2 cm. long, very pubescent.

Common on hills near Tehuacán, collected by J. N. Rose, August 1, 2, 1901 (no. 5910), and again in September, 1906 (no. 11256, type); and by C. A. Purpus in June, 1903.

This species differs from all others which I have seen in its very hairy pods.

Type U. S. National Herbarium no. 454039.

Brongniartia parvifolia Rose, sp. nov.

A low, spreading shrub 15 to 45 cm. high; young parts very pubescent; leaflets 19 to 31, crowded, narrowly elliptical, mucronate, 6 to 10 mm. long, pubescent on both sides; stipules in size and shape much as the leaflets; peduncles axillary, solitary, about 10 mm. long, pubescent; bracts subtending the calyx ovate, acute, hairy; calyx glabrous, 2-lipped, the tube 3 to 4 mm. long; upper lip 2-toothed; lower lip cut into

3 lanceolate acute lobes, both teeth and lobes pubescent on the margin; corolla "dark red;" pods 2.5 to 3 cm. broad, 1 or 2-seeded.

Collected by Mr. E. W. Nelson on the road between San Geronimo and La Venta, State of Oaxaca, July 13, 1895 (no. 2777).

A peculiar looking species for Brongniartia.

Type U. S. National Herbarium no. 229365.

Brongniartia revoluta Rose, sp. nov.

Shrub 60 to 90 cm. high; leaves rather small for the genus; leaflets 9 to 13, oblong, 4 to 18 mm. long, glabrous above, appressed-pubescent beneath, the margin revolute; flowers axillary; bracts at the base of the tube pubescent; pods cuneate at base, glabrous, 3 to 4 cm. long, 2 or 3-seeded.

Collected by E. W. Nelson on west slope of Mount Zempoaltepec, Oaxaca, July 3 to 13, 1894 (no. 564).

Type U. S. National Herbarium no. 469218.

Brongniartia goldmanii Rose, sp. nov.

Small tree 2 to 3 meters high; pubescence on young parts short, dense, spreading; leaflets 7 to 9, shortly oblong, 2 cm. or less long, rounded or even retuse at apex, pubescent on both surfaces when young, but soon glabrate above; flowers axillary on peduncles 10 mm. or less long; bracts at base of calyx orbicular, 7 mm. long, pubescent; calyx tube hairy; pods subsessile, never exserted above the calyx tube, 4 cm. long, glabrous.

Collected by E. A. Goldman on road from Las Flechas to La Rastra, Sinaloa, February 22, 1899 (no. 322).

Type U. S. National Herbarium no. 360243.

NEW SPECIES AND NEW COMBINATIONS UNDER CRACCA.

The need of a careful revision of the Mexican species known under Tephrosia has long been apparent to the writer, who has several times studied them with the hope of presenting a synopsis, but so many of the older species are still poorly represented in our American herbaria that it has not seemed hitherto nor does it yet seem wise to attempt a revision. Most of the existing descriptions have been studied, however, and a large series of recently collected specimens have been examined, resulting in the description of a number of new species. The substitution of the older name Cracca also requires the making of a number of new combinations, a part of which are here presented. The excuse for publishing thus fragmentarily on this genus is that my correspondents desire names in order that they may publish upon or distribute their material, and particularly that several species are found to be the hosts of fungi and their names are wanted in this connection.

Cracca affinis (S. Wats.) Rose.

Tephrosia affinis S. Wats. Proc. Am. Acad. **21**: 424. 1886.

Cracca cuernavacana Rose, sp. nov.

Stems herbaceous, 60 to 90 cm. high, clothed with rusty appressed hairs; leaflets thin, 9 to 12 pairs, elliptical-oblong, obtuse, mucronate at tip, glabrous above, appressed-pubescent beneath, 15 to 25 mm. long; racemes axillary, rather short and dense-flowered; bracts lanceolate, acuminate; pedicels, calyx, and banner clothed

with rusty appressed pubescence; calyx lobes linear; pods straight, glabrous except a few hairs on the valves.

Collected by C. G. Pringle on wooded slopes of the barranca above Cuernavaca in 1896 (no. 6327).

Type U. S. National Herbarium no. 461989.

Nearest *Cracca affinis*, but with thinner leaflets, denser spikes, and broader bracts.

Cracca diversifolia Rose, sp. nov. FIGURE 24.

Plant suffrutescent, the cespitous stems less than a meter in height, herbaceous, densely pubescent; leaflets 1 to 5, oblong, 3 to 8 cm. long, obtuse, a little narrowed at base, thickish, glabrous above, with densely matted white pubescence beneath; inflorescence a short dense terminal raceme or sometimes becoming paniculate; calyx very pubescent, either white or brownish; petals violet-colored; banner nearly orbicular, pubescent without.

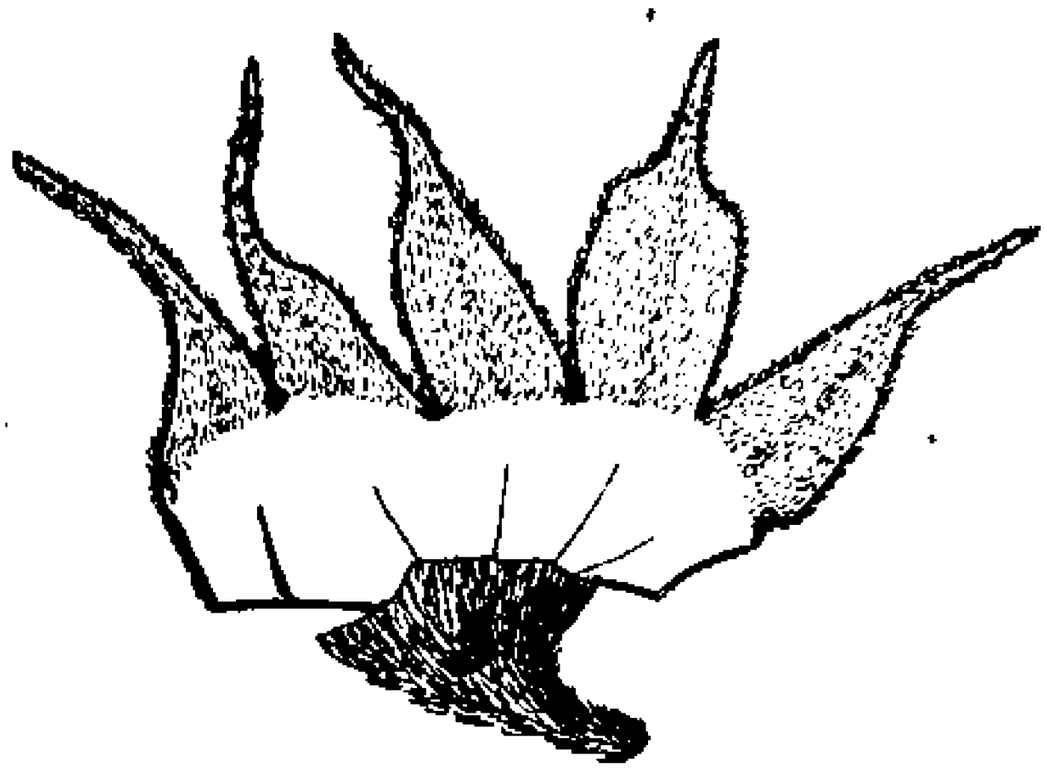


FIG. 24.—Calyx of *Cracca diversifolia*. Scale 2.

Collected by C. G. Pringle near Uruapan, November 14, 1905 (no. 13697).

Type U. S. National Herbarium no. 462389.

Nearest *Cracca sericea*, but still very different.

Cracca langlassei (Micheli) Rose.

Tephrosia langlassei Micheli, Mem. Soc. Phys. Nat. Geneve **34**: 250. *pl. 3*. 1903.

Cracca major (Micheli) Rose.

Tephrosia major Micheli, Mem. Soc. Phys. Nat. Geneve **34**: 251. *pl. 4*. 1903.

Cracca multifolia Rose.

Tephrosia multifolia Rose, Contr. Nat. Herb. **1**: 320. 1895.

Cracca palmeri (S. Wats.) Rose.

Tephrosia palmeri S. Wats. Proc. Am. Acad. **24**: 46. 1889.

Cracca platyphylla Rose, sp. nov. FIGURE 25.

Perhaps shrubby at base, low, about 30 cm. high, densely pubescent; leaves simple, shortly oblong, 4 to 6 cm. long, roundish at apex, subsessile, glabrate above, woolly-pubescent beneath; inflorescence very compact; calyx lanate; banner lanate without; petals "rich rose red;" pods not seen.

Collected by E. W. Nelson on a dry hillside in pine woods between Mascota and San Sebastián, Jalisco, March 14, 1897 (no. 4062).

Type U. S. National Herbarium no. 327035.

Most nearly related to *Cracca major*, but the leaves always simple and covered beneath with a very different pubescence and the inflorescence much more compact.

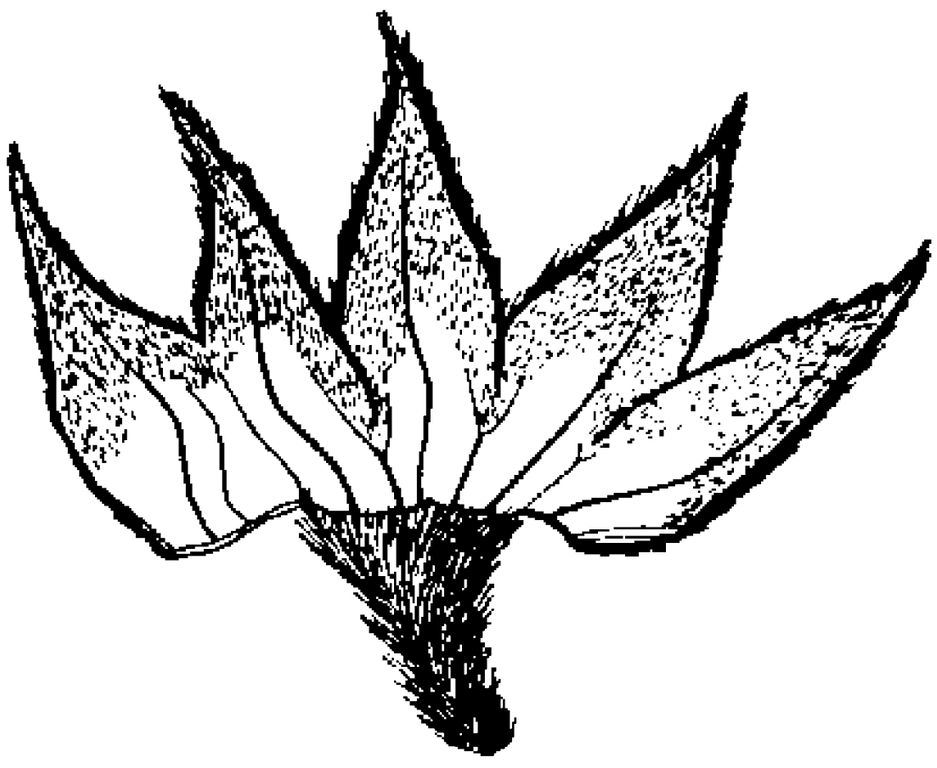


FIG. 25.—Calyx of *Cracca platyphylla*. Scale 2.

Cracca rhodantha (Brandeg.) Rose.

Tephrosia rhodantha Brandeg. Zoe 5: 201. 1905.

Perennial 60 to 90 cm. high; branches weak and somewhat spreading, hirsute; leaves pinnate; common petiole very short; rachis 10 to 14 cm. long; leaflets 9 to 17, opposite, oblong, 18 to 30 mm. long, obtuse or retuse, appendiculate, strigose-

pubescent; racemes axillary, elongate, 12 to 40 cm. long; rachis flattened; flowers in clusters of threes; pedicels 4 to 6 mm. long; calyx lobes filiform; the two upper slightly united; corolla light purple; banner orbicular, obtuse, 12 to 14 mm. in diameter; keel obtuse; stamens 10, axillary, one free; ovary pubescent; style pubescent on the inner margin; legume linear, 5 to 7.5 cm. long, strigose.

Collected by Dr. E. Palmer in grassy flats at the mouth of a ravine near Lodiego, Sinaloa, October 9 to 15, 1891 (no. 1619).

Type U. S. National Herbarium no. 305315.

Cracca sericea (S. Wats.) Rose.

Clitoria sericea S. Wats. Proc. Am. Acad. **22**: 407. 1887.

Cracca tenella (A. Gray) Rose.

Tephrosia tenella A. Gray, Pl. Wright. **2**: 36. 1853.

THREE NEW SPECIES OF DIPHYSA.

The genus Diphysa, a characteristic arid tropical genus, has a wide distribution in Mexico, but only a few species have been described. After a somewhat exhaustive study of the genus I wish to propose the three following species:

Diphysa occidentalis Rose, sp. nov.

Shrub or small tree, glabrous throughout; leaflets about 20, oblong, acute; inflorescence few-flowered, sometimes only 1 or 2-flowered; calyx glabrous, except the ciliate lobes; petals yellow; pods oblong, much inflated, 4 to 8 mm. long, subsessile.

Specimens examined:

Sonora: Guaymas, Dr. E. Palmer, 1887 (no. 198, type).

Colima: Manzanillo, Dr. E. Palmer, December 1 to 31, 1890 (no. 890); city of Colima, M. E. Jones, July 2, 1892 (no. 177).

Sinaloa: Culiacan, Dr. E. Palmer, August 27 to September 15, 1891 (no. 1498).

Guerrero: Acapulco and vicinity, Dr. E. Palmer, October, 1894, to March, 1895 (no. 106a).

This species seems to have a wide range, extending down the west coast of Mexico from Guaymas to Acapulco.

Type U. S. National Herbarium no. 40567.

Diphysa minutifolia Rose, sp. nov.

Shrub, 1 to 2 meters high; old branches either gray or cherry red; first year's branches puberulent; leaves small, narrow, 2 to 6 cm. long; stipules linear, 2 to 3 mm. long; leaflets numerous, sometimes as many as 40, small, 4 to 6 mm. long, oblong, obtuse, pubescent when young, glabrate in age; inflorescence much reduced, sometimes only 1 or 2-flowered; bractlets not seen, doubtless caducous; calyx slightly pubescent, perhaps becoming glabrate; ovary pubescent; pods 4 to 5 cm. long, inflated.

Collected by C. G. Pringle in a barranca near Cuernavaca, Morelos, June 25, 1896 (no. 6876, type), and near Yautepec, Morelos, by C. G. Pringle, May, 1904 (no. 11963); also at the latter place by Rose and Painter, August, 1903 (no. 6568).

Type U. S. National Herbarium no. 491996.

This species is not near any other Mexican species.

Diphysa echinata Rose, sp. nov.

Low shrub; young parts with some soft pubescent and many stiff yellow, almost prickly hairs; leaflets about 12, orbicular to oblong, 1.5 to 2 cm. long, very thin, glabrous above, very pale and puberulent beneath; racemes about 6-flowered; pedicels slender, 1 to 2 cm. long; bractlets at base of calyx ovate, 10 to 12 mm. long; calyx tube glabrous, the margin of the lobes ciliate; corolla yellow, 2 cm. long; pods not seen.

Collected by J. N. Rose between Rosario and Colomas, July 12, 1897 (no. 1603).

Type U. S. National Herbarium no. 300448.

NEW SPECIES AND NEW COMBINATIONS IN PAROSELA.

I have published in previous numbers of the series[a] two short papers containing many species. There is still a considerable number of the so-called Daleas which have not been transferred to Parosela, of which some are not known to me. The following list represents species which either are new or are old species which I have recently studied and believe to belong to Parosela.

Through the kindness of Col. D. Prain, Director of the Royal Botanic Gardens, Kew, and Mr. W. Botting Hemsley I have obtained fragments from seven types of Dalea belonging to the Kew Herbarium, all but one being of species described by Mr. Hemsley himself. Three of these not already transferred to Parosela are here placed under that name.

Parosela anthonyi (Brandeg.) Rose.

Dalea anthonyi Brandeg. Erythea **7**: 2. 1899.

Parosela campylostachya Rose, sp. nov.

Perhaps annual; branches glabrous or nearly so, bearing prominent glands; leaflets 21 to 45, glabrous, 2 to 3 mm. long, the margins revolute, bearing large glands beneath, glandless above; racemes short-peduncled, many-flowered; calyx 10-ribbed, glabrous without, bearing 1 or rarely 2 large glands between the ribs; teeth short and broad, hairy within; petals purplish.

Collected by Dr. C. G. Pringle near Cieneguilla, Oaxaca, November 1, 1894 (no. 5657).

Type U. S. National Herbarium no. 305786.

This species was originally distributed under the name *Dalea nutans*, to which it is not closely related. It is very near *Parosela lasiostoma* Rose, but has more numerous and smaller leaflets, these more inclined to be revolute.

Parosela capitata (S. Wats.) Rose.

Dalea capitata S. Wats. Proc. Am. Acad. **25**: 146. 1890.

Parosela crassifolia (Hemsl.) Rose.

Dalea crassifolia Hemsl. Biol. Centr. Am. **1**: 238. 1880.

Parosela hospes Rose, sp. nov.

A slender shrub 2 to 3 meters high; branches slender, perfectly glabrous, more or less purplish; leaves glabrous throughout; leaflets 5 to 7, oblong to spatulate, retuse, sometimes simply rounded at apex, 6 to 10 mm. long, the under surface covered with glands, the upper surface simply pitted; inflorescence a weak terminal raceme 5 to 6 cm. long; bracts broadly ovate, acute, glabrous, very glandular; pedicels short but distinct; calyx tube short, 2 to 3 mm. long, at first very silky without, the teeth oval and ciliate, the lower tooth a little longer; petals creamy white to pale rose color; stamens 10; ovary somewhat hairy, containing 2 ovules.

Collected by C. G. Pringle in the Sierra Madre above Monterey, in 1888 (no. 1904, type) and 1903 (no. 11417); also by Dr. E. Palmer in the Caracol Mountains, Coahuila, in 1880 (no. 210).

Type U. S. National Museum no. 24351.

Dr. S. Watson in reporting on Dr. E. Palmer's plants of 1880 calls this plant a variety of *Dalea frutescens*, but does not give it a name. It differs strikingly from that species in several respects. The flowers are in racemes instead of spikes, the calyx

[a] Contr. Nat. Herb. **8**: 302. 1905; **10**: 103. 1906.

tube is silky-pubescent instead of glabrous, the rachis is glabrous not hairy, the leaflets are fewer and larger, and it has a different geographical range.

The specific name is given as this plant is the host of *Apodanthes pringlei* S. Wats.

Parosela lutea (Cav.) Rose.

Psoralea lutea Cav. Ic. **4**: 12. *pl. 325*. 1797.

Dalea lutea Willd. Sp. Pl. **3**: 1341. 1801.

Parosela macrostachya (Moric.) Rose.

Dalea macrostachya Moric. Mem. Soc. Phys. Geneve **6**: 534. *pl. 5*. 1833.

Parosela saffordii Rose, sp. nov.

Low bushy shrubs; branches often short and stout, glabrous; stipules persistent, purplish; leaflets 9 to 13, oblanceolate to spatulate, 2 to 3 mm. long, retuse, glabrous, glandular beneath, rather thickish, the margins often revolute; rachis of leaf rather thickish; stipels distinct; heads shortly peduncled, often appearing sessile; bracts lanceolate, acuminate, ciliate; calyx hairy, the teeth filiform nearly as long as the tube; petals purplish; keel and wings attached to the stamen tube near its base.

Collected by William E. Safford, February 3, 1907 (no. 1246). The same species was collected in 1880 (no. 208) by Dr. E. Palmer in the Sierra Madre 40 miles south of Saltillo and distributed as *Dalea polycephala*. *D. polycephala*, however, has pubescent stems and leaves.

Type U. S. National Herbarium no. 573293.

This species is much nearer *P. formosa*, but has narrow bracts and shorter calyx teeth. The species is named in honor of Lieutenant William E. Safford, now of the Department of Agriculture.

Parosela schaffneri (Hemsl.) Rose.

Dalea schaffneri Hemsl. Diag. Pl. Nov. **1**: 7. 1878.

Near *P. lasiostoma* Rose.

Parosela similis (Hemsl.) Rose.

Dalea similis Hemsl. Diag. Pl. Nov. **1**: 7. 1878.

Parosela tomentosa (Cav.) Rose.

Psoralea tomentosa Cav. Ic. **3**: 21. *pl. 240*. 1794.

Dalea tomentosa Willd. Sp. Pl. **3**: 1341. 1801.

MISCELLANEOUS NEW SPECIES.

The following species are of genera which have been wholly or in part revised by the writer.

Crotalaria gloriosa Rose, sp. nov.

Slender shrub about 2 meters high, all the young parts covered with a dense golden-yellow pubescence; leaflets 3, lanceolate, 4 to 6 cm. long, acute, densely pubescent on both surfaces; inflorescence a long, slender, many-flowered raceme; bracts linear, persistent; calyx very pubescent; corolla large, 15 mm. long, very hairy without; keel strongly pointed; pods densely silky-pubescent.

Collected by Rose and Painter in mountains near Iguala, August 10 to 12, 1905 (no. 9412).

Type U. S. National Herbarium no. 452900.

This is perhaps nearest *C. mollicalata* and *C. eriocarpa*, but the petals are very hairy without, the upper surface of the leaves much more pubescent, etc.

Indigofera tumidula Rose, sp. nov.

Stem soft-wooded, 6 meters or more in height; branches herbaceous, appressed-pubescent; leaflets 3 to 7, oblong, 3 to 4 cm. long, rounded at base and apex, mucronately tipped, slightly appressed-pubescent on both surfaces, paler beneath;

raceme 7 to 12 cm. long; flowers not seen; fruit short and turgid, 5 mm. or less long, appressed-pubescent, 2-seeded.

Collected by Dr. C. G. Pringle in Iguala Cañon, Guerrero, September 22, 1905 (no. 13693).

Type U. S. National Herbarium no. 462385.

This species in the shape and size of its fruit suggests *I. densiflora*, but it has fewer and larger leaflets.

Phaseolus (Leptospron) lozanii Rose, sp. nov.

A high-climbing vine; stems glabrate; leaflets 3, ovate, acuminate, 5 to 9 cm. long, glabrous on both surfaces; inflorescence including the peduncle 20 to 25 cm. long; bracts orbicular, striate; bractlets ovate, small; calyx tube glabrous without; upper lip broad and short; lower lip 3-lobed, ovate, acute, the lower lobe a little longer; banner broad, purplish, glabrous without; immature pods pubescent.

Collected by Dr. C. G. Pringle near Uruapan, 1907 (no. 10358).

Type U. S. National Herbarium no. 462493.

Perhaps nearest *P. cuernavacana*, but the leaflets decidedly acuminate, and the stems nearly glabrous.

Ramirezella pringlei Rose, sp. nov.

Tall woody vines; leaflets 3, broadly ovate, acuminate, 6 to 10 cm. long, early glabrate, slightly reticulated; inflorescence somewhat pubescent; pedicels 10 mm. or less long; calyx tube short and broad, the lobes ciliate; the upper lobe broad and obtuse; the 3 lower lobes ovate, acute; corolla violet, 2 cm. long.

Collected by Dr. C. G. Pringle in Iguala Cañon, October 2, 1906 (no. 13822).

Type U. S. National Herbarium no. 462398.

Ramirezella buseri (Micheli) Rose.

Phaseolus buseri Micheli, Mem. Soc. Phys. Nat. Geneve **34:** 263. *pl. 13.* 1903.

Robinia pringlei Rose, sp. nov.

A medium-sized, apparently spineless tree; young branches with short, appressed, often scanty pubescence; young leaves with dense, silky, brownish pubescence; mature leaves 20 to 30 cm. long; leaflets 13 to 15, shortly oblong, 4 to 6 cm. long, rounded at base or broadly cuneate, rounded at apex, paler beneath, scantily pubescent on both surfaces; racemes 10 to 15 cm. long; pedicels 10 to 12 mm. long; calyx tube broad, the upper lip notched, the lower lip 3-lobed; pod 3 to 6 cm. long.

Collected by C. G. Pringle in valley near Tula, State of Mexico, altitude 19 to 40 meters, March 23, 1906 (no. 10218).

Type U. S. National Herbarium no. 462258.

LINACEAE.

A NEW SPECIES OF LINUM.

Linum lasiocarpum Rose, sp. nov.

Annual, simple or more or less branched, 1.5 to 30 cm. high, slender, glabrous except some hairs in the inflorescence; lower leaves generally in whorls, obovate, 10 mm. or less long, obtuse, entire, not at all glandular; upper leaves opposite or alternate, narrower, sometimes acute, rarely toothed; pedicels very short, 1 mm. or less long, densely pilose; sepals lanceolate, acute, with gland-bearing margins, the three nerves prominent and wing-like; petals yellow, 4 mm. long; styles distinct to the base; carpels pilose.

Collected by C. G. Pringle near Monterey, April 15, 1906 (no. 10209).

Near *L. cruciatum*, but leaves not glandular-serrate and the sepals more strongly nerved.

Type U. S. National Herbarium no. 462252.

RUTACEAE.

THE GENUS MORKILLIA.

The following account of Morkillia, which recently appeared in the Smithsonian Miscellaneous Collections, is here reprinted (without change except in the citations) for the sake of connection with my other Mexican studies.

The genus Chitonia has hitherto been represented only by material collected many years ago. Until now it has rested upon a single species, *C. mexicana*. Fruiting specimens of this were collected in 1905 near Tehuacán, Mexico, and in 1906 fruit and flowers were obtained from the same place. Some years earlier, Mr. E. W. Nelson had collected in Northern Mexico a very different species, which is here described as new.

The name Chitonia of Mociño & Sessé is a homonym of the Chitonia of D. Don, and hence a new name is here proposed. The genus is named Morkillia, in honor of Mr. W. L. Morkill, general manager of the Mexican Southern Railroad, who has taken a great interest in and has contributed to the development of our explorations in southern Mexico.

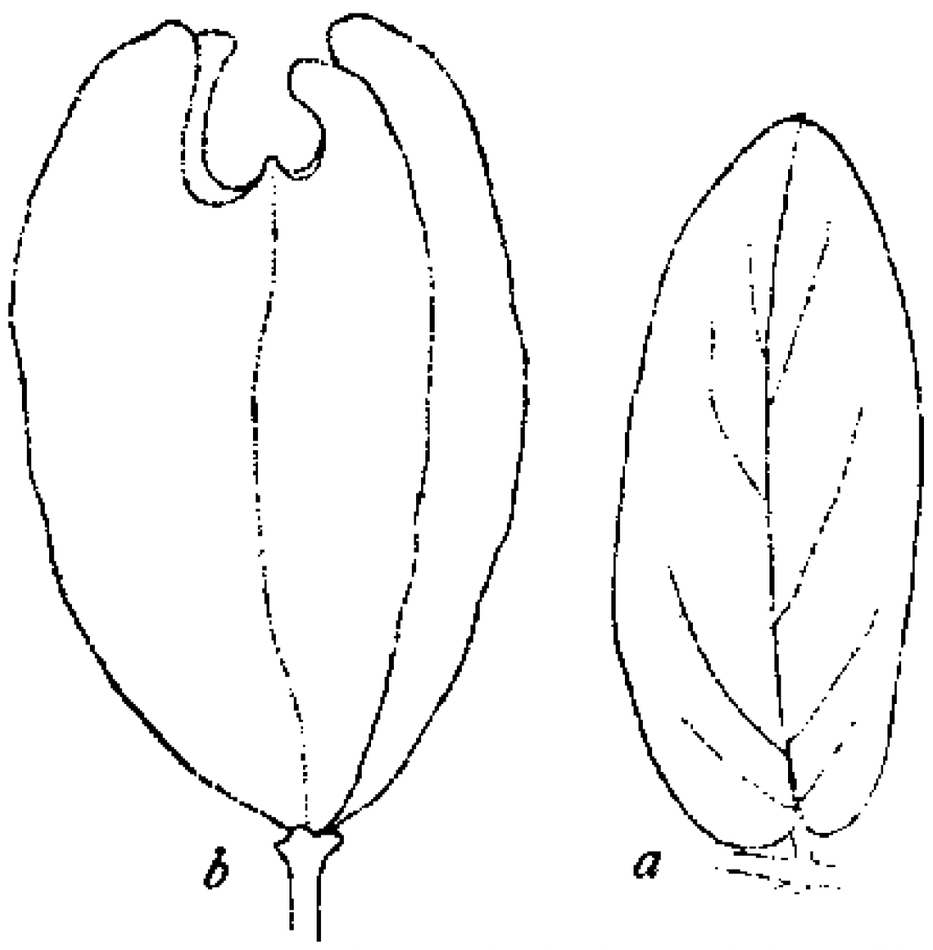


FIG. 26.—(*a*) Leaflet and (*b*) fruit of *Morkillia mexicana*. Natural size.

Morkillia mexicana (Moc. & Sessé) Rose & Painter, Smithson. Misc. Coll. **50**: 33. 1907. FIGURE 26.

Chitonia mexicana Moc. & Sessé; DC. Prod. **1**: 707. 1824.

Shrub 3 to 5 meters high; young branches densely pubescent; lateral leaflets 4 to 7 pairs, oblong, obtuse or at first acute, shortly petiolulate, very pubescent on both surfaces, 3 to 5 cm. long; flowers large and showy, 8 to 9 cm. in diameter; petals strongly notched, deep purple; fruit 4 to 5 cm. long with 4 lateral wings, these free at the top and more or less incurved, dehiscing when mature, exposing the red aril of the seeds; seeds white with a black spot at the tip.

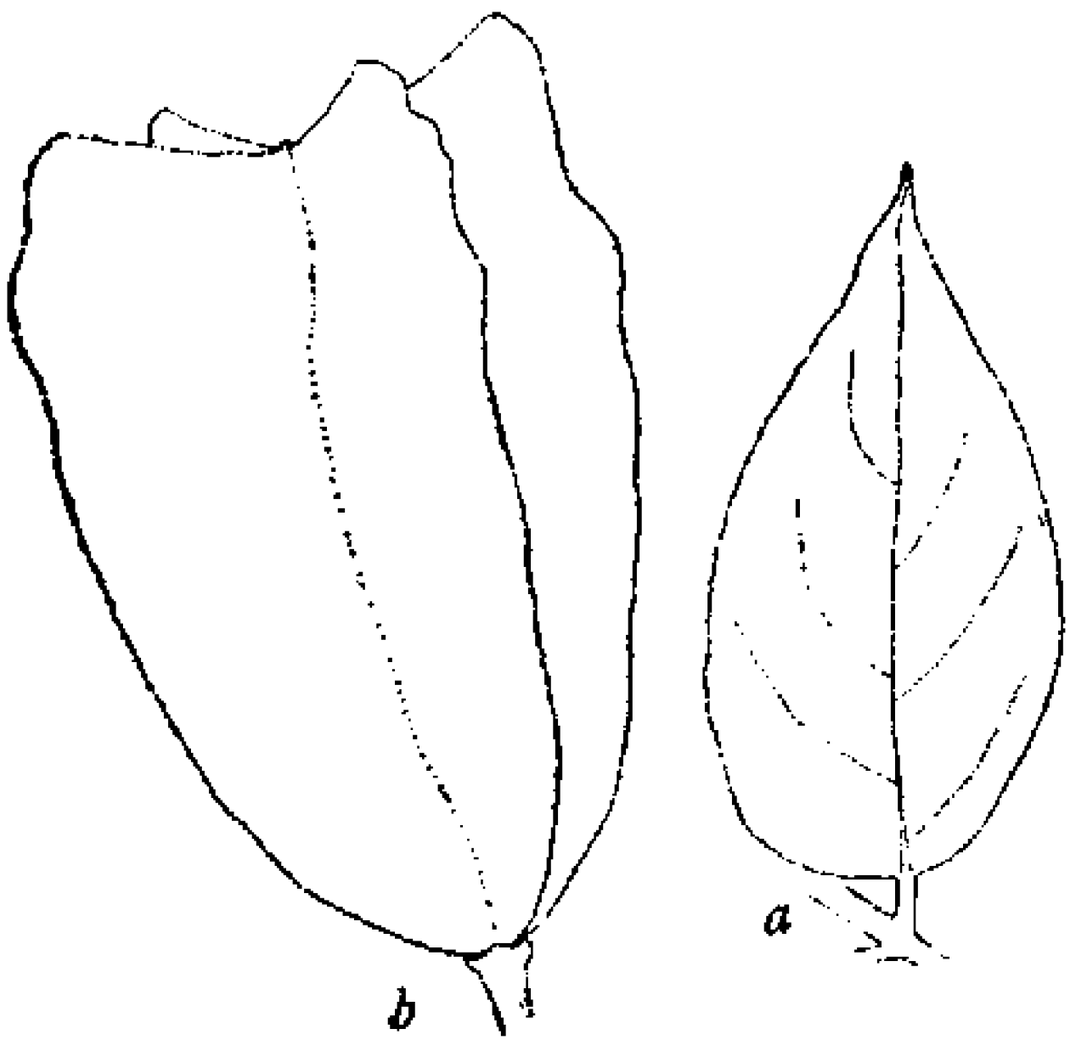


FIG. 27.—(*a*) Leaflet and (*b*) fruit of *Morkillia acuminata*. Natural size.

Specimens examined:

Puebla: Near Tehuacán, Rose & Painter, August 30, 1905 (no. 9992); J. N. & J. S. Rose, September 2, 1906 (no. 11278); C. A. Purpus, July, 1905 (no. 1315).

Morkillia acuminata Rose & Painter, Smithson. Misc. Coll. **50**: 34. 1907. FIGURE 27.

Near *Morkillia mexicana*, but leaflets paler above, ovate and acuminate, more densely pubescent, flowers much smaller (6 cm. or less broad), petals less notched, and fruit broader and nearly truncate at apex.

Collected by Mr. E. W. Nelson on road over mountain between Victoria and Jaumave Valley, altitude 240 to 750 meters, May 31, 1898 (no. 4444).

THE MEXICAN SPECIES OF PTELEA.

Dr. E. L. Greene has recently published an exhaustive treatment of the genus Ptelea in these contributions,[a] in which 14 Mexican species are described, all but one of them as new. Three of these, however, he has since segregated as a new generic type under the name Taravalia. Below will be found the eleven species of Ptelea attributed to Mexico. Dr. Greene's descriptions of three of these, two based by him on material collected by the writer, the third earlier established by the writer on material of Mr. Pringle's, are reprinted in full.

Ptelea acutifolia Greene & Rose, Contr. Nat. Herb. **10:** 68. 1906.

"Twigs of the season dull chestnut-color, rather sharply and angulately rugose and puberulent, the older glabrate, darker, obtusely and tortuously striate: leaves firm but not subcoriaceous, deep green above, paler beneath and villous-strigulose, definitely crenulate, all on elongated petioles mostly 6 to 8 cm. long; odd leaflet lance-elliptic, very acute at both ends, 5.5 to 8 cm. long, the pair usually but little smaller and of the same outline, being scarcely inequilateral: samaras small for the foliage, transversely subquadrate-orbicular to quite orbicular, the largest and most quadrate 2 cm. wide, 1.5 cm. long, such subtruncate at both ends; body very round-ovoid, hardly as broad as the wing, lightly circumvallate, not at all sharply transverse-rugose, moderately punctate; style and stipe nearly equal.

"State of Jalisco, Mexico, on the road between Huejuquilla and Mesquitec, August 25, 1897, Dr. J. N. Rose, no. 2580, as in the National Herbarium. Species not otherwise known, and remarkable for the great length of the petioles, the leaflets not acuminate, though very acute."

Ptelea coahuilensis Greene, Contr. Nat. Herb. **10:** 61. 1906.
Distribution: Coahuila.

Ptelea cuspidata Greene, Contr. Nat. Herb. **10:** 62. 1906.
Distribution: Chihuahua.

Ptelea glauca Greene, Contr. Nat. Herb. **10:** 64. 1906.
Distribution: Sonora.

Ptelea laetissima Greene & Rose, Contr. Nat. Herb. **10:** 69. 1906.

"Twigs of the season dull red-brown, lightly rugulose, puberulent, the older dull brown, glabrate, smoothish: leaves small, of a light very bright green above, light dull green beneath, with faint trace of minute scattered hairiness on both faces, but to the unaided eye glabrous; odd leaflet lanceolate, acutish at both ends, about 5 cm. long, the pair similar and hardly inequilateral, only about half as large, all sessile, obsoletely crenulate: samaras large for the foliage, greenish in maturity, orbicular, about 1.8 cm. long and broad, truncate at base, emarginate at apex; body oval, of less than the width of the wing, prominently rugose, but the wrinkles not very continuously transverse, punctuation not strong; style and stipe nearly equal, both slender yet prominent.

"Near Tehuacán, State of Puebla, Mexico, September, 1905, collected by Messrs. Rose, Painter, and Rose (no. 9927), type in the National Herbarium. The specimens being at that date in fruit nearly matured, and with foliage bright and untar-

[a] Contr. Nat. Herb. **10:** 49–78. 1906.

nished as if that of early summer at the North, are evidence that the species comes into leaf and flower only late in summer, after the beginning of the rainy season.

"We have in the United States no Ptelea to equal this in the beauty of its bright green almost brilliant foliage, a strong tinge of which is held by even the mature fruit."

Ptelea megacarpa Rose, Contr. Nat. Herb. **10:** 68. 1906.

"Twigs tortuously striate rather than rugulose, and with glands between the lines; bark chestnut-colored when mature, glabrous: leaves large, of thin texture, vivid dark-green on both faces, scarcely lighter beneath and not in the least glaucescent, glabrous; leaflets ovate-elliptic, the pair almost or quite as large as the odd one, oblique rather than notably inequilateral, all cuspidately acuminate, entire, the odd one 7 to 12 cm. long: samaras very large, thin and flat, the circumscription exactly orbicular, abruptly subcordate at base and equally obcordate-notched at apex, both the length and breadth about 3.5 cm.; body small in proportion to the wing, circumvallate, transverse-rugose, almost dotless, as also the wing; style of thrice the length of the stipe.

"Dr. Rose establishes this handsome species on Mr. Pringle's no. 8868 (type in the National Herbarium), from the State of Hidalgo, Mexico; and it has been so distributed.

"Mr. Pringle reports it to attain the dimensions of a small tree at about 1,600 meters altitude below Trinidad Iron Works, where it was obtained by him June 2, 1904. Flowers were collected May 10, but unhappily none but the pistillate; so that the character of the filaments can not be given."

Ptelea obtusata Greene, Contr. Nat. Herb. **10:** 61. 1906.
Distribution: Coahuila.

Ptelea pumila Greene, Contr. Nat. Herb. **10:** 61. 1906.
Distribution: Coahuila.

Ptelea sancta Greene, Contr. Nat. Herb. **10:** 63. 1906.
Distribution: Sonora.

Ptelea scutellata Greene, Contr. Nat. Herb. **10:** 62. 1906.
Distribution: Chihuahua.

Ptelea subintegra Greene, Contr. Nat. Herb. **10:** 61. 1906.
Distribution: Durango.

THE SPECIES OF TARAVALIA.

Three species of Taravalia have been described, all coming from Lower California. They are as follows:

Taravalia aptera (Parry) Greene, Leaflets **1:** 223. 1906.
Ptelea aptera Parry, Proc. Davenp. Acad. **4:** 39. 1884.
Distribution: Lower California.

Taravalia nucifera Greene, Leaflets **1:** 222. 1906.
Ptelea nucifera Greene, Contr. Nat. Herb. **10:** 75. 1906.
Distribution: Lower California.

Taravalia obscura Greene, Leaflets **1:** 223. 1906.
Ptelea obscura Greene, Contr. Nat. Herb. **10:** 76. 1906.
Distribution: Lower California.

SIMARUBACEAE.

THE MEXICAN SPECIES OF CASTELA.

The species of Castela are very characteristic desert undershrubs, and their distribution ought to be carefully worked out. The study of our very scanty material has shown one new species, which is here described. Also the variety of *C. nickelsoni* is here raised to specific rank. The four Mexican species, one of which is very doubtful, are the following:

Castela lychnophoroides Liebm. Vidensk. Meddel. **1853**: 110. 1854.

This plant is an uncertain Castela. I have not yet been able to find it at the type locality. The description suggests that it may not belong to this genus.

Castela peninsularis Rose, sp. nov.

Thorny shrub; pubescence on branches and thorns short, dense, velvety, yellowish; leaves oblong, 1 to 2 cm. long, entire or few-toothed, somewhat revolute, the pubescence on the under surface soft but not matted; flowers axillary, red; stamens pubescent.

Collected by C. A. Purpus at San José del Cabo, Lower California, March, 1901 (no. 244).

Distributed as *C. tortuosa*, but different in its leaves and pubescence.

Castela texana (Torr. & Gr.) Rose.

Castela nickelsoni texana Torr. & Gr. Fl. N. Am. **1**: 680. 1840.

Castela texana has generally passed as the *Castela nickelsoni* of the West Indies, a very different species. Its relationship is more closely with *C. tortuosa* of South Mexico, from which it differs in its somewhat narrower leaves, these more strongly reticulated beneath and in its more yellowish pubescence.

Castela tortuosa Liebm. Vidensk. Meddel. **1853**: 110. 1854.

This species has long been a desideratum in our larger herbaria. In 1905 it was collected by Rose and Painter from near the type locality, Tehuacán, Mexico.

ADDITIONAL SPECIES OF TEREBINTHUS.

In No. 5 of this series a list of 50 species of Terebinthus was given.[a] Since its preparation several new species have come to hand and these with several others which had been overlooked are here presented.

Terebinthus acuminata Rose, sp. nov.

Small shrub, 3 to 4 meters high, the trunk and older branches shedding the bark and becoming reddish-brown; leaves large, pinnate; rachis of leaf terete, pubescent; leaflets 5 to 7, broadly lanceolate, acuminate, 6 to 10 cm. long, glabrous or nearly so above, somewhat pubescent beneath, especially on the veins; fruit in rather dense racemes, shortly oblong, labrous.

Collected by J. N. Rose and Joseph H. Painter on a hill near Chapala, Jalisco, October 5, 1903.

Type U. S. National Herbarium no. 451271.

Terebinthus attenuata Rose, sp. nov.

Tree; branches even when quite young perfectly glabrous; leaves large, pinnate; leaflets 5 to 7, lanceolate, long-attenuate, rounded at base, 8 to 12 cm. long, rather

[a] Contr. Nat. Herb. **10**: 117–122. 1906.

thin (at least on flowering specimens), perfectly glabrous on both surfaces except for some tufts of hairs in the lower axils of the veins on the under surface; racemes slender, clustered at the ends of the second-year branches, 10 to 15 cm. long, glabrous; pedicels slender, 1 to 2 cm. long, glabrous; immature fruit glabrous.

Collected by J. N. Rose near Colomas, Sinaloa, July 16, 1897 (no. 3213).

Type U. S. National Herbarium no. 302178.

Terebinthus diversifolia Rose.

Bursera diversifolia Rose, Contr. Nat. Herb. **5**: 113. 1897.

Terebinthus laxiflora (S. Wats.) Rose.

Bursera laxiflora S. Wats. Proc. Am. Acad. **24**: 44. 1889.

This is a very distinct species. The material from Lower California referred to this species is quite distinct and will be taken up under a different specific name by Mr. T. S. Brandegee.

Terebinthus nelsonii Rose.

Bursera nelsonii Rose, Contr. Nat. Herb. **3**: 314. 1895.

Terebinthus pilosa (Engler) Rose.

Bursera graveolens pilosa Engler in DC. Monog. Phan. **4**: 49. 1883.

Terebinthus pubescens (Schlecht.) Rose.

Elaphrium pubescens Schlecht. Linnæa **16**: 527. 1842.

Rachis of leaf winged; leaflets 7, 3 to 5 cm. long, narrowly elliptical, acute and acuminate, cuneate at base, entire below, coarsely and irregularly toothed above, pubescent on both sides; inflorescence as long as the leaves; calyx teeth 4, very short, ciliate; petals 4, elliptical, obtuse, somewhat narrowed at base, glabrous.

Type locality: "E campéche."

Probably common in Yucatan.

This species is not recognized by Dr. Engler or other writers on this genus. As suggested by Schlechtendal, it is near *Bursera graveolens*, but it is apparently distinct. Before studying this species I had segregated from *T. graveolens* material from Yucatan, which I now find answers very well to *T. pubescens*.

Terebinthus trijuga (Ramirez) Rose.

Bursera trijuga Ramirez, Anal. Inst. Med. Nac. **2**: 16. 1896.

MALPIGHIACEAE.

THRYALLIS.

The genus Thryallis was published by Linnæus in the second edition of his Species Plantarum[a] basing it upon a single species *T. brasiliensis*. In 1829 Martius described two additional species *T. longifolia* and *T. latifolia*.

These two species, however, were soon found not to be congeneric with the original species, but instead of being taken out as a new generic type,[b] were allowed to remain as Thryallis, while the true type of that genus was transferred to Galphimia[c]. The following species either are new or have been published under Galphimia.

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[a] Page 554.

[b] Otto Kuntze in 1891 (Rev. Gen. Pl. **1**: 88) gave the name Hemsleyna to these species.

[c] Cav. Ic. **5**: 61. 1799.

KEY TO MEXICAN SPECIES.

Leaves very pubescent ..... *T. vestita.*
Leaves quite glabrous or nearly so.
  Leaves sessile..... ..... *T. sessilifolia.*
  Leaves distinctly petioled.
    Stems roughened ..... *T. tuberculata.*
    Stems not roughened.
      Glands borne on the petiole near its middle.
        Inflorescence glabrous ..... *T. palmeri.*
        Inflorescence not glabrous.
          Under surface of leaf more or less pubescent ..... *T. hirsuta.*
          Under surface of leaf glabrous..... *T. humboldtiana.*
Glands borne on or at the base of the blade.
  Gland stalked ..... *T. humilis.*
  Glands sessile.
    Mature leaves linear to linear-lanceolate. *T. linifolia.*
    Mature leaves broader than linear.
      Internodes longer than the leaves.
        Petioles nearly glabrous; flowers tinged with red..... *T. montana.*
        Petioles very pubescent; flowers tinged with green..... *T. angustifolia.*
      Internodes shorter than the leaves.
        Leaves lanceolate..... *T. gracilis.*
        Leaves oblong.
          Upper leaves acute; inflorescence lax ..... *T. glauca.*
          All leaves obtuse; inflorescence strict ..... *T. multicaulis.*

UNCERTAIN SPECIES.

T. grandiflora (Bartl.) Kunze.
T. glandulosa (Cav.) Kunze.
T. latifolia (Bartl.) Kunze.
T. paniculata (Bartl.) Kunze.

Thryallis angustifolia (Benth.) Rose.

Galphimia angustifolia Benth. Bot. Sulph 9. *pl. 5.* 1844.

This seems to be the common species of the west coast of Mexico, especially of Lower California. This species has been confused with *G. linifolia* Gray but is apparently distinct. Even if the two should be combined *T. angustifolia* would be the proper name.

Thryallis glandulosa (Cav.) Kuntze.

Thryallis glauca (Cav.) Kuntze.

Thryallis gracilis (Bartl.) Kuntze.

Thryallis grandiflora (Bartl.) Kuntze.

Thryallis hirsuta (Cav.) Kuntze.

Thryallis humboldtiana (Bartl.) Kuntze.

Thryallis humilis Rose, sp. nov.

Low bushy shrub, 30 to 60 cm. high, slightly pubescent; leaves lanceolate, 4 to 7 cm. long, 2 to 3 cm. broad, glabrous, very pale beneath, acute, tapering at base into a short petiole, somewhat revolute-margined at least in herbarium specimens, bearing a stalked gland on each margin a little distance above the base, but these sometimes

wanting; racemes terminal, elongated, sometimes 20 cm. long; pedicels slender, 1 to 1.5 cm. long; sepals glabrous, obtuse, alternating with small gland-tipped appendages; flower buds reddish; petals yellow, obtuse, 8 mm. long; fruit glabrous.

Collected by J. N. Rose on the road between Concepción and Acaponeta, Tepic, July 29, 1897 (no. 1907).

Type U. S. National Herbarium no. 300792.

Thryallis latifolia (Bartl.) Kuntze.

Thryallis linifolia (A. Gray) Kuntze.

Thryallis montana Rose, sp. nov.

A small shrub 1 to 2 meters high; branches reddish, glabrous; blade broadly ovate, 3 to 4 cm. long, 15 to 25 mm. broad, acute or sometimes rounded at apex, rounded or broadly cuneate at apex, bearing two sessile glands at base; petiole 5 to 7 mm. long; racemes 4 to 10 cm. long, slightly pubescent; pedicels 10 to 12 mm. long, jointed much below the middle; sepals oblong, glabrous, obtuse; petals 8 mm. long including the slender claw; fruit 4 mm. long.

Collected by J. N. Rose in southern Durango, August 15, 1897 (no. 2309).

Somewhat resembling *T. ovata*, but glands nearer the base of the leaf blade, the flowers smaller, etc.

Type in U. S. National Herbarium no. 301220.

Thryallis multicaulis (A. Juss.) Kuntze.

Thryallis palmeri Rose.

Galphimia glandulosa Rose, Contr. Nat. Herb. **5**: 137. 1897, not Cav. 1899.

Thryallis paniculata (Bartl.) Kuntze.

Thryallis sessilifolia Rose.

Galphimia sessilifolia Rose, Contr. Nat. Herb. **3**: 313. 1895.

Thryallis tuberculata Rose, sp. nov.

Low shrub, the young branches tuberculately roughened, each little knob crowned by a two-branched brown hair; leaf oblong, 3 to 5 cm. long, 7 to 12 mm. broad, obtuse, cuneate at base; petiole and mid-vein roughened like the petiole, otherwise glabrous, pale beneath, bearing two stalked glands at base of blade; raceme 10 to 15 cm. long, roughened like the stems; pedicels 10 mm. or so long; sepals oblong, obtuse, 3 mm. long; petals 8 mm. long; fruit not seen.

Collected by J. N. Rose between Rosario and Colomas, July 12, 1897 (no. 1607).

Not closely related to any other Mexican species. Easily distinguished by its roughened stem.

Type U. S. National Herbarium no. 300453.

Thryallis vestita (S. Wats.) Rose.

Galphimia vestita S. Wats. Proc. Am. Acad. **21**: 421. 1886.

EUPHORBIACEAE.

A NEW COMBINATION IN CNIDOSCOLUS AND A NEW SPECIES OF MOZINNA.

The genus Jatropha as treated by Müller[a] and most writers since his time contains several well-marked genera with good fruit, flower, and habit characters. Dr. J. K. Small[b] has recently restored Cnidoscolus Pohl. and Mozinna Ort.

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[a] DC. Prod. **15**: 1076. 1864–66.

[b] Fl. Southeast. U. S. 706. 1903.

Cnidoscolus palmeri (S. Wats.) Rose.

Jatropha palmeri S. Wats. Proc. Am. Acad. **24**: 76. 1889.

This rare species has heretofore been known from a single flowering plant found by Dr. E. Palmer near Guaymas, Mexico. Messrs. Nelson and Goldman have now collected both flowering and fruiting specimens some 20 miles east of San Ignacio, Lower California. These specimens, unlike the type material, have the long stinging hairs so characteristic of *C. urens* and *C. stimulosa*.

The inflorescence consists of only a few flowers; the fruit is shortly oblong in outline and about 1 cm. long.

Mozinna pauciflora Rose, sp. nov. PLATE XXII.

A large compact bush often with many stems, 3 to 4 meters high and often as broad; branches usually stunted, very young branches densely pubescent but older ones glabrate and reddish; leaves and flowers often borne in fascicles from old nodes on very short spurs, these crowded with the old stipules and persistent peduncles; leaves simple, rather thin, broadly obovate to spatulate, 4 to 6 cm. long, rounded at apex, narrowed at base into a short petiole, entire, softly pubescent on both surfaces; stipules dissected into linear segments, these brown-pubescent and persistent; flowers solitary, or sometimes several from the same spur, very short-peduncled, 1 to 2 mm. long; calyx 3 mm. long, green, pubescent, its 5-lobes about 2 mm. long; corolla red or pinkish, somewhat urn-shaped, 5 to 6 mm. long, pubescent without; stamens in two whorls, the longer ones reaching the mouth of the corolla; female flowers not seen; fruit glabrous, strongly flattened, 2 cm. broad, 1.5 cm. high, 2-celled; seeds globular, 1 cm. in diameter.

Common on the dry hills east of Tehuacán, Puebla.

Collected by Rose and Painter in August and September, 1905 (no. 9950), and by Rose and Rose, September 1, 1906 (no. 11247, type).

Type U. S. National Herbarium no. 454030.

EXPLANATION OF PLATE XXII.—Fig. *a*, branch; *b*, flower; *c*, stamens; *d*, gland; *e*, fruit; *f*, seed. Figs. *a*, *e*, and *f*, natural size; *b*, *c*, and *d*, scale 2.

CELASTRACEAE.

NEOPRINGLEA AND ITS TWO SPECIES.

In July, 1891, Dr. S. Watson proposed the name Neopringlea for Llavea Liebm., while in the same year, but later (November), Dr. Otto Kuntze proposed also the name Henningsocarpus.

The relationships of this genus are still doubtful, but for the present I shall leave it in Celastraceae, where it usually has been placed.

The two species are as follows:

Neopringlea integrifolia (Hemsl.) S. Wats. Proc. Am. Acad. **26**: 135. 1891.

Neopringlei viscosa (Liebm.) Rose.

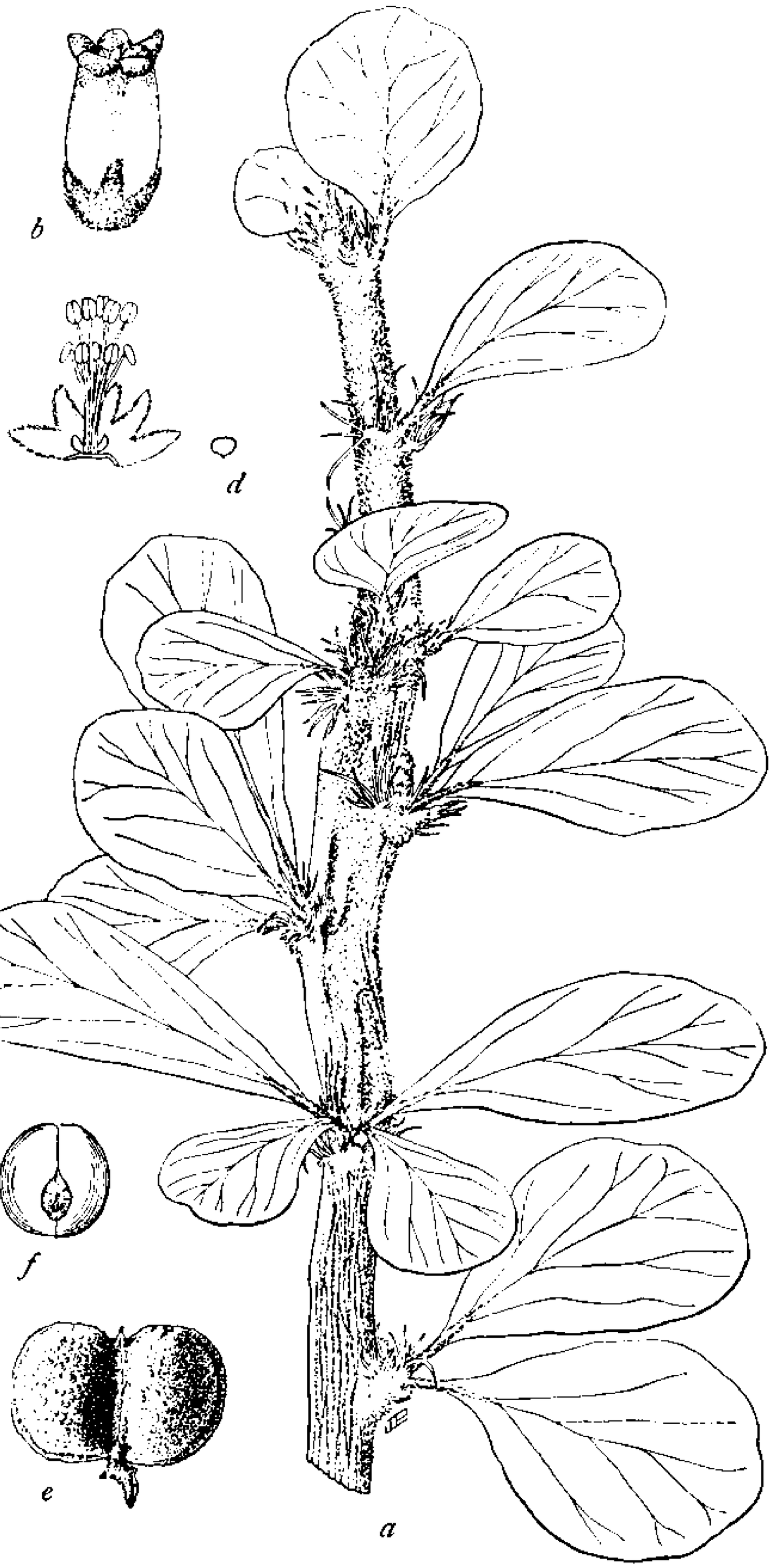
Llavea viscosa Liebm. Vidensk. Meddel. **1853**: 96. 1854.

Collected by J. N. Rose and Jos. H. Painter, near Tehuacán, Puebla, August and September, 1905 (no. 10021), and by J. N. and J. S. Rose near the same locality September 2 and 4, 1906 (nos. 11279 and 11432).

TWO NEW SPECIES OF WIMMERIA.

Since my synopsis of the genus Wimmeria was published[a] Prof. Radlkofer has added one new species, and two others are now proposed.

[a] Contr. Nat. Herb. **5**: 129. 1897.



MOZINNA PAUCIFLORA ROSE.

Wimmeria guatemalensis Rose, sp. nov.

Shrub with many short stubby branches; branches very pubescent; leaves small, 8 to 12 mm. long, obovate to spatulate, thickish, obtuse to retuse, pubescent on both surfaces, subentire; flowers not seen; pedicels pubescent; fruit 6 to 10 mm. long, glabrous.

Collected by E. W. Nelson near Nenton, Guatemala, December 13 to 15, 1895 (no. 3522).

This species is nearest *W. pubescens*, from which it is distinguished by its somewhat different leaves and glabrous fruit.

Type U. S. National Herbarium no. 274039.

Wimmeria lanceolata Rose, sp. nov.

Shrub 3 to 5 meters high; branches pale, glabrous; leaves lanceolate, 10 cm. or more long including the slender petiole, cuneate at base, long-acuminate, glabrous, coarsely crenate; flowers in small cymes; sepals orbicular, ciliate; petals cream-colored; fruit 12 to 18 mm. broad, 10 mm. or less high, strongly notched at apex, glabrous.

Collected by J. N. Rose and Jos. H. Painter near Iguala, Guerrero, August 10, 1905 (no. 9287, type), and by C. G. Pringle near Balsas Station, Guerrero, September 27, 1900 (no. 13511).

Type U. S. National Herbarium no. 452771.

Nearest *W. persifolia* Radlk., from which it may be known by its more lanceolate leaves not at all pubescent on the midrib and with coarser teeth, as well as by its strongly notched fruit.

Wimmeria microphylla Radlk. Bot. Centralbl. **15**: 359. 1903.

Collected by J. N. Rose and Jos. H. Painter near Tehuacán, 1905 (nos. 10013, 10129) and by J. N. Rose near the same locality, 1906 (nos. 11242, 11434).

RHAMNACEAE.

SIX SPECIES OF CEANOTHUS, FOUR NEW.

Ceanothus australis Rose, sp. nov.

Shrub, 2 to 3 meters high, spineless; branches very regular, elongated, 10 to 15 cm. long; leaves opposite, 10 to 18 mm. long, much longer than the internodes, one-nerved, thick, often retuse at apex, pale green; stipular glands large and long-persistent; pedicels slender, pubescent; flowers white.

Collected by E. W. Nelson near Coixtlahuaca, Oaxaca, November 12, 1894 (no. 1914).

Type U. S. National Herbarium no. 569221.

This species belongs to the section Cerastes and is perhaps nearest *C. greggii*, but it has much longer branches and larger leaves.

Ceanothus candolleanus Rose, sp. nov.

Bush 3 to 5 meters high; young branches pubescent; leaves oblong, above glabrous or at least glabrate, beneath densely brownish-tomentose, 5-nerved, rather broad at base, obtuse, serrate, the teeth tipped by red (in age black) glands; pedicels slender, 4 to 5 mm. long, glabrous, bluish; calyx teeth acute; petals blue.

Specimens examined:

Federal District: Near Eslava, C. G. Pringle, November, 1903 (no. 11395); San Nicolas, M. Bourgeau, 1865 (no. 994).

Type U. S. National Herbarium no. 460858.

This species seems to be the *C. azureus* of DeCandolle's Prodromus[a] which came from San Angel near the two stations mentioned above. Here may also belong the

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([a] 2: 31. 1825.)

C. bicolor Humb. & Bonpl. and the *C. caerulea* of Humboldt, Bonpland, and Kunth, but their plant is described as having acute leaves and very short pedicels (1 line long).

Ceanothus goldmanii Rose, sp. nov.

Shrub 2 to 4 meters high; young branches reddish-pubescent; leaves opposite; ovate to orbicular in outline, acute or obtuse, the margin bearing a few sharp teeth, thick and coriaceous, puberulent above, pubescent beneath; pedicels glabrous; petals white.

Common in the mountains of Northern Lower California.

Specimens examined:

Lower California: La Huerta, E. A. Goldman, June 2, 1905 (no. 1126, type); San Pedro Martir Mountains, E. A. Goldman, July 5, 1905 (no. 1207); also T. S. Brandegee, May 28, 1889.

Type U. S. National Herbarium no. 565036.

This species has heretofore been passing as *C. rigidus*, but it grows in very different situations, and has very characteristic leaves with white instead of pink flowers.

Ceanothus lanuginosus (Jones) Rose.

Ceanothus greggii lanuginosus Jones, Proc. Calif. Acad. II. **5**: 629. 1895.

Mr. Jones's variety seems quite distinct from the true *C. greggii* and surely deserves specific rank.

Ceanothus parvifolius (S. Wats.) Rose.

Ceanothus azureus parrifolius S. Wats. Proc. Am. Acad. **23**: 270. 1880.

Ceanothus submontanus Rose, sp. nov.

Shrub, 1 to 3 meters high, much branched; bark of first year's branches reddish, covered with soft cinereous pubescence, the older branches light gray; leaves opposite, oblong-cuneate, pale and pubescent above, pubescent beneath, 6 to 16 mm. long, entire, rounded at apex; pedicels slender, glabrous, and somewhat glutinose in age; capsule globular, 5 mm. in diameter, bearing three prominent projections above the middle.

Collected by E. A. Goldman near Alamo, Lower California, July 11, 1905 (no. 1140, type) and at Piñon on northwest slope of San Pedro Martir Mountains, July 5, 1905 (no. 1209).

The type is U. S. National Herbarium no. 365049.

This species belongs to the section Cerastes and is nearest *C. cuneatus*, but differs from the typical specimens of that species in the nature and color of the pubescence, in having the leaves paler above and not so white beneath, and in its more globular fruit.

VITACEAE.

A NEW CISSUS.

Cissus subtruncata Rose, sp. nov.

Stems creeping or climbing; softly pubescent; leaves broadly ovate, rounded-truncate or slightly cordate at base, obtuse, acute or slightly acuminate, densely lanate-pubescent beneath especially when young, more or less pubescent above; inflorescence compound, subumbellate, pubescent; pedicels slender, pubescent, nodding in fruit; calyx cup-shaped, pubescent; sepals rounded, scarious-margined; pedicels glabrous, 2 mm. long; ovary glabrous; style glabrous, 1 to 1.5 mm. long.

Collected by J. N. Rose near Oaxaca City, June, 1899 (no. 4614).

Type U. S. National Herbarium no. 346595.

This species differs in several respects from true *C. sicyoides*, especially in its hairy pedicels and very pubescent young leaves.

TILIACEAE.

FOUR NEW SPECIES OF TRIUMFETTA.

The genus Triumfetta has long been in need of revision, and some years ago I hoped to present a preliminary treatment of the Mexican species, but I have not been able to finish it. While trying to arrange the Mexican material in the National Herbarium I discovered the following new species:

Triumfetta falcifera Rose, sp. nov.

Low, bushy shrubs, 90 to 150 cm. high; branches densely pilose; leaves lanceolate, long-acuminate, rounded at base, 7 to 10 cm. long, with scattered simple and stellate hairs above, densely and softly stellate beneath; flowers in small axillary clusters or in narrow more or less elongated panicles; sepals densely pubescent, about 6 mm. long, the appendages 4 mm. long, often 2-parted, sometimes 3-toothed; petals yellow; stamens indefinite; fruit orbicular, covered with stout short prickles, nearly glabrous, 4-celled.

Collected by Dr. E. Palmer near Acapulco in 1894–95 (nos. 63 & 266).

Type U. S. National Herbarium no. 266324.

Triumfetta dehiscens Rose, sp. nov.

Stems shrubby; young branches with dense reddish stellate pubescence; upper leaves short-petioled, lanceolate, acuminate, very irregularly serrate, the lower teeth glandular, the young ones very pale beneath, densely soft-stellate, greener and less stellate above; fruit orbicular, covered with short glabrous prickles, 5-celled, dehiscing when mature.

Collected by J. N. Rose near Colomas, July 16, 1897 (no. 1698).

Type U. S. National Herbarium no. 300559.

Very different from most species of the genus, which have indehiscent fruit.

Triumfetta discolor Rose, sp. nov.

Plants growing in clumps, 60 to 90 cm. high; branches pubescent with fine hairs interspersed with coarse stellate or simple pilose ones; leaves with petioles about the length of the blade, the blade nearly orbicular in outline and obtuse, rarely ovate and acutish, 2 to 7 cm. in diameter, greenish above with rough scattered stellate hairs, white beneath with a dense stellate tomentum; inflorescence terminal in a mostly naked narrow panicle; sepals 4 or 5, brownish, somewhat stellate, the appendage slender (2 to 3 mm. long); petals bright yellow, about the length of the sepals, hairy at base; stamens about 20; fruit not seen.

Collected by J. N. Rose between Pedro Paulo and San Blascito, Territorio de Tepic, August 4, 1897 (no. 1979 type), and on the east slope of the west range and the west slope of the east range of the Sierra Madre in the State of Durango, August 13 and 15 (nos. 2255 and 3305).

Type U. S. National Herbarium no. 300870.

A very beautiful species which does not approach any other described from Mexico. *T. socorrensis* has somewhat smaller but thicker leaves.

Triumfetta goldmanii Rose, sp. nov.

Branches at first covered with small stellate hairs but soon becoming glabrate; leaves lanceolate, rounded at base, acuminate, green but with scattered simple, appressed hairs above, paler and somewhat more pubescent (hairs also simple) beneath, crenately toothed, 5 to 7 cm. long; petioles short (in specimens seen), 1 cm. long; flowers usually in umbels of 2 or 3; peduncles 1 to 3 in the upper axils, 3 to 4 mm. long; pedicels 4 to 10 mm. long; calyx 15 to 16 mm. long, covered with small stellate hairs without and bearing a small erect appendage just below the tip; petals yellow; anthers reddish; ovary and fruit sessile; fruit glabrous but covered with stout bristles, somewhat rugose, globose, 5 mm. in diameter.

Collected by E. A. Goldman on the Sierra de Choix, 50 miles northeast of the town of Choix, State of Sinaloa, October 17, 1898 (no. 264).

Type U. S. National Herbarium no. 335763.

MALVACEAE.

MISCELLANEOUS SPECIES.

Gaya violacea Rose, sp. nov.

A slender erect shrub up to 2 meters high, the branches clothed with short soft pubescence together with long spreading hairs; petioles 4 to 6 cm. long; blade ovate, acuminate, coarsely crenate, cordate at base, the sinus either narrow or closed, becoming glabrate above, finely stellate-pubescent beneath; peduncles slender, a little shorter than the petioles, pilose as well as stellate-pubescent; calyx lobes ovate, acute; petals violet; carpels 9, each one-seeded.

Collected by C. G. Pringle under dry cliffs on the Sierra Madre above Monterey, 1906 (no. 10221).

Type in U. S. National Herbarium no. 462260.

This species is not very near any of the known Mexican species of Gaya, differing from them all in its violet or purplish flowers.

Malvastrum[a] **bicuspidatum** (S. Wats.) Rose.

Malvastrum tricuspidatum bicuspidatum S. Wats. Proc. Am. Acad. **21**: 417. 1886.

In 1885 Dr. S. Watson briefly described his variety *bicuspidatum* of *Malvastrum tricuspidatum*, which Mr. E. G. Baker later referred to *Malvastrum scabrum*, to which it is much more closely related. In the National Herbarium we have considerable material labeled *M. scabrum* besides the Wilkes specimen from Peru, which appears to be true *M. scabrum*. A careful study of the Mexican species convinces me that the supposed variety deserves specific rank. It differs from *M. scabrum* in its smaller leaves, these never cordate but cuneate at base, the flowers always solitary, the peduncles shorter, the sepals more acuminate, the carpels also slightly different.

The following specimens have recently been collected:

Morelos: Near Cuernavaca, Rose & Painter, September, 1905 (no. 10246).
Guanajuato: Leon, Rose & Lozano, September, 1906.

Wissadula microcalyx Rose, sp. nov.

Stems herbaceous, 1 to 2 meters high, much branched, clothed with yellow glandular spreading hairs; leaves broadly ovate, sometimes 3-lobed, the lower ones 15 cm. long, acuminate, crenately toothed, cordate at base, stellate-pubescent beneath; inflorescence paniculate; calyx small, the lobes broadly ovate; corolla deep yellow, 3 cm. in diameter; carpels obtuse, 3-seeded.

Collected by J. N. Rose on the mountains west of Tehuacin, September 12, 1906 (no. 11418).

Type U. S. National Herbarium no. 454200.

LOASACEAE.

TWO NEW SPECIES OF EUCNIDE.

Eucnida nelsonii Rose, sp. nov.

Pubescence on stems soft and spreading; leaves all petiolate, nearly orbicular, 5 to 60 mm. long, with rough pubescence on both surfaces, irregularly lobed and toothed; pedicels 2 mm. or less long; calyx lobes linear-oblong, 1 cm. long; petals erect, 2.5 mm. long; stamens numerous, longer than the petals.

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[a] Malvaeopsis C. Presl has priority over Malvastrum and accordingly has been substituted for it by some writers. It is not at all clear to my mind that these two names belong to the same genus and I therefore propose provisionally to retain Malvastrum. The Vienna Congress has also retained this name, but for a different reason.

Collected by E. W. Nelson at La Salada, Michoacan, March 15 to 22, 1903 (no. 6926).
Type U. S. National Herbarium no. 399295.
Perhaps nearest *E. cordata*, but with softer pubescence, less lobed leaves, and nearly glabrous petals.

Eucnida pringlei Rose, sp. nov.

A rather coarse climbing plant; pubescence on stems and branches soft and spreading; leaves long-petioled, the upper ones often 7 cm. long, broadly ovate, 8 to 15 cm. long, rounded at apex, more or less cordate at base; pedicels 2 to 3 cm. long; calyx 15 to 17 mm. long; petals erect, 3.2 to 3.8 cm. long; stamens numerous, 5 cm. long.
Collected by C. G. Pringle on limestone cliffs in the Iguala Cañon, altitude 750 meters, September 22, 1905 (no. 10077).
Type U. S. National Herbarium no. 462126.

LYTHRACEAE.

SIX NEW SPECIES OF CUPHEA.

It is with considerable reluctance that I continue to use the name Cuphea instead of Parsonsia, but Prof. E. Koehne, who has for so many years given attention to the genus, still thinks that Cuphea had better be retained, and for the present I have accepted his advice; but I still believe that Parsonsia should be used. Until Prof. Koehne or some one else can revise and transfer all the species these may as well wait in Cuphea.

Cuphea goldmanii Rose, sp. nov.

FIGURE 28.

Shrub 1 to 2 meters high; old branches brownish, with very short pubescence; young branches with soft white hairs and stiff purple ones, as also with sessile glands; leaves lanceolate, shortly acuminate, rounded at base, short-petioled, pale and pubescent beneath, dark and with coarse pubescence above, almost scabrous; flowers axillary; calyx 18 to 20 mm. long, pubescent, spurred at base, the teeth all large, the upper ones much larger; petals 6, all of the same color, dark red, distinctly clawed, the two upper a little larger; stamens 11, the longer ones exserted; gland large, reflexed; style slender, glabrous; seeds 35 to 40.

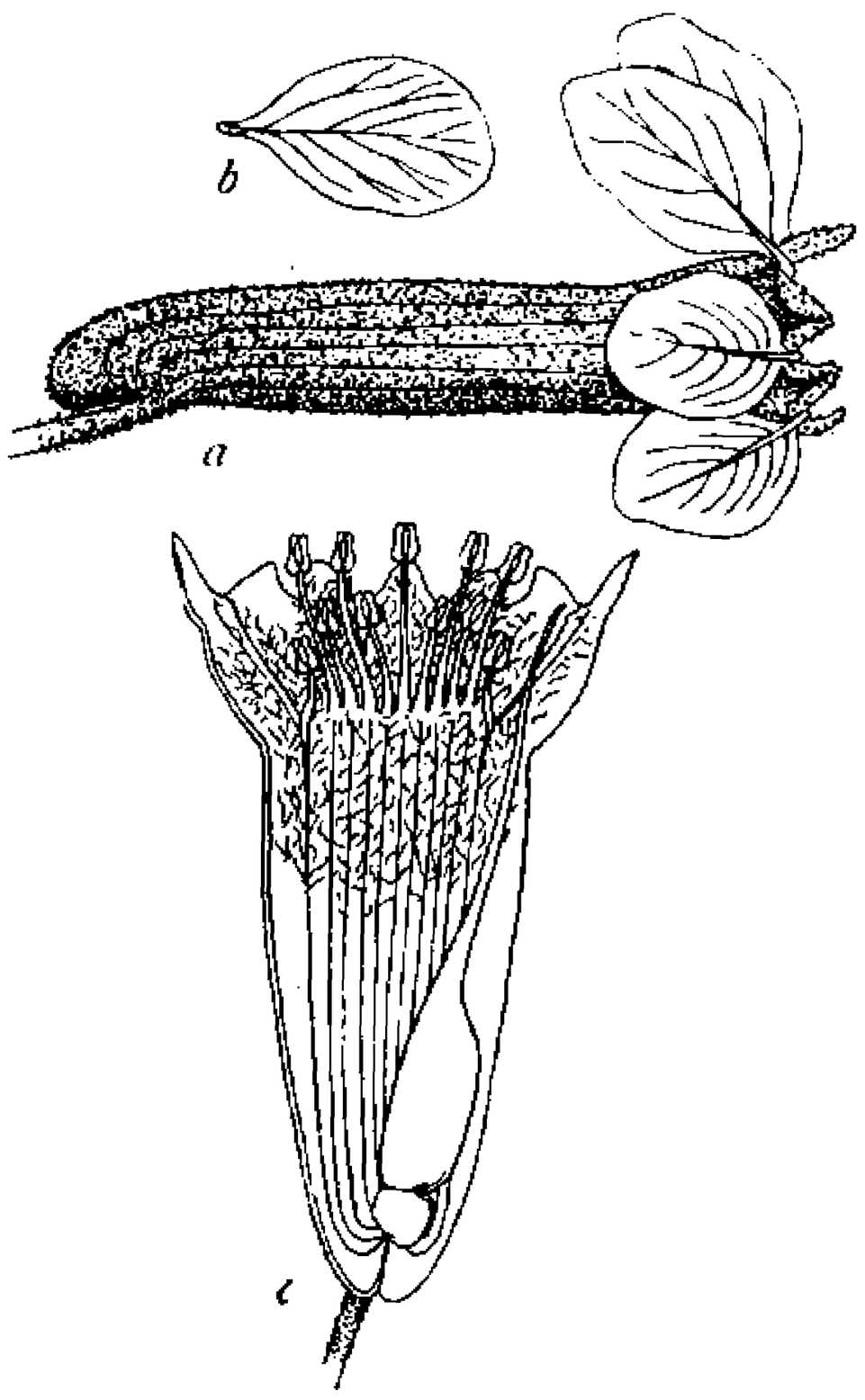


FIG. 28.—Flower and petal of *Cuphea goldmanii*. *a*, Natural state; *b*, petal; *c*, without petals, opened. Scale 2.

Collected by E. A. Goldman at Comitan, Chiapas, April 3, 1904 (no. 824).
Type U. S. National Herbarium no. 470627.
Perhaps nearest *Cuphea llavea*, but very different.

Cuphea imberbis Rose, Engl. Bot. Jahrb. **41**: 94. 1907. FIGURE 29.

Probably an annual, 30 to 40 cm. high; purplish at the nodes, with very short close pubescence; leaves thin, somewhat lanceolate, tapering toward the apex, cuneate at base, short-petioled, with roughish pubescence on both surfaces; flowers axillary, solitary; peduncle 10 to 12 mm. long, bibracteolate at top; calyx tube elongated, 2 cm. long, with close pubescence and a few long stiff hairs, the upper sepal much longer, the appendages alternate, the calyx tube longer than the lobes; two dorsal petals violet purple, 10 to 12 mm. long, tapering at base into a slender claw, subtended at base by a large squama; 4 ventral petals erect, small, 2 mm. long, white; stamens 9, all glabrous, 5 exserted; disk one-sided, reflexed; capsule 12-seeded.

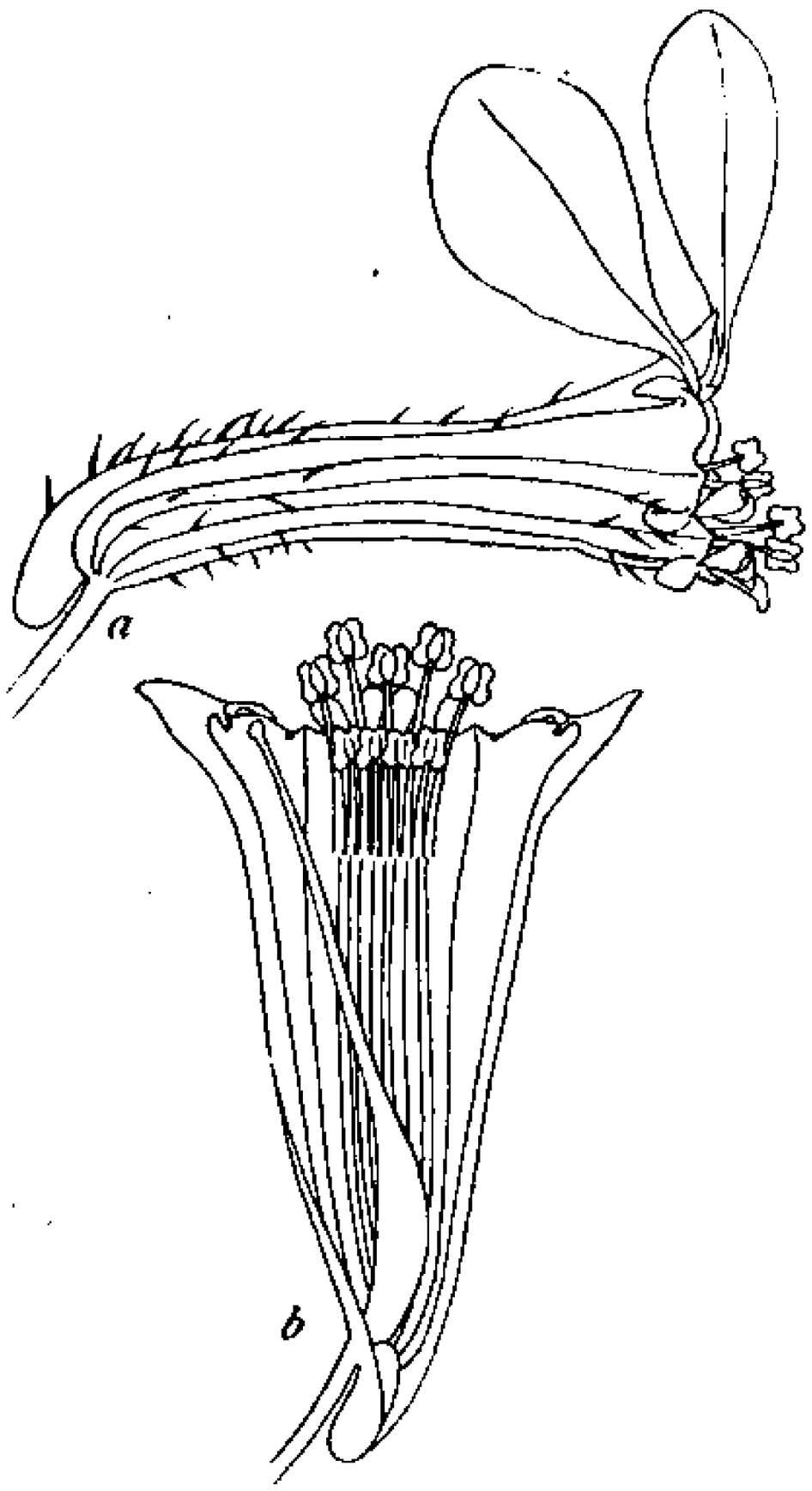


FIG. 29.—Flower of *Cuphea imberbis*. *a*, Natural state; *b*, without petals, opened. Scale 2.

Collected by C. G. Pringle near Trinidad, Puebla, 1906 (no. 8979).

This species is to be placed near *C. palmeri*.

Cuphea lozanii Rose, Engl. Bot. Jahrb. **41**: 91. 1907. FIGURE 30.

Annual, either simple or somewhat branched, 20 to 30 cm. high, with pubescence of two kinds, one of short white retrorse hairs, the other of the long spreading red or yellow hairs; leaves narrowly lanceolate, or the upper ones linear, 1.5 to 3 cm. long, subsessile, acute; peduncles short; prophylla black, small, deeply parted, appearing as a fringed involucre; calyx 12 to 14 mm. long, purple on one side, with short, scabrous pubescence and a few long scattered hairs; upper lobe much broader than the others; spur rather short; petals 6, large, nearly equal, deep purple; two longer stamens covered with dense purple wool; seeds 4 to 6.

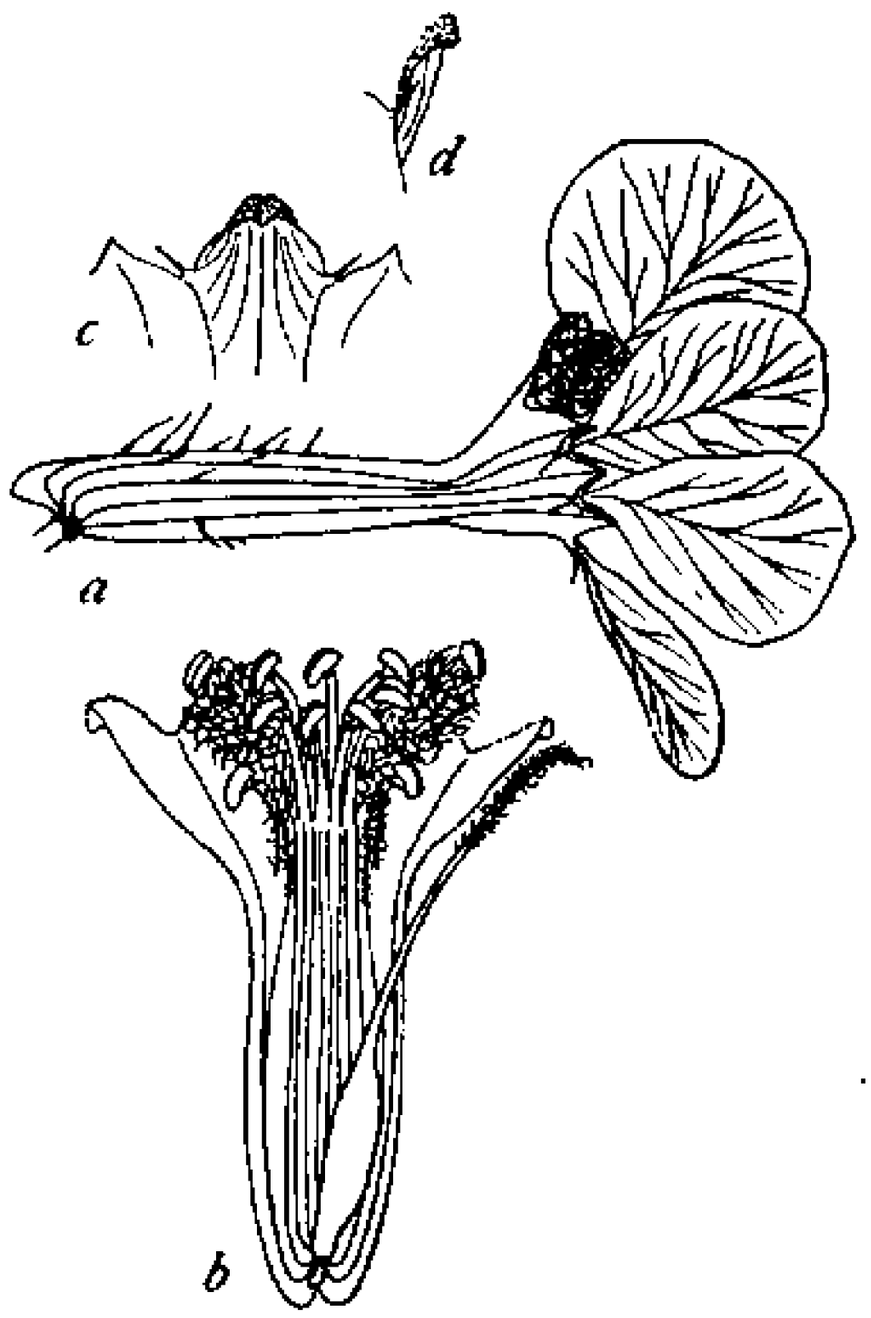


FIG. 30.—Flower and sepal of *Cuphea lozanii*. *a*, Natural state; *b*, without petals, opened; *c*, front view of upper sepal; *d*, side view of same. Scale 2.

Collected by C. G. Pringle and Filemón Lozano at Etzatlan, Jalisco, 1904 (no. 8858).

This species is nearest *C. lophostoma*, but with different pubescence, foliage, prophylla, etc.

Cuphea lutea Rose, Engl. Bot. Jahrb. **41**: 87. 1907.

Annual; stems (and foliage) yellowish green, slender, much branched, clothed with long spreading purplish hairs and a fine short pubescence arranged in lines; leaves petioled, lanceolate, obtuse, pubescent with long scattered hairs and short hispid hairs; calyx short-pediceled, 7 to 8 mm. long, usually with none but the long spreading hairs, yellow green to purplish brown; dorsal sepal much longer; two dorsal petals 6 to 7 mm. long, purplish; 4 ventral petals yellow, narrow, 2 mm. long.

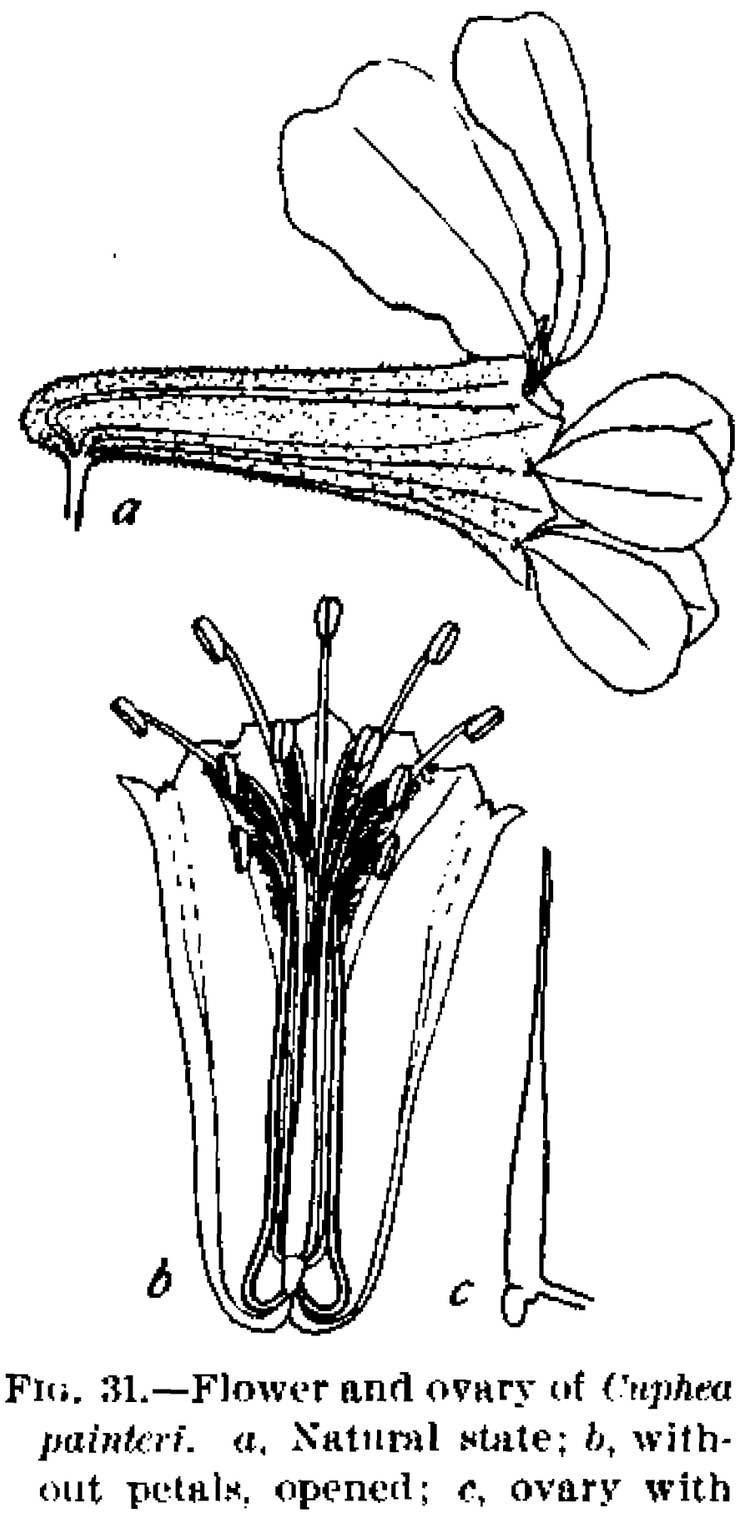


FIG. 31.—Flower and ovary of *Cuphea painteri*. *a*, Natural state; *b*, without petals, opened; *c*, ovary with basal gland. Scale 2.

Specimens examined:

Oaxaca: Valley of Oaxaca, Nelson, September 20, 1894 (no. 1457a); Pringle same year and locality (no. 5725); Cuicatlan, Nelson, 1894 (no. 1689), type; Telixtlahuaca, Lucius C. Smith, 1895 (no. 536).

This species resembles *C. tolucana*, but is more branched, has the ventral petals yellow, etc.

Cuphea painteri Rose, Engl. Bot. Jahrb. **41**: 91. 1907. FIGURE 31.

Perennial, somewhat frutescent at base, 30 to 50 cm. tall, somewhat branching; the old stems shreddy at base, above bearing stiff reflexed hairs with scattered spreading longer ones and in the inflorescence somewhat viscid; leaves lanceolate, 4 to 6 cm. long, acute, cuneate at base, roughened on both sides, borne on short slender petioles; inflorescence a narrow panicle, 5 to 20 cm. long; bracts linear; pedicels slender; corolla lilac-colored, setose, 14 mm. long, glabrous within and with two longitudinal wings; spur pronounced, rounded; petals deep lilac, the 2 dorsal nearly orbicular, 6 mm. long including the short claw; the 4 ventral ones orbicular, sessile, half as long as the dorsal ones; stamens 11; style and capsule glabrous; gland reflexed; seeds about 20.

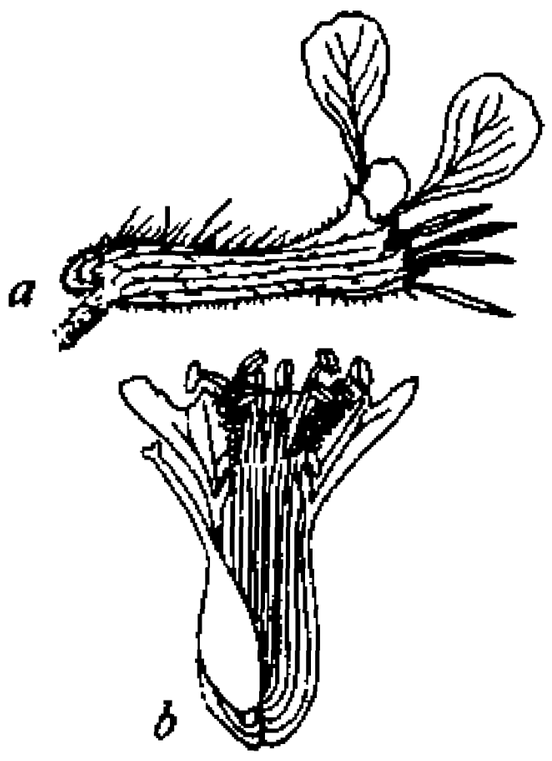


FIG. 32.—Flower of *Cuphea viscosa*. *a*, Natural state; *b*, without petals, opened. Scale 2.

Collected at Etzatlan, Jalisco, Mexico, by J. N. Rose and Jos. H. Painter, October 2, 1903 (no. 7532), and at the same locality later by C. G. Pringle (no. 8770).

This species in habit and foliage resembles *C. hookeriana*, but is quite different in the color of the calyx, petals, etc. I found this species on the same mountain as the latter, but not at as great an elevation.

Cuphea viscosa Rose, Engl. Bot. Jahrb. **41**: 89. 1907. FIGURE 32.

Annual; stems branching; branches slender, terminating in long slender erect racemes, clothed with short clammy pubescence; leaves lanceolate, cuneate at base, slender-petioled, the margin and petiole glandular-ciliate, the two surfaces glabrate; pedicels 5 to 6 mm. long, glandular-pubescent; calyx 8 mm. long, slender, hirsute with purplish hairs below, these especially noticeable in unopened flowers, much enlarged and nearly glabrous above; dorsal lobe enlarged; petals 6, the 2 dorsal ones purplish, oblong, obtuse, 6 mm. long, including the slender claw, the 4 ventral linear, 3 mm.

long, only seen in unopened buds; stamens 11; dorsal stamens glabrous above, woolly below; ovary and style glabrous; ovules and seeds 3.

This species belongs to the section Heterodon.

Collected by C. G. Pringle, from holes in limestone ledges of mountains above Iguala, Guerrero, altitude 1,050 meters, October 3, 1900 (no. 8392).

CACTACEAE.

MISCELLANEOUS NEW SPECIES.

Cactus maxonii Rose, Smithson. Misc. Coll. **50**: 63. 1907.

Melocactus guatemalensis Gürke & Eichlam, Monatsschr. Kakteenk. **18**: 37. 1908.

Melocactus maxonii Gürke, Monatsschr. Kakteenk. **18**: 93. 1908.

Plant body simple, deep green, broadly cone-shaped or short-cylindrical, 10 to 15 cm. high; cephalium rather small, consisting of a mass of white wool and brown bristles; ribs 11 to 15, rather broad, either mottled or plain; spines generally 9, rarely only 8, sometimes with several smaller ones, making 11 in all, the central 1 (rarely 2) short, standing nearly at right angles to the rib, 1.5 to 2 cm. long; radial spines spreading or even recurved, pale red or rose-colored with a whitish bloom, but when old colored amber; flowers small, rose-colored; fruit narrowly oblong or club-shaped, red, resembling that of Mamillaria; seeds black, shining.

Collected in Guatemala near El Rancho by W. R. Maxon in 1905 (no. 3766) and near Salama, January 22, 1905 (no. 3378); also collected in Guatemala by Prof. W. A. Kellerman. Both collectors sent living plants to Washington, and this description is drawn up from this material.

Perhaps nearest *C. neryi* but with more numerous ribs, with a smaller cephalium, and with the spines almost always 9.

Echinocactus megarrhizus Rose, sp. nov.

Roots large and fleshy, either solitary or in clusters of three or four; plant body nearly globular or a little elongated, 5 to 8 cm. high, usually solitary; ribs divided into spirally disposed mammae; mammae dark green, 4 to 5 mm. high; radial spines 20 or more, pectinate, at first pale yellow, in age white; in seedlings the spines all pubescent; centrals usually 4, the 3 upper similar to although a little larger than the radial, in young areoles not easily distinguished from them, the lower radial stout and strongly hooked, 15 mm. long; flowers not seen; fruit green, suggesting that of a Mamillaria, clavate, bearing a few naked scales near the top; seeds black, smooth, shining.

Collected by Dr. E. Palmer near Victoria, Mexico (no. 107, 1907).

Type U. S. National Herbarium no. 572337.

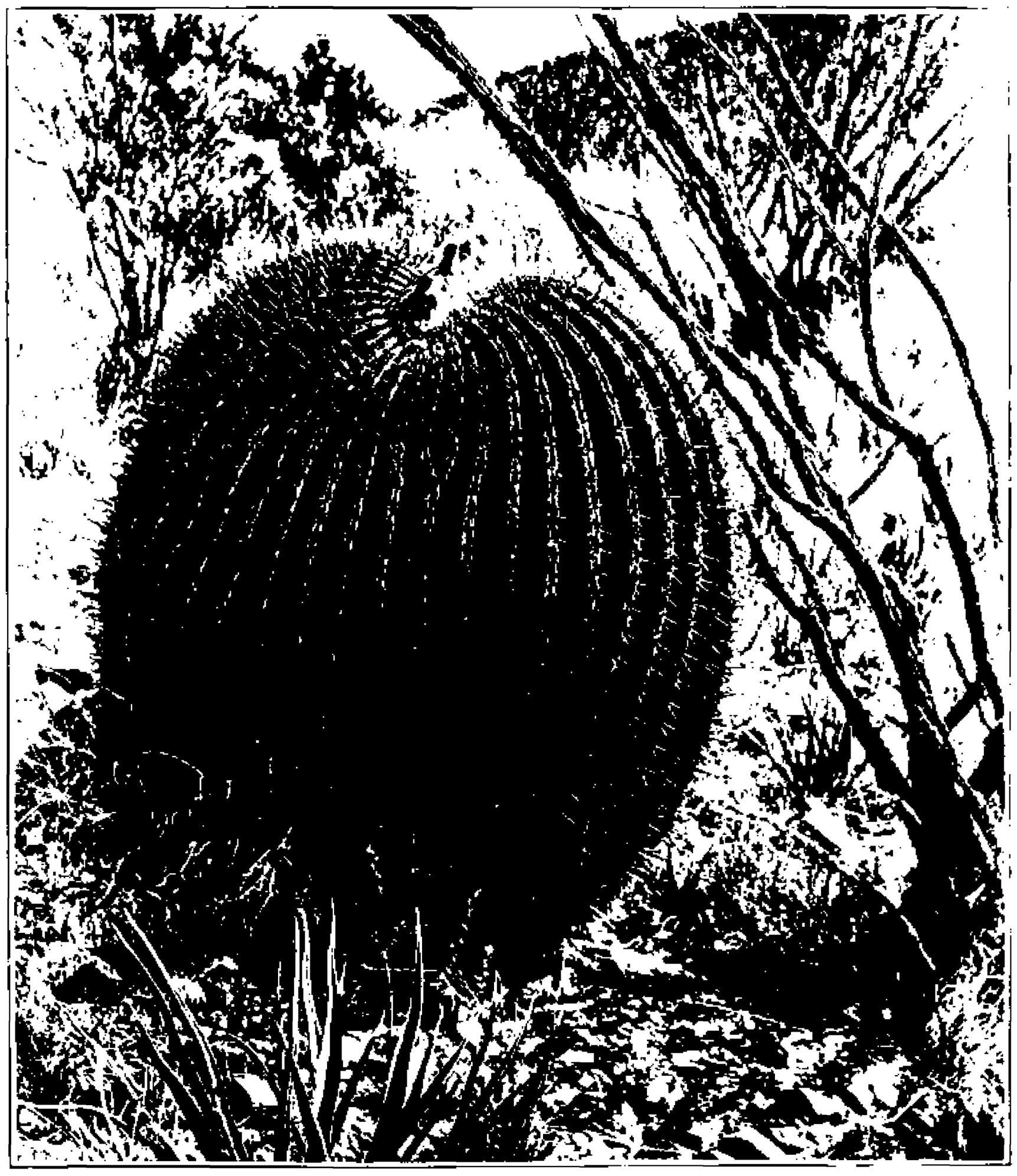
This species is near *E. brevihamatus* and *E. scheeri*, but has differently colored spines, and differs in technical details.

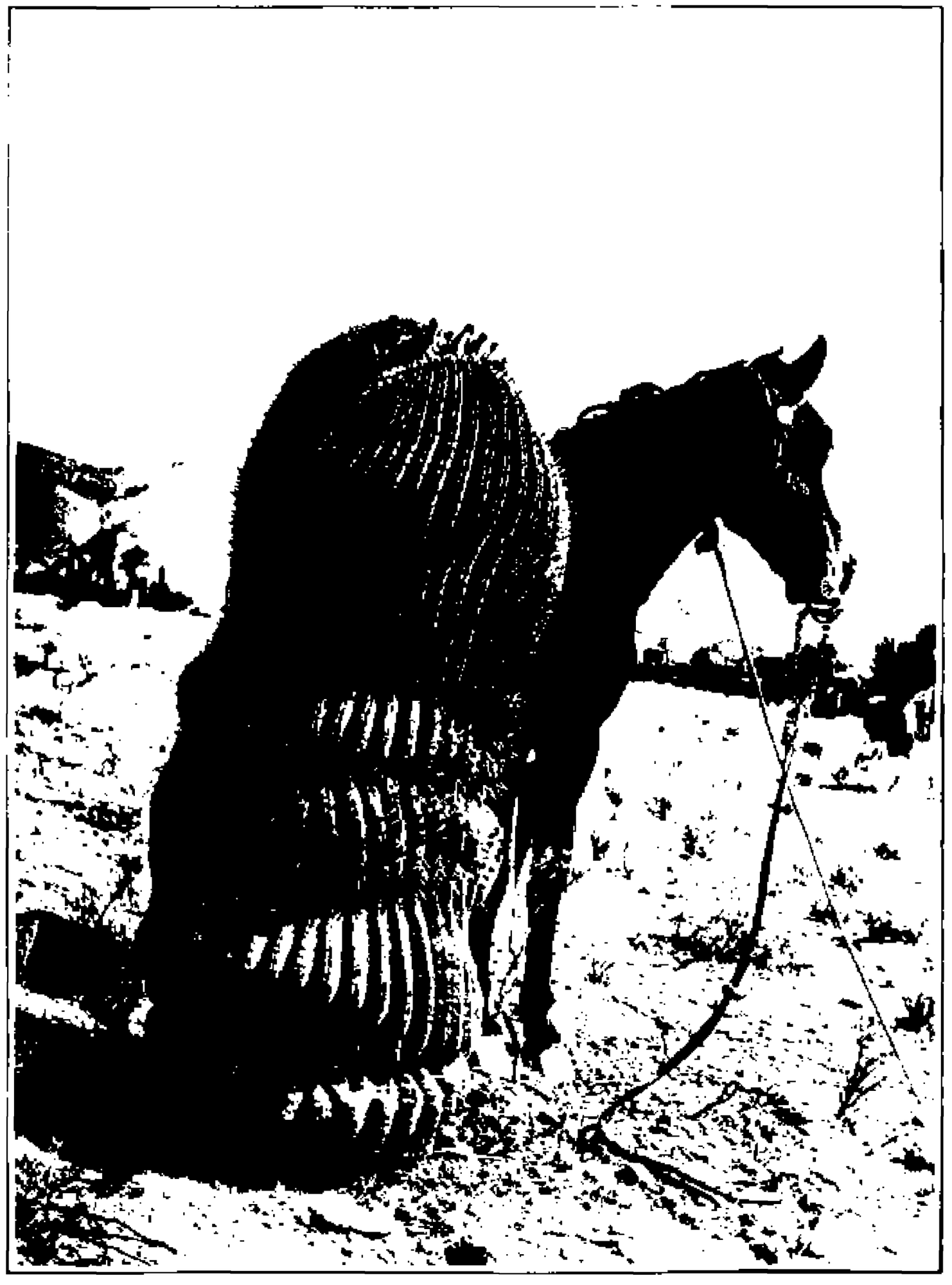
Echinocactus palmeri Rose, sp. nov. PLATE XXIII

Stems 100 to 150 cm. or more high, 40 to 50 cm. in diameter; ribs 12, 20, 26, or perhaps more in large plants; central spines 4, annular, the upper one erect, 6 to 8 cm. long, stout, straight, yellow above, brownish and somewhat swollen at base, the 3 lower shorter, spreading, similar in color and markings but flattened; radials 5 to 8, much smaller, lighter-colored and weaker; flowers rather small, yellow, about 2 cm. long; sepals and petals more or less lacerated along the margin; fruit about 3 cm. long, hidden in a dense covering of soft white wool; bracts weak and bristle-tipped.

This is the well-known *Echinocactus saltillensis* of horticultural collections, but is not the species first described under that name.

Not uncommon from southern Coahuila to Zacatecas.





ECHINOCACTUS PALMERI ROSE.

OPUNTIA AZUREA ROSE.

Specimens examined:

Zacatecas: Concepción del Rio, Dr. E. Palmer, August 11 to 14, 1904 (no. 324, type); same State, F. E. Lloyd, 1908 (no. 12).

Type U. S. National Herbarium no. 471193.

Dr. E. Palmer calls this the "barrel cactus," and states that it is cooked in syrup and made into candy. F. E. Lloyd writes of it as follows: "Biznaga burra. The most striking cactus of this region, where it is found on the higher foothill slopes and in the hills on the slopes facing the south, with only very few exceptions. Growing point depressed, elongate-ovate, except in very young plants, in which it is round, as in cacti in general; marked by a dense felt of wool of light brown color. Two meters in height. Spines brown in young, yellow in old plants. Ridges furrowed in older plants. Flowers entirely lemon-yellow, as well as the fruit, which is dry, hollow, with persistent perianth."

Echinocactus victoriensis Rose, sp. nov.

Plants never cespitose; plant body globular or somewhat depressed; 10 to 30 cm. in diameter, of a bright glossy green color; ribs usually 11, rather thin, 2 to 3 cm. deep, acute, 4 to 6 cm. apart at widest point; areoles few, 3 to 4 cm. apart, rather small; spines all bright yellow; radials 7 or 8, only slightly spreading from the central; central 1, a little longer and stouter than the others, 3 to 4 cm. long; flowering part of areole filled with short brownish wool but hardly forming enough to give a cap to plant; petals yellow, about 3 cm. long; ovary about 2 cm. long, the small broadly ovate bracts naked in the angles; seeds brownish black, shining, about 2 mm. in diameter.

Not very common in rocky places above Victoria, Mexico.

Collected by Dr. E. Palmer, April 9, 1907 (no. 267); living specimens sent to Washington, no. 07. 206.

Type U. S. National Herbarium no. 572498.

Individual specimens of this species much resemble *E. robustus*, but the material in general presents a type different in habit, spines, and flowers. Called "visnaga."

Opuntia azurea Rose, sp. nov. PLATE XXIV. FIGURE 33.

A compact upright plant with a single trunk, 1 to 2 meters high; joints orbicular to obovate, 10 to 15 cm. in diameter, pale bluish green, glaucous; areoles about 2 cm. apart, bearing numerous brown glochides, the lower ones without spines, the upper ones with 1 to 3 more or less reflexed spines; spines almost black, at least when old, unequal, the longer ones 2 to 3 cm. long; petals deep yellow, 3 cm. long, with crimson claw, but in age pink throughout; filaments greenish or almost white; anthers pale yellow; stigmas pale green; fruit dull crimson, subglobose to ovate, truncate, spineless, the pulp light green, juicy and edible.

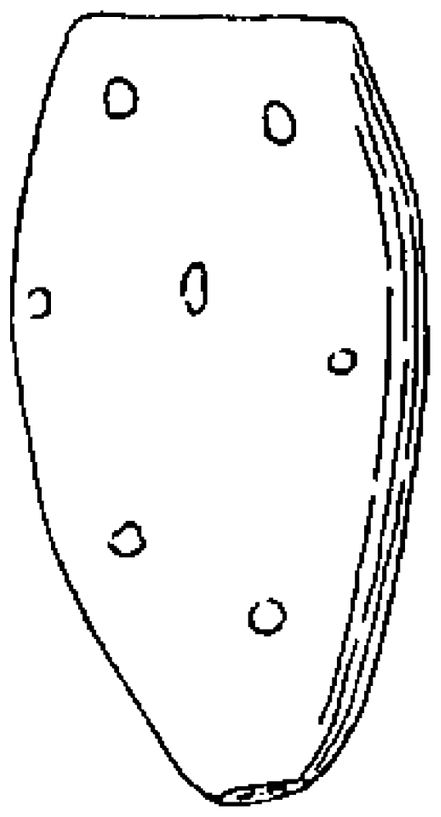


FIG. 33.—Fruit of *Opuntia azurea*. Natural size.

Collected by F. E. Lloyd, in northeastern Zacatecas, 1908 (no. 30).

Type U. S. National Herbarium no. 535132.

Called in Mexico "nopalito" and "nopal coyotillo." Perhaps near *O. phaeacantha*, but surely very distinct.

EXPLANATION OF PLATE XXIV.—From photograph taken by F. E. Lloyd in northern Zacatecas.

Opuntia chihuahuensis Rose, sp. nov.

Low spreading plants; old joints yellowish-green, obovate, 10 to 15 cm. long; areoles rather few, distant, 2 to 4 cm. apart; lower areoles spineless, the upper ones bearing 1, 2, or 3 normal spines, these brownish, porrect, 4 to 6 cm. long, terete or a little flattened, often with 1 or 2 shorter whitish ones added; joints, when very young,

shiny, brownish, the areoles bearing at first a single brown spine and small brownish, terete, acute leaves; petals obovate, 3 cm. long, obtuse, yellow with reddish bases (when dry); ovary spineless but the few areoles crowded with brownish bristles.

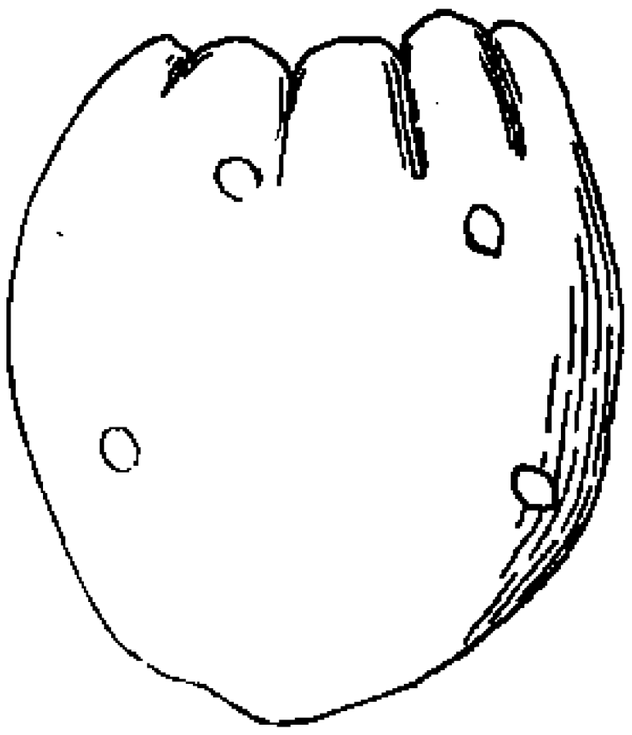


FIG. 34.—Fruit of *Opuntia lloydii*. Natural size.

Described in part in the field from living plants in April, 1908, and in part from herbarium specimens collected from the same colony at flowering time by Dr. E. Palmer.

Specimens examined:

Chihuahua: Santa Eulalia near Chihuahua City, J. N. Rose, April, 1908 (no. 11675); same locality, Dr. E. Palmer, 1908 (no. 69, type).

Type U. S. National Herbarium no. 573546.

This species is nearest *O. phaeacantha*, from which it differs in its larger, broader joints and lighter-colored spines and in its distribution, which is considerably south of the range of that species.

Opuntia lloydii Rose, sp. nov.

PLATE XXV. FIGURE 34.

A much branched shrub, 2 to 3 meters high; joints when young green, becoming glaucous, terete, the ultimate at maturity 1.2 to 1.7 cm. in diameter; tubercles prominent, oblong; spines few on last year's joints, near the base none, in the upper areoles 3, reddish, 1.1 cm. long; lateral spines usually minute (0.6 mm. long); antepenultimate joints with a fourth spine, medially placed, 1 cm. long, sheathed; leaves terete, 6 to 8 mm. long; flowers 3 cm. long (opening midday to mid-afternoon; petals 13 mm. long, 12 to 14 mm. broad, dull purple; style rose-color; fruit at first strongly tubercled, the tubercles with one to several minute spines (1 cm. long); fruit 2 to 2.25 cm. broad, greenish and yellowish, irregularly colored, slightly and irregularly tuberculate; seeds 3 mm. wide, 1.6 mm. thick.

Collected by F. E. Lloyd on footslopes, Zacatecas (no. 26).

Type U. S. National Herbarium no. 535128.

EXPLANATION OF PLATE XXV.—From photograph taken by F. E. Lloyd in northern Zacatecas.

Opuntia pyriformis Rose sp. nov.

PLATE XXVI. FIGURE 35.

Widely spreading, sometimes 7 to 10 meters broad, the lower branches almost resting on the ground, 3 to 5 meters high; joints pyriform, thick, 18 cm. long, perhaps often larger; areoles closely set (12 mm. apart), small, circular; spines 1 or 2, on old joints more, usually reflexed, slender, weak, yellow, 10 to 22 mm. long; flowers yellow; fruit 4 cm. long, somewhat tubercled, spineless, the large areoles crowded with brown hairs forming hemispherical cushions, spineless.

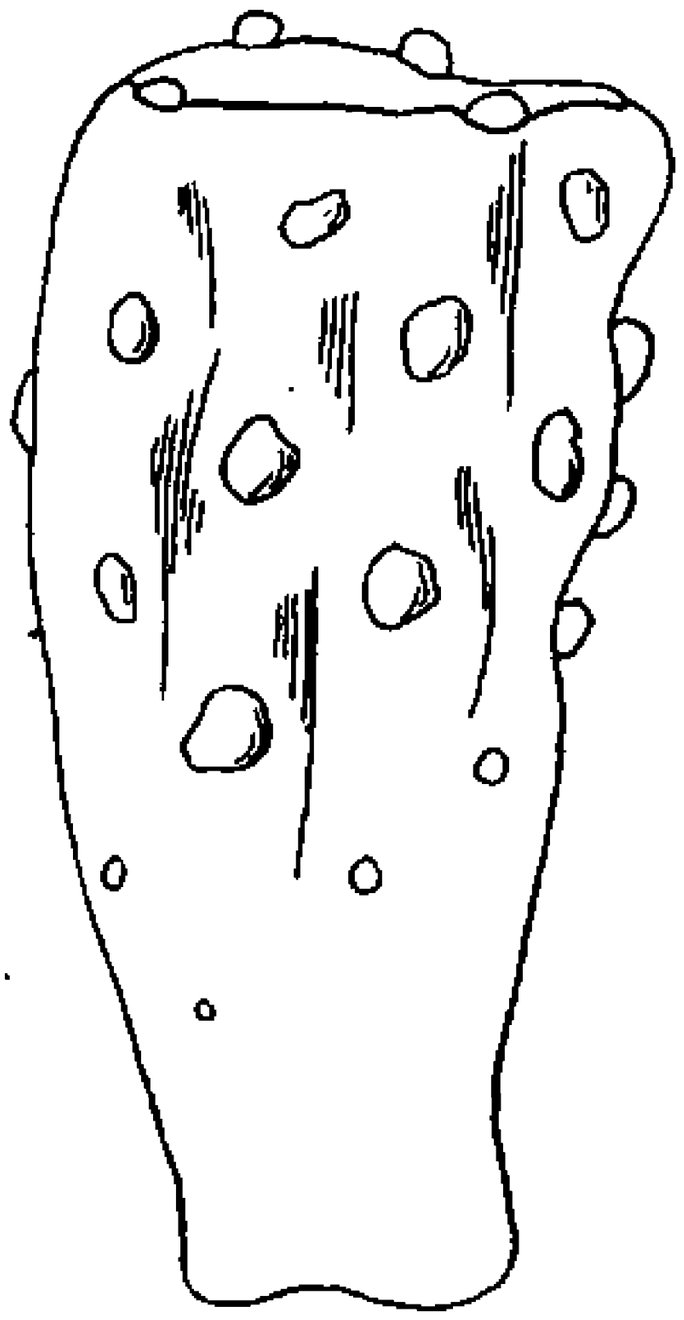


FIG. 35.—Fruit of *Opuntia pyriformis*. Natural size.

Collected by F. E. Lloyd chiefly in arroyos, northeast slopes of Pico de Teira (Pico Etereo), Hacienda de Cedros, Zacatecas, August 30, 1908 (no. 62).

Type U. S. National Herbarium no. 535200.

EXPLANATION OF PLATE XXVI.—Joint with attachment. From photograph taken by F. E. Lloyd in northern Zacatecas. Scale 7/10.

OPUNTIA LLOYDII ROSE.

OPUNTIA PYRIFORMIS ROSE.

OPUNTIA VILLIS ROSE.

Opuntia vilis Rose, sp. nov. PLATE XXVII. FIGURE 36.

Low creeping plants often forming mats several meters in diameter and only 10 to 15 cm. high; joints prostrate, then erect or ascending, the ultimate vertical joints clavate, 5 cm. long, the others 2 to 4 cm. long, very turgid, pale green with low tubercles; leaves terete, 2 to 3 mm. long, acute, red; young areoles with white wool; radial spines upward of 12, the number increasing with age by the addition of very small whitish ones; central spines of prostrate joints 4, reddish, white-tipped, 1 to 4 cm. long, terete, slightly scabrous, with a sheath 5 mm. long; of clavate joints, white, reddish on the upper surface at the base, and along the whole of the lower surface, flattened; flowers 4 cm. long; petals brilliant-purplish, 2 cm. long; filaments bright yellow with green bases; style white; stigmas yellow; fruit pale green, blackening in drying, 2.5 to 2 cm. in diameter, 2.5 to 3 cm. long, tuberculate, especially about the margin of the scission; disc crenate and upper portions of the fruit correspondingly fluted; fruit spiny, somewhat dry, with large white seeds.

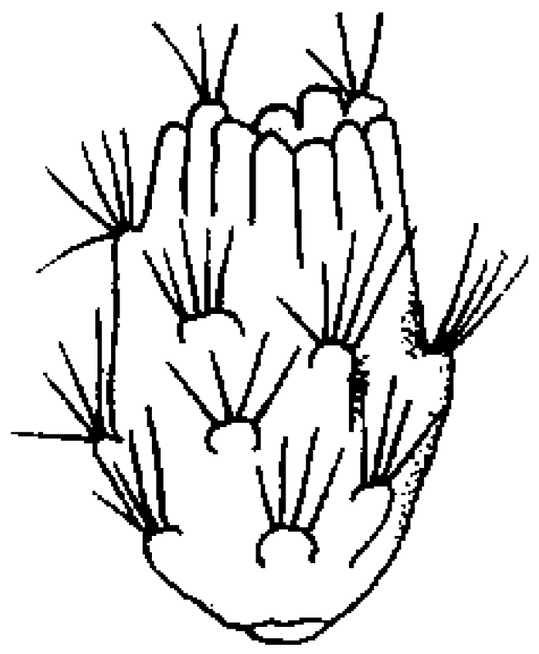


FIG. 36.—Fruit of *Opuntia vilis*. Natural size.

Collected by F. E. Lloyd on footslopes and plains, Zacatecas, Mexico, 1908 (no. 14).

This species is nearest *O. grahamii*, from which it differs in its shorter, more terete joints, much shorter spines, and purple, not yellow, flowers.

Called "perro" by the Mexicans.

Type U. S. National Herbarium no. 535116.

EXPLANATION OF PLATE XXVII.—From photograph taken by F. E. Lloyd in northern Zacatecas.

Echinocereus rigidissimus (Engelm.) Rose.

Echinocereus pectinatus rigidissimus Engelm. Proc. Am. Acad. **3**: 279. 1856.

Echinocereus pectinatus robustus Bauer, Gartenflora **1890**: 513. *pl. 1331*. 1890.

This Echinocactus is sometimes known in the trade as *Cereus candicans*, *Cereus rigidissimus*, *Echinocereus robustior*, *Cereus robustior*, etc.

It is clearly distinct from both *Echinocereus pectinatus* and *Echinocereus caespitosus* and I have no hesitancy, therefore, in raising it to specific rank.

Echinocereus centralis (Coult.) Rose.

Cereus pectinatus centralis Coult. Contr. Nat. Herb. **3**: 386. 1896.

Echinocereus pectinatus centralis Schum. Gesamth. Kakteen 271. 1899.

Professor Coulter when first describing this plant as a variety questioned whether it might not be a good species. It is quite distinct from true *Echinocereus pectinatus* as well as *Echinocereus rigidissimus*.

ONAGRACEAE.

A NEW SPECIES OF GAURA AND ONE OF LAVAUXIA.

Gaura grandiflora Rose, sp. nov.

A rather coarse perennial, 40 to 60 cm. high; stems herbaceous, branching, the axis percurrent, with both long and short pubescence; branches many, ascending, more or less purplish; leaves lanceolate, 4 to 6 cm. long, acute, somewhat toothed, pubescent on both surfaces; inflorescence somewhat pubescent, often early glabrate; calyx buds glabrous; calyx tube slender, 3 to 3.5 cm. long; petals 2 to 2.5 cm. long; anthers linear, attached near their middle; ovary and fruit glabrous, the latter 7 mm. long.

Probably common in the mountains of Chihuahua and Durango. It has been confused with *Gaura mutabilis* of central Mexico, but is easily distinguished by its glabrous calyx and fruit.

The following material has been examined:

Durango: Papasquaro, E. W. Nelson, August 7, 1898 (no. 4671, type); not far from Durango City, Dr. E. Palmer, 1896 (no. 270).

Chihuahua: High plain between Cusihuisiachic and Guerrero, C. G. Pringle, September 5, 1887 (no. 1244).

Type U. S. National Herbarium no. 332725.

Lavauxia palustris Rose, sp. nov.

Acaulescent, perennial; basal leaves erect, narrowly lanceolate, sometimes 10 cm. long, acute, nearly entire above, more or less lacerate below, shortly petioled, puberulent; calyx tube slender; tips of calyx lobes linear and free in bud; fruit sessile, winged, 14 mm. long.

Collected by Dr. C. G. Pringle in damp hollows just south of Buena Vista Station, Hidalgo, August 10, 1904 (no. 8929).

Type U. S. National Herbarium no. 462042.

This species is somewhat similar to *L. triloba*, but has differently cut leaves.

THE SUBFAMILY LOPEZIEAE.

Dr. Rudolf Raimann, in Engler & Prantl's Pflanzenfamilien, has very properly proposed the name Lopezieae for the irregular-flowered division of the Oenotheraceae. He includes four genera in this group. Of these four genera three are monotypic, and hence practically all the species of the group belong to one genus, viz, Lopezia. In the genus Lopezia 33 species have been named or described and a considerable number of new ones have recently been collected, of which 9 are to be found in this paper.

A careful review of the material which has been accumulating in the National Herbarium leads me to the conclusion that there are three genera to be taken out of Lopezia, each of which contains two species.

Of the other genera, Semeiandra and Diplandra, a representation has recently been added to the National Herbarium, but Reisenbachia is only known to me from Presl's plate.

The following key to seven genera should be helpful:

KEY TO GENERA.

Petals none; stamen one..... REISENBACHIA.
Petals 4; stamens two.
  Stamens alike and perfect..... DIPLANDRA.
  Stamens dissimilar, only one perfect.
    Sepals more or less united into a tube.
      Calyx tube long and slender; stamens long-exserted.. SEMEIANDRA.
      Calyx tube short; stamens shorter than the calyx.... PELOZIA.
    Sepals distinct or nearly so.
      Petals sessile; style and stamens long-exserted..... PSEUDOLOPEZIA.
      Petals more or less stalked.
        Flowers large (20 mm. or more long); shrubs 15 to 20 mm. long..... JEHLIA.
        Flowers small (7 mm. or less long), annuals..... LOPEZIA.

REISENBACHIA.[a]

The genus Reisenbachia is only known from Haenke's material, which Presl has described and figured. Only a single species has been described and figured, this said to have been collected in Mexico, but no definite locality given. This is one of the plants which should be carefully looked for by Mexican collectors.

DIPLANDRA.[b]

The only known species of the genus Diplandra was collected in west Mexico by the botanists of the Beechey Exploring Expedition. Since then no collection of it has been reported. We now have good specimens obtained by Dr. E. Palmer from Tepic, near the type locality.

SEMEIANDRA.[c]

The genus Semeiandra was first collected near Tepic by the botanist connected with the Beechey Exploring Expedition and afterwards by T. Coulter and B. Seemann in western Mexico. No recent collection of it has been reported. We now have it in the National Herbarium from Dr. E. Palmer's collection made at Tepic, Nelson's in Jalisco, and Rose's in Sinaloa.

PELOZIA.

Pelozia Rose, gen. nov.

Sepals 4, linear, the lower one nearly distinct to the base, the three upper more or less united, the central one bearing a large gland a short distance above the base within, the two lateral ones forming with the lower one two small pouches or spurs at their base; petals 4, the two lower entire, attached to the calyx, the two upper borne on the three upper sepals; stamens 2, the lower petaloid, the upper perfect; style single, short; fruit a 4-celled capsule, shortly to narrowly oblong. Delicate annuals with thin alternate leaves, and small axillary flowers.

This genus is nearest Lopezia, but is well separated by the characters given. The fruit is not globular, but oblong, the sepals are not all distinct, but the three upper are united for a part of their length, and the lower sepal, while nearly distinct, forms with the adjacent sepals two short spurs. The three upper also bear a large gland within. The two lower petals are borne at the base of the flower, while the two upper are borne upon the sepals, are broader than the lower, and are not at all glandular at the top of the spur as in Lopezia.

Type species *P. laciniata*.

KEY TO SPECIES.

Upper petals entire; capsule elongated ..... *P. clavata.*
Upper petals laciniate; capsule short ..... *P. laciniata.*

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[a] Reisenbachia Presl, Rel. Haenk. 2: 36. *pl. 54.* 1836. Type species *R. racemosa.*

[b] Diplandra Hook. & Arn. Bot. Beech. 291. *pl. 60.* 1839. Type species *D. lopezioides.*

[c] Semeiandra Hook. & Arn. Bot. Beech. 291. *pl. 59.* 1839. Type species *S. grandiflora.*

Pelozia clavata (Brandeg.) Rose. FIGURE 37.

Lopezia clavata Brandeg. Proc. Cal. Acad. II. 2: 157. *pl. 4.* 1887.

Known only from southern Lower California, first collected by Mr. Brandegee and recently by Nelson and by Goldman.

FIG. 37.—Flower and fruit of *Pelozia clavata*. *a*, *b*, Two views of flower; *c*, capsule. Scale 2.

Pelozia laciniata Rose, sp. nov. FIGURE 38.

Stems 40 to 50 cm. high, scantily pubescent; leaves on slender petioles, lanceolate, thin, with shallow distant teeth; pedicels slender, 2 to 3 cm. long; sepals 4, acute; petals pinkish purple, the two lower narrow, entire, the two upper broad, laciniate above, toothed below; sterile stamen narrow; ovary shortly oblong.

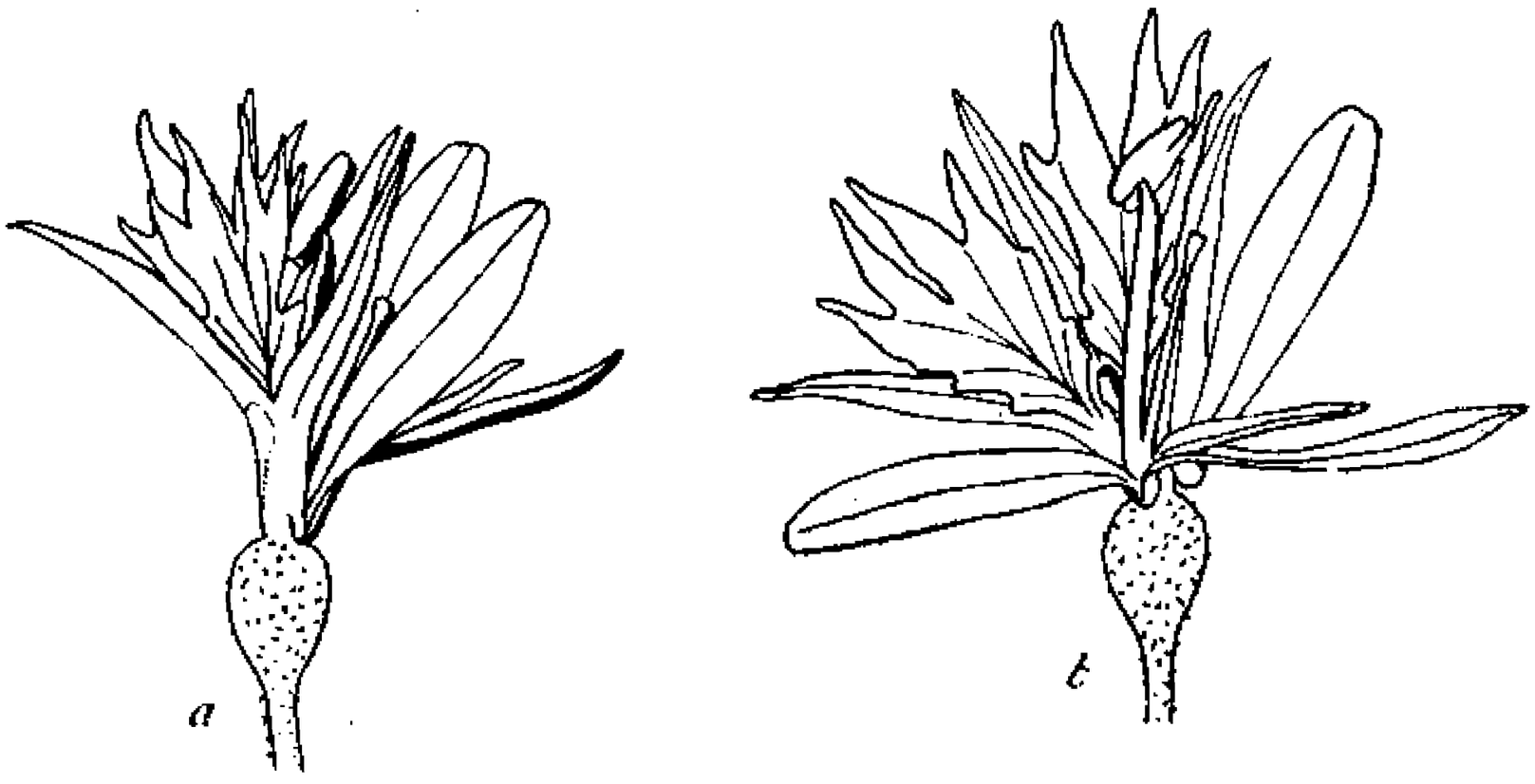

FIG. 38.—Flower of *Pelozia laciniata*. *a*, *b*, Two views, Scale 2.

Collected by E. W. Nelson in mountains near Talpa, Jalisco, altitude 1,320 to 1,500 meters, March 7, 1897 (no. 4035).

Type in U. S. National Herbarium no. 327105.

PSEUDOLOPEZIA.

Lopezia insignis Hemsley is very different from true Lopezia and clearly deserves generic rank. Mr. Hemsley has called attention to some of its peculiarities and to its resemblance to *Semeiandra grandiflora*. *Lopezia longiflora* Decaisne seems to be congeneric.

Pseudolopezia Rose, gen. nov.

Sepals 4, nearly or quite distinct, valvate in the bud, equal, linear; petals 4, narrow, sessile, the two outer ones narrow, curved outward; the two inner erect, none glandular; stamens 2, elongated, one fertile, the other petaloid; style slender, elongated; fruit globose.

Habit not known, possibly a shrub; lower leaves opposite, broad, serrate; upper leaves, especially those of the inflorescence, alternate.

Type species *Lopezia insignis* Hemsl.

Pseudolopezia insignis (Hemsl.) Rose.

Lopezia insignis Hemsl. Diag. Pl. Nov. **1**: 16. 1878.

Pseudolopezia longiflora (Decaisne) Rose.

Lopezia longiflora Decaisne, Rev. Hortic. IV. **3**: 221. *pl. 12.* 1854.

JEHLIA.

This genus has heretofore not been technically published. It has been mentioned several times in print, as by Planchon[a] in 1851–52, and by W. J. Hooker in the Botanical Magazine in 1853. The name has sometimes been spelled Zehlia. Its species have heretofore rested in Lopezia, from which it differs strikingly in its habit and flowers.

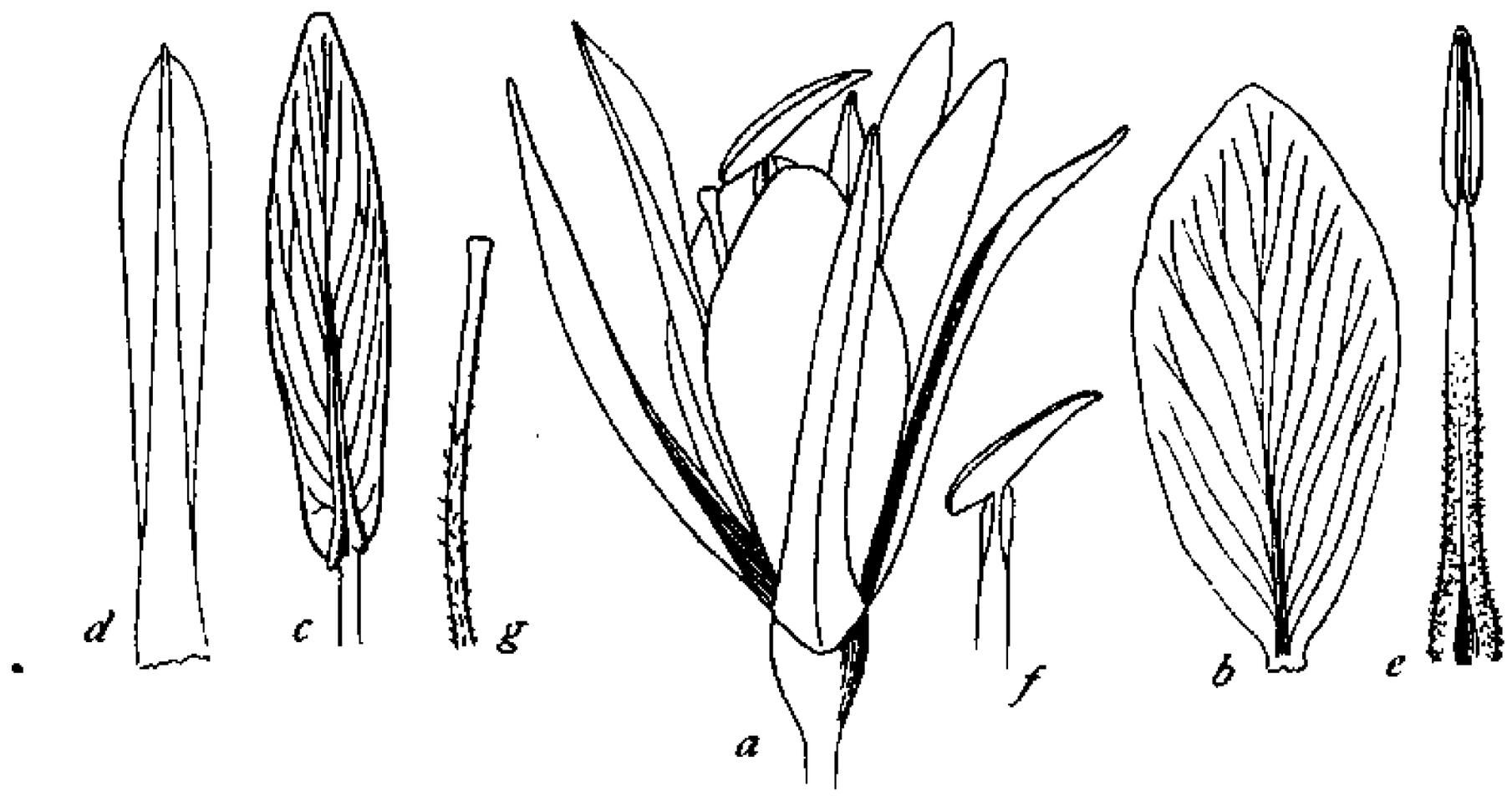

FIG. 39.—Flower and flower parts of *Jehlia macrophylla*. *a*, Flower; *b*, petal; *c*, petal; *d*, sepal; *e*, stamen; *f*, anther; *g*, style. Scale 2.

Jehlia, gen. nov FIGURE 39.

Sepals 4, linear-lanceolate, broadest at base, erect-spreading, distinct; petals 4, two somewhat larger than the other two; stamens 2, the lower petaloid, the upper perfect; capsule globular. Half shrubby plants with large opposite leaves and large fuchsia-like flowers.

Type species *Lopezia macrophylla* Benth.

The following species seem to be congeneric:

Jehlia macrophylla (Benth.) Rose.

Lopezia macrophylla Benth. Pl. Hartw. 83. 1841.

Jehlia grandiflora (Zucc.) Rose.

Lopezia grandiflora Zucc. Flora **15**: Beibl. 101. 1832.

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[a] Fl. de Serres **7**: 177.

LOPEZIA.[a]

A review of the names of 33 species of Lopezia has consumed a large amount of time. Some of the results obtained have been very gratifying, while others have been most discouraging. Of these species only a few, in fact only four, have been described during the last fifty years. Most of them have been very briefly characterized and they have often been misunderstood. The material in our large herbaria is much confused.

Lopezia elegans Rose sp. nov. FIGURE 40.

Annual, about 40 cm. high, very much branched throughout, with very scanty short pubescence; leaves thin, lanceolate, the lower ones long-petioled, glabrous; fruiting pedicels slender, 10 to 12 mm. long, puberulent; flower buds obtuse, glabrous; sepals dark purple; petals violet-purple, the two lower 6 mm. long, the blade nearly orbicular, the two upper linear-oblong, not appendaged, each bearing a single gland at the top of the spur; sterile stamen bright crimson, deeply notched.

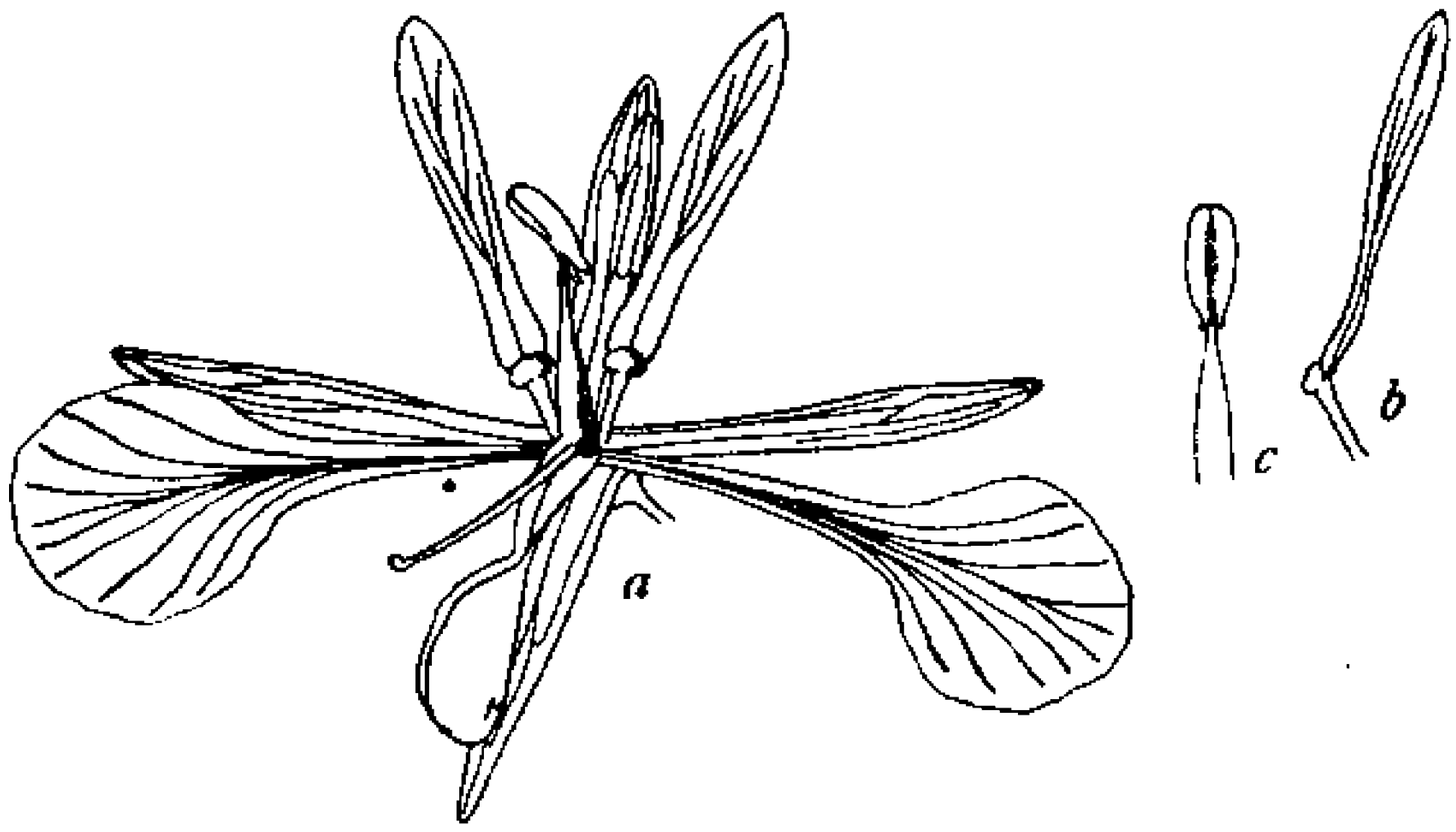

FIG. 40.—Flower and flower parts of *Lopezia elegans*. *a*, Flower; *b*, petal with basal gland; *c*, stamen. Scale 2.

Collected by Dr. E. Palmer near Alvarez, San Luis Potosí, September 28 to October 3, 1902 (no. 159).

Type U. S. National Herbarium no. 397706.

Lopezia glandulosa Rose, sp. nov. FIGURE 41.

Annual, about 40 cm. high, branching from the base; branches ascending, slender, with scanty pubescence below and with glandular hairs on the upper parts as well as on the pedicels; leaves opposite below, alternate above, lanceolate, obtuse, short-petioled, glabrate; pedicels 10 mm. or less long, glandular-pubescent; flower buds obtuse, glabrous; sepals dark red; petals purplish, the two lower spatulate, tapering gradually into the slender claw, 5 to 6 mm. long, the two upper linear-oblong, not appendaged, each bearing one gland at the top of the claw; sterile stamen deep purple; capsule globular, glabrous.

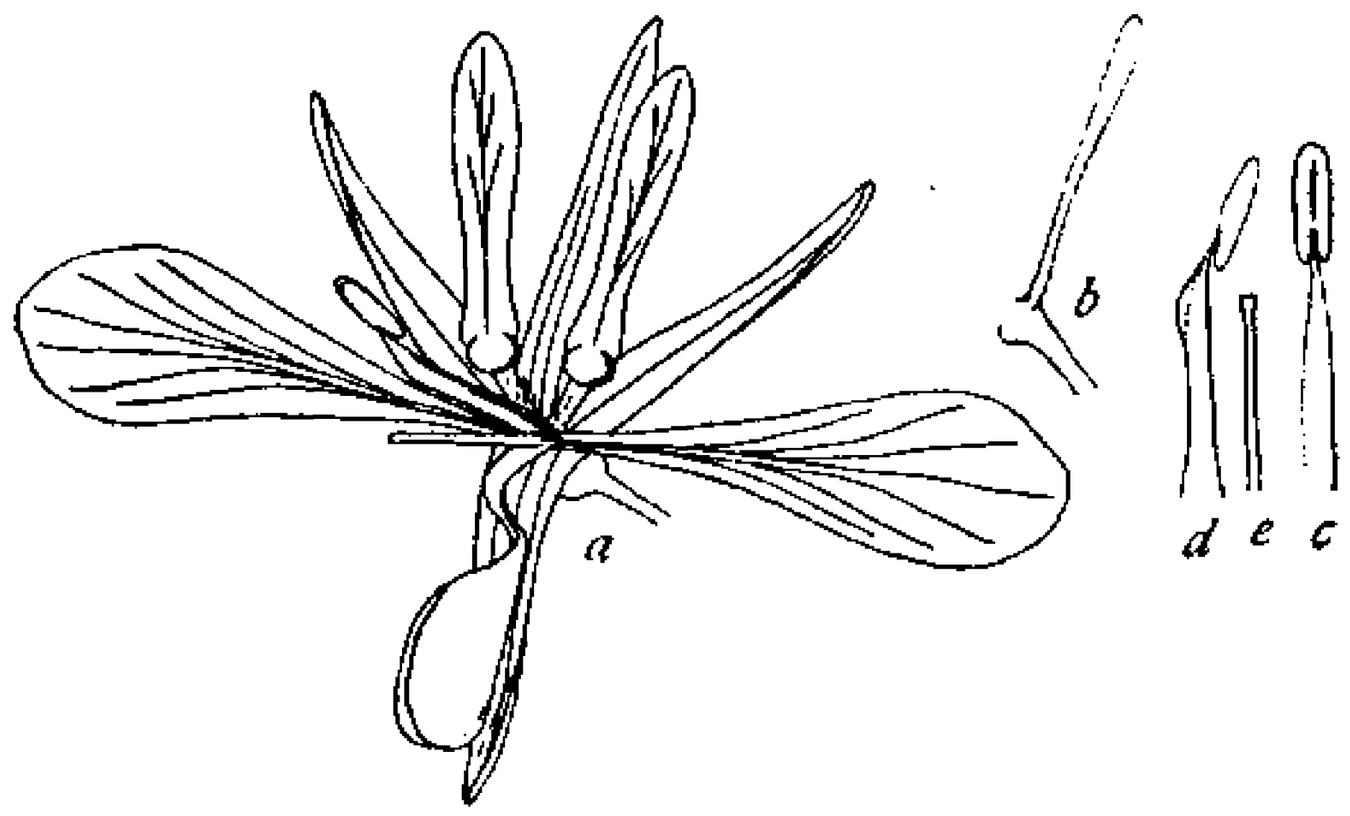

FIG. 41.—Flower and flower parts of *Lopezia glandulosa*. *a*, Flower; *b*, side view of petal with gland; *c*, *d*, stamens; *e*, style. Scale 2.

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[a] Lopezia Cav. Ic. **1**: 12 *pl. 18*. 1791. Type species *Lopezia racemosa*.

Collected by J. N. Rose on the road between Bolaños and Guadalajara, but in the State of Zacatecas, September 20, 1897 (no. 3034).

Type U. S. National Herbarium no. 301991.

Lopezia oaxacana Rose, sp. nov. FIGURE 42.

Probably annual, 60 cm. or more high with rather coarse but scanty pubescence; leaves lanceolate, acuminate, the larger ones 10 to 15 cm. long, including the slender petiole, the upper ones much smaller, somewhat pubescent on both surfaces, the margin with shallow serrations; pedicels becoming 20 mm. long or more in fruit, slender, bearing short glandular hairs; flower buds oblong, abruptly pointed, bearing tufts of hairs, especially at the top and base of the sepals; petals probably pinkish, nearly white in herbarium specimens, the two lower 7 mm. long, spatulate, the two upper narrowly spatulate, each with two appendages below and bearing two glands at the top of the claw; sterile stamen purplish; capsule globular, glabrous.

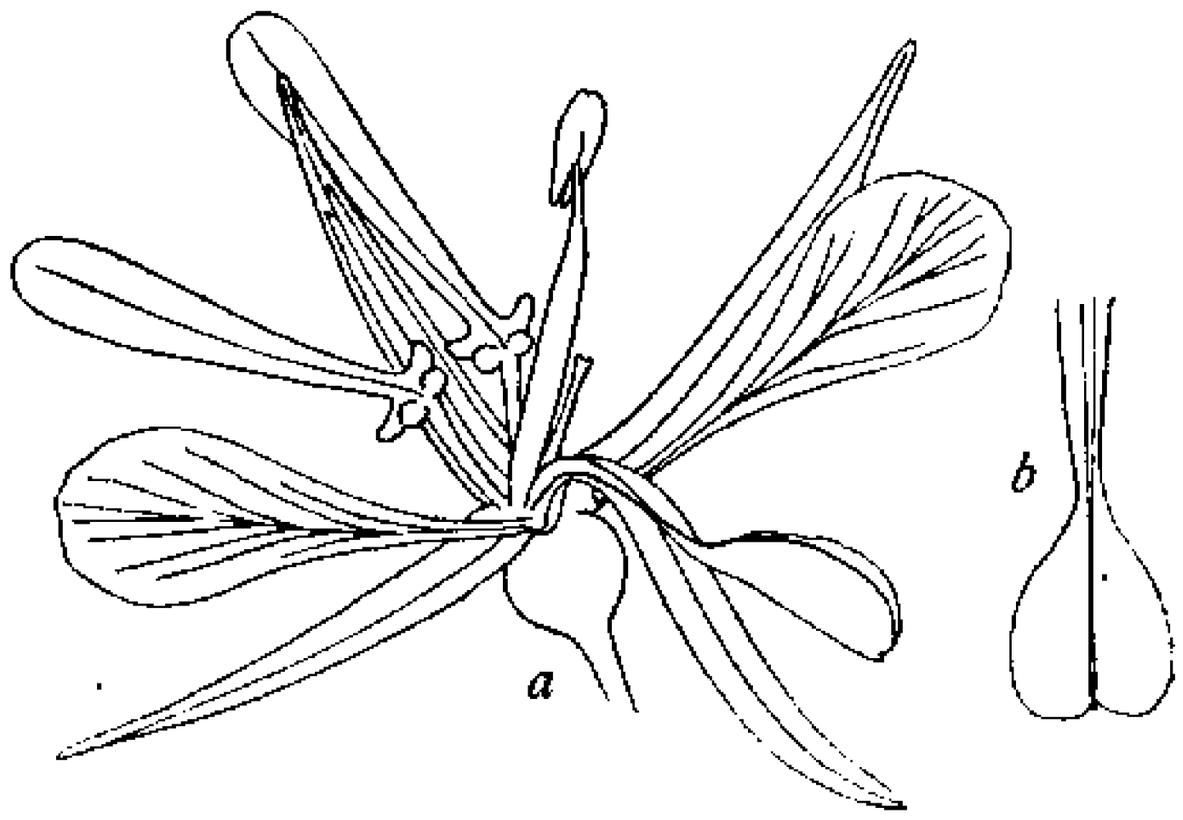

FIG. 42.—(*a*) Flower and (*b*) sterile stamen of *Lopezia oaxacana*. Scale 2.

Collected by C. Conzatti and V. Gonzales, October 10, 1897, no. 509 (type), and by Charles L. Smith, October 2, 1894 (no. 844), both on San Felipe, Oaxaca.

Type U. S. National Herbarium no. 574851.

Lopezia palmeri Rose, sp. nov. FIGURE 43.

Annual, much branched, the branches long and weak, with short, scanty spreading pubescence; leaves alternate, small (1 to 2 cm. long) acute, somewhat pubescent; pedicels slender, 1 to 2 cm. long, glabrous; sepals linear, glabrous, dark red; petals purplish, the two lower 5 mm. long, including the slender claw (somewhat longer than the lamina), the two upper spatulate, rounded at apex, each with two appendages below and bearing two glands at the top of the claw; sterile stamen shorter than the petals and deeper purple.

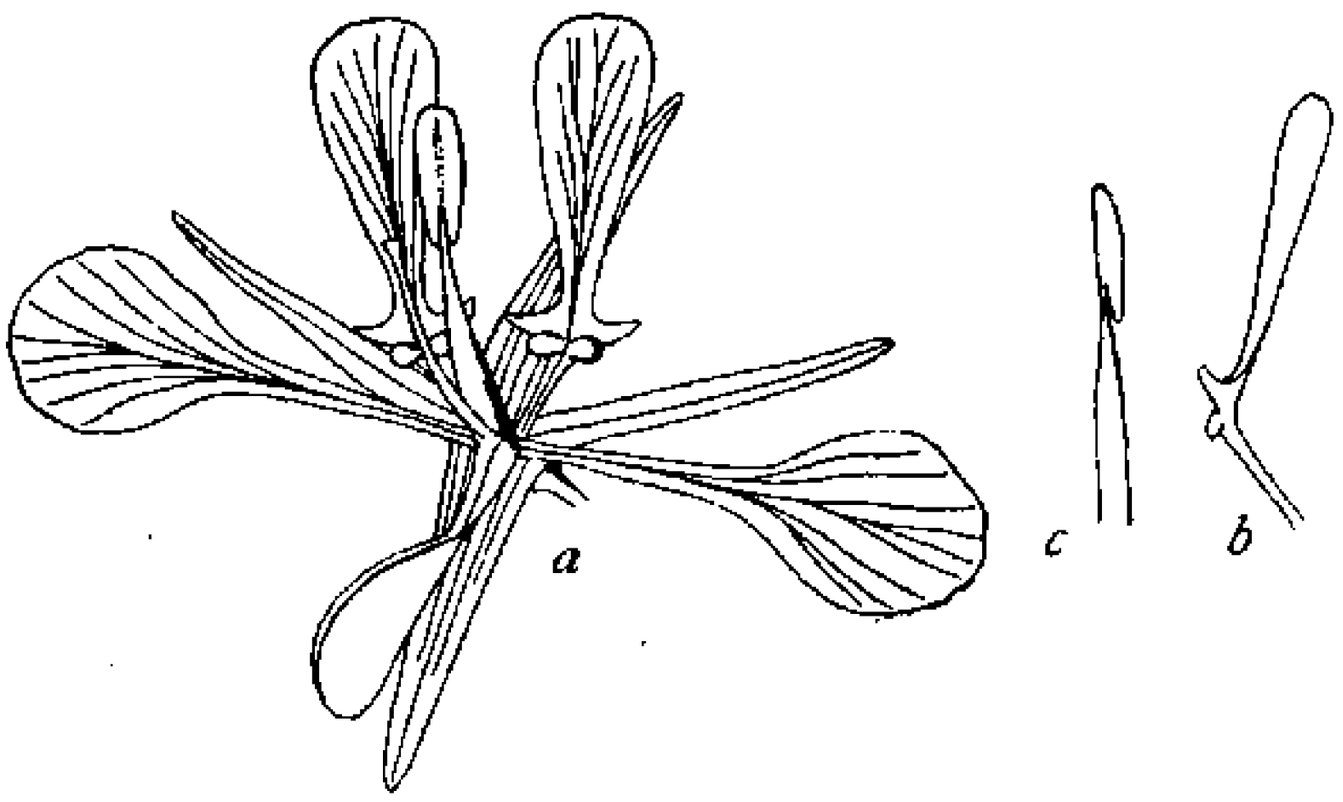

FIG. 43.—Flower and flower parts of *Lopezia palmeri*. *a*, Flower; *b*, petal with gland; *c*, stamen. Scale 2.

Collected by Dr. E. Palmer at San Ramon, Durango, April 21 to May 18, 1906 (no. 85).

Type U. S. National Herbarium no. 571100.

Lopezia parvula Rose, sp. nov. FIGURE 44.

Delicate annual, 10 to 25 cm. high, erect, nearly simple, with scanty short pubescence disposed in horizontal bands; leaves lanceolate, thin, ciliate, the lower ones opposite, the upper ones alternate; calyx buds glabrous, with a short blunt tip; sepals pale, tinged with pink; two lower petals spatulate, gradually tapering to the base; two upper petals pale purple, spatulate, not appendaged below, bearing a single gland at the top of the spur; sterile stamen pale purple; capsule glabrous.

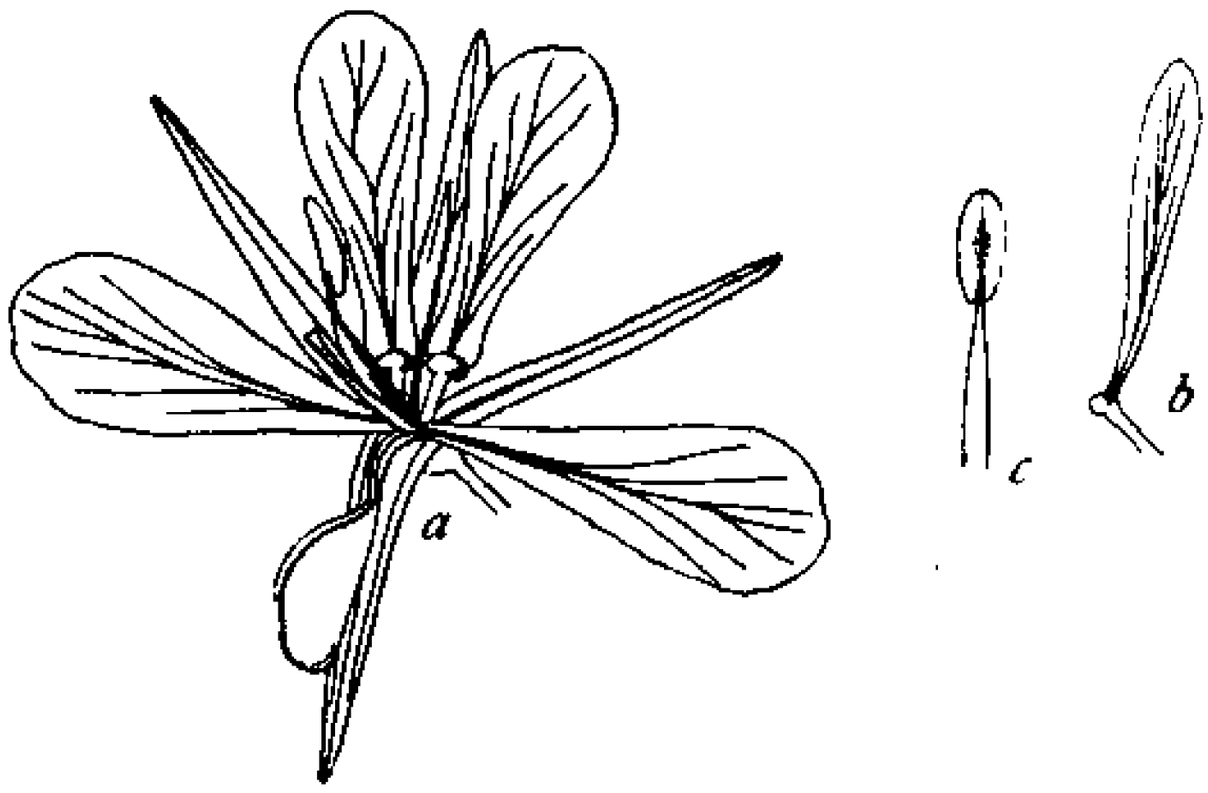

FIG. 44.—Flower and flower parts of *Lopezia parvula*. *a*, Flower; *b*, petal with gland; *c*, stamen. Scale 2.

Collected by E. W. Nelson near La Providencia, Durango, altitude 1,960 to 2,400 meters, September 11, 12, 1898 (no. 4987).

Type U. S. National Herbarium no. 333016.

Lopezia pringlei Rose, sp. nov.

FIGURE 45.

Annual, 40 to 56 cm. high, somewhat branching above, the pubescence rather scanty, chiefly of short crisped hairs or with some stipitate glands in the upper part; leaves alternate, lanceolate, acute, tapering at base into a short petiole, somewhat pubescent on both surfaces, thin, subentire; inflorescence a slender leafy raceme; bracts narrow, acute; pedicels 5 to 7 mm. long, glabrous; sepals glabrous, red; petals violet, the two lower spatulate, the two upper linear, not appendaged below, bearing each a single gland; capsule globular, glabrous.

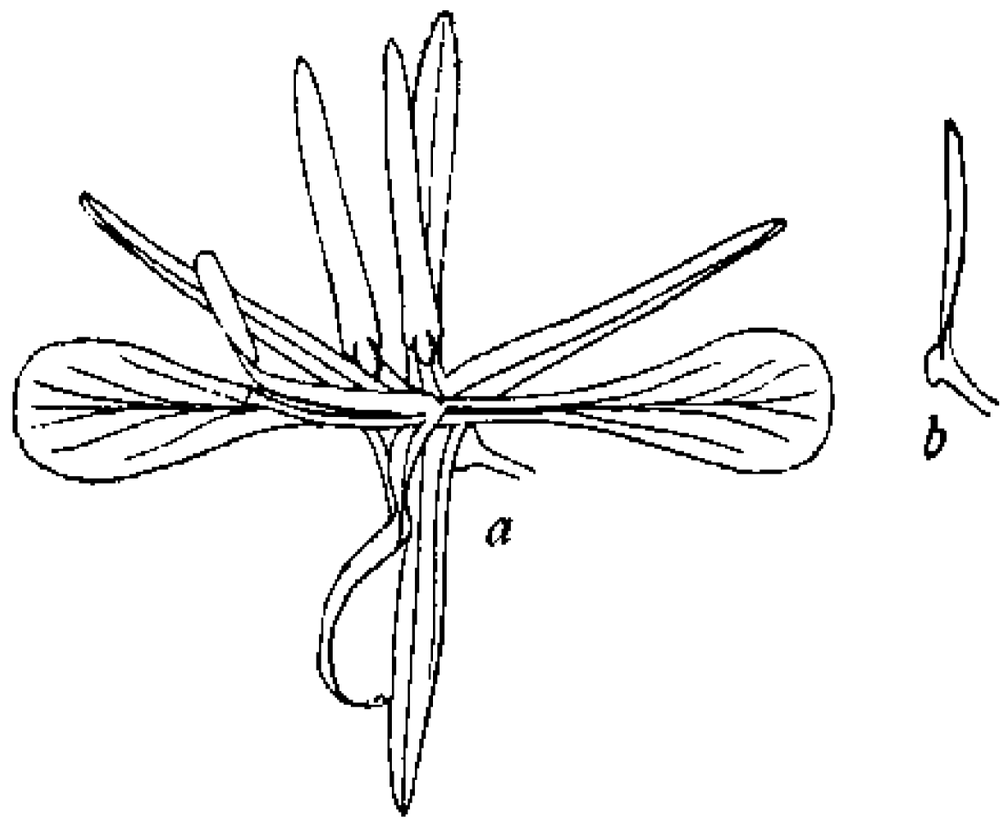

FIG. 45.—Flower and petal of *Lopezia pringlei*. *a*, Flower; *b*, side view of petal showing gland. Scale 2.

Collected by C. G. Pringle on the Sierra de San Filipe, Oaxaca, altitude 3,000 meters, 1906 (?) (no. 6005, type), and by E. W. Nelson near Reyes, Oaxaca, October 17, 1904 (no. 1716).

Type U. S. National Herbarium no. 461987.

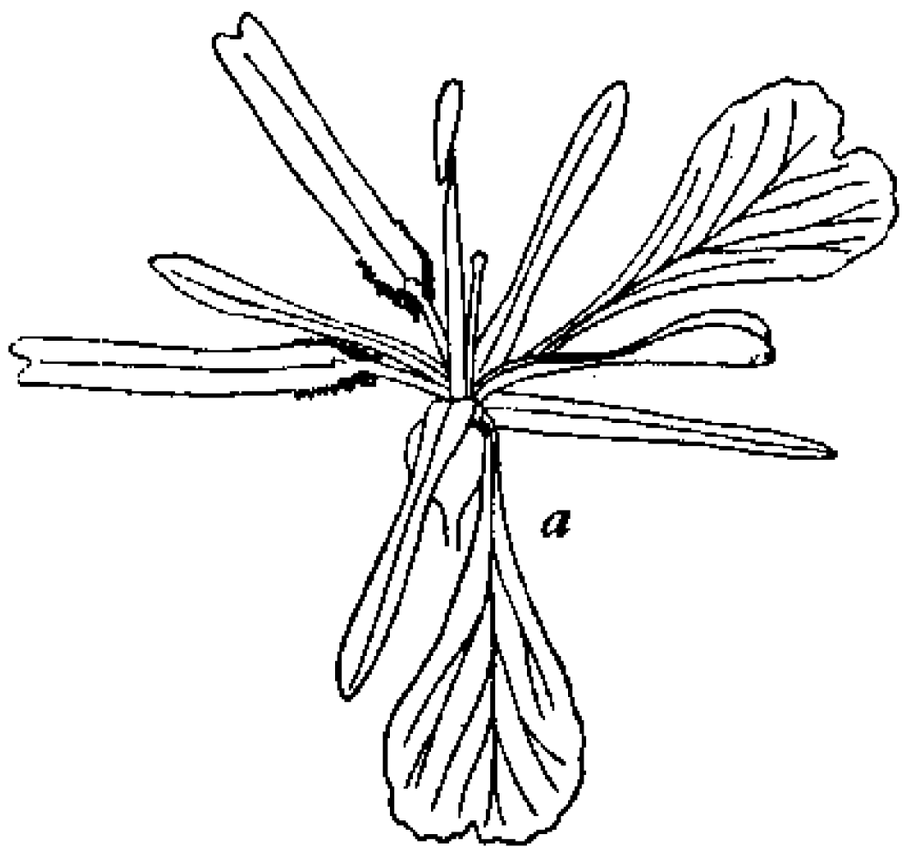

FIG. 46.—(*a*) Flower and (*b*) stamen of *Lopezia smithii*.

Lopezia smithii Rose, sp. nov.

FIGURE 46.

Annual, 6 to 7 cm. high, slightly winged, pubescent, much branched; leaves sessile or nearly so, acute, cuneate at base, crenate; pedicels slender, 12 to 15 mm. long; flower parts all purplish; sepals linear, 4 mm. long; two lower petals 6 mm. long, obovate, tapering into a long slender claw; upper petals with linear blade, not auriculate at base,

glands single, yellowish, fringed with short hairs; sterile stamen 3 mm. long, purplish.

Collected by Lucius C. Smith near Jaquacatlan, Oaxaca, altitude 1,290 meters, November 4, 1895 (no. 294).

Type U. S. National Herbarium no. 574852.

Lopezia stricta Rose, sp. nov. FIGURE 47.

Annual; stems rather strict, with a few erect branches, clothed with a short dense, somewhat reflexed pubescence; leaves lanceolate, somewhat mottled with red, short-petioled, obtuse, a little pubescent on both surfaces, the margins undulate; pedicels 2 to 3 cm. long; sepals linear, dark red, glabrous; petals pale pink (nearly white in herbarium specimens), the two lower 8 mm. long, including the slender claw, rounded at apex, the two upper nearly linear, with two appendages below and each bearing two glands at the top of the claw; sterile stamen shorter than the petals and deeper-colored; capsule orbicular, glabrous.

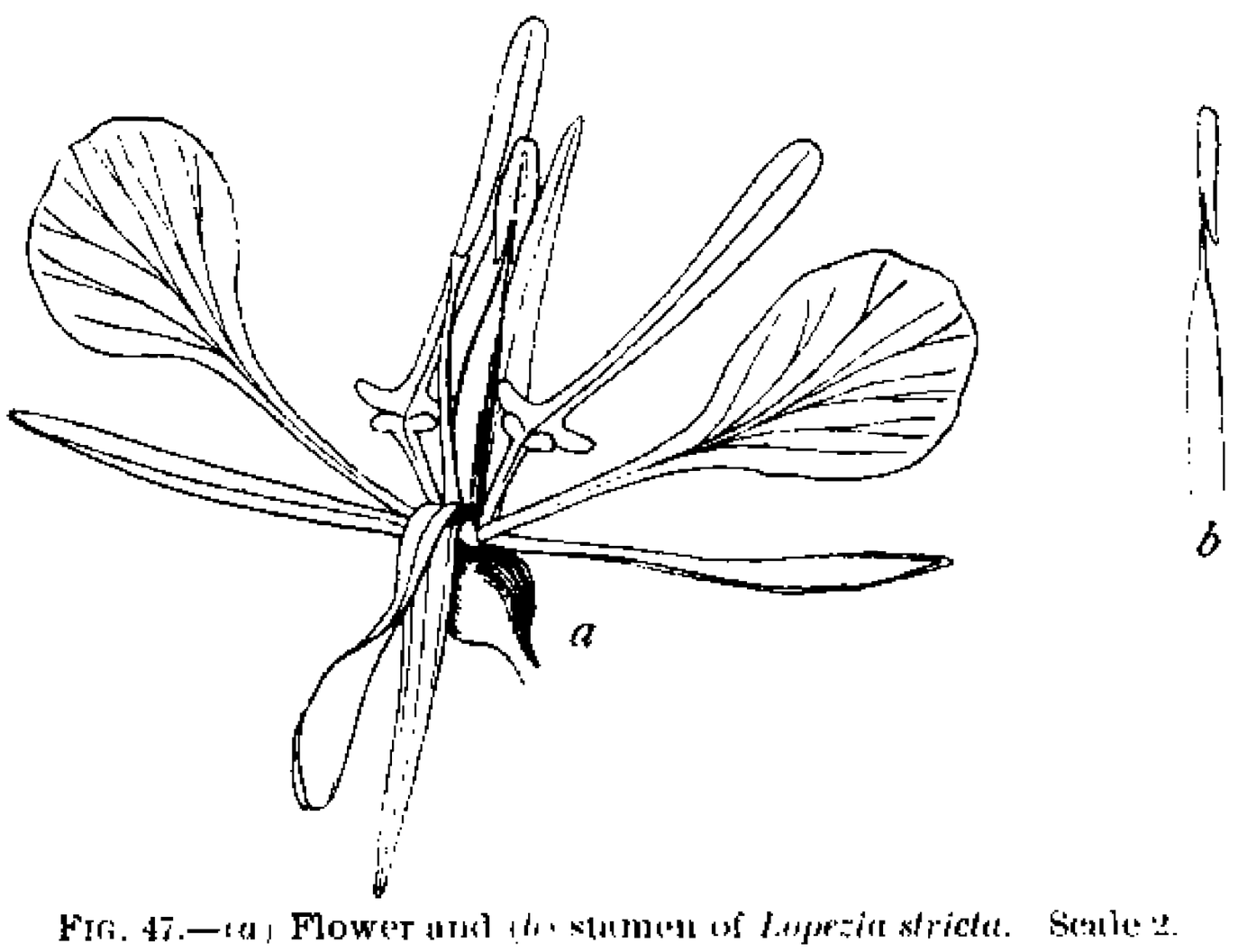

FIG. 47.—(a) Flower and (b) stamen of *Lopezia stricta*. Scale 2.

Collected by J. N. Rose in the Sierra Madre west of Bolaños, Jalisco, September 15 to 17, 1897 (no. 2979).

Perhaps nearest *Lopezia mexicana* H.B.K., but with paler petals and smaller glands on the upper petals.

Type U. S. National Herbarium no. 301735.

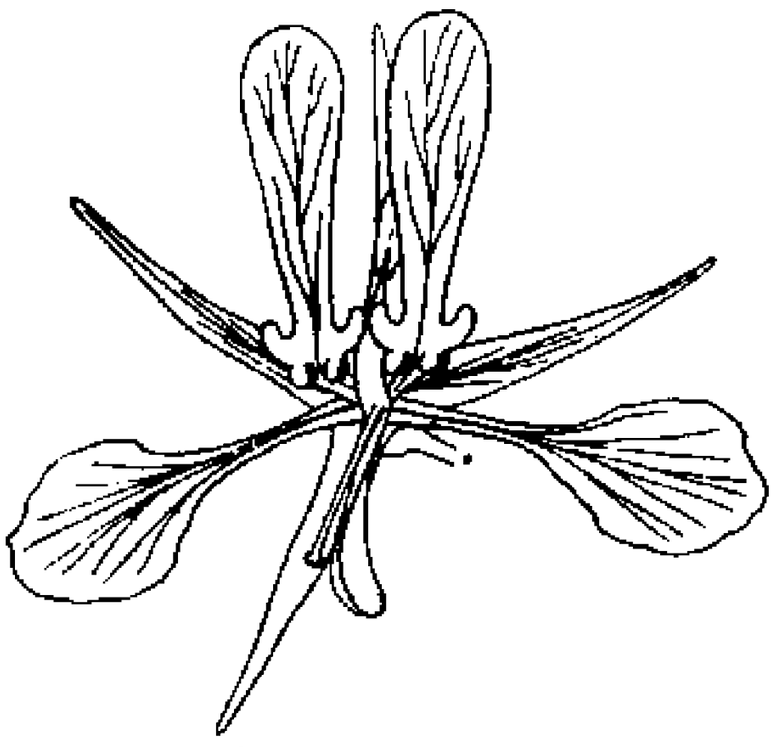

FIG. 48. Flower of *Lopezia violacea*. Scale 2.

Lopezia violacea Rose, sp. nov. FIGURE 48.

Annual, branching throughout, glabrous or with a short crisp pubescence; leaves alternate, lanceolate, short-petioled, rounded or broadly cuneate at base, obtuse, denticulate, glabrous; racemes terminating branches; pedicels slender, 12 to 18 mm. long; sepals linear, red, glabrous; petals violet, the two lower nearly orbicular, tapering below into a slender claw, the two upper spatulate-oblong, two-horned below and bearing each two glands at the top of the claw; sterile stamen shorter than the petals and paler in color; capsule orbicular, glabrous.

Collected by C. G. Pringle on the Sierra de Tepoxtlan, Morelos, altitude 2,350 meters, October 30, 1900 (no. 8358).

Type U. S. National Herbarium no. 381869.

APIACEAE.

A NEW SPECIES OF ARRACACIA AND ONE OF PRIONOSCIADIUM.

Arracacia purpusii Rose, sp. nov.

Stems herbaceous from slender rootstocks, glabrous, 30 to 40 cm. high; leaves 2-ternate; leaflets ovate, acute, 1 to 2.5 cm. long, serrate, glabrous; rays 5 to 7, nearly

equal, 4 to 5 cm. long; pedicels 4 to 5 mm. long; involucre wanting; bractlets of involucels several, linear, 3 to 4 mm. long; fruit ovate. 4 to 5 mm. long; stylopodium stout, conical.

Collected by C. A. Purpus at Bocca del Monte, Puebla, Mexico, June, 1907 (no. 2509).

Type U. S. National Herbarium no. 574890.

Prionosciadium humile Rose.

Peucedanum madrense S. Wats. Proc. Am. Acad. **25**: 150. 1890.

On account of an earlier published *Prionosciadium madrense* a new specific name is here given to this species.