REPORT ON A COLLECTION OF PLANTS FROM THE PINACATE REGION OF SONORA.

By J. N. Rose and Paul C. Standley.

INTRODUCTION.

An expedition was organized at the Desert Laboratory of the Carnegie Institution by Dr. D. T. MacDougal in the autumn of 1907 for the purpose of making a general bio-geographical reconnaissance of the region between Tucson and the Gulf of California. Attention was to be directed chiefly to a comparison of the physical features of the coastal desert with those of the elevated arid area in which the Desert Laboratory is located and to obtaining data regarding the general features of distribution and environment of the higher plants and animals.

The expedition left Tucson, Arizona, November 2, 1907, going westward 125 miles to the northern end of the Ajo Mountains, thence southward across the Mexican boundary to the village of Sonoyta, and westward through Santo Domingo and Quitovaquito. The course of the Sonoyta River was now followed southward to Agua Dulce where its waters are lost in the sands and then the route was laid across the desert to Monument 180 on the boundary, from which a departure was made that took the party southward along the western side of the Pinacate Mountains, the principal stations being Papago Tanks, Tule Tanks, and Pinacate Peak. In addition to this Mr. G. Sykes made a forced march to the shore of Adair Bay on the Gulf of California.

The Pinacate Mountains are the highest in northwestern Sonora. They run north and south just east of parallel 113° 30′ longitude, between 31° 40′ and 31° 50′ north latitude. The highest peak, Pinacate, is about 1,218 meters in height, its slopes extending with but slight interruption to the shore of the Gulf. The entire range is of recent volcanic origin, with many sunken or elevated craters, the formations including great areas of volcanic sand, ashes, tufa, and hard lava, and the range lies in a vast field of broken lava which extends northward into Arizona. A careful survey of the region traversed was made by Mr. G. Sykes and his most excellent map is reproduced in connection with this article.

A small but very interesting collection of herbarium specimens made by Doctor MacDougal forms the basis of this paper. No attempt was made to obtain a full representation of the flora of the

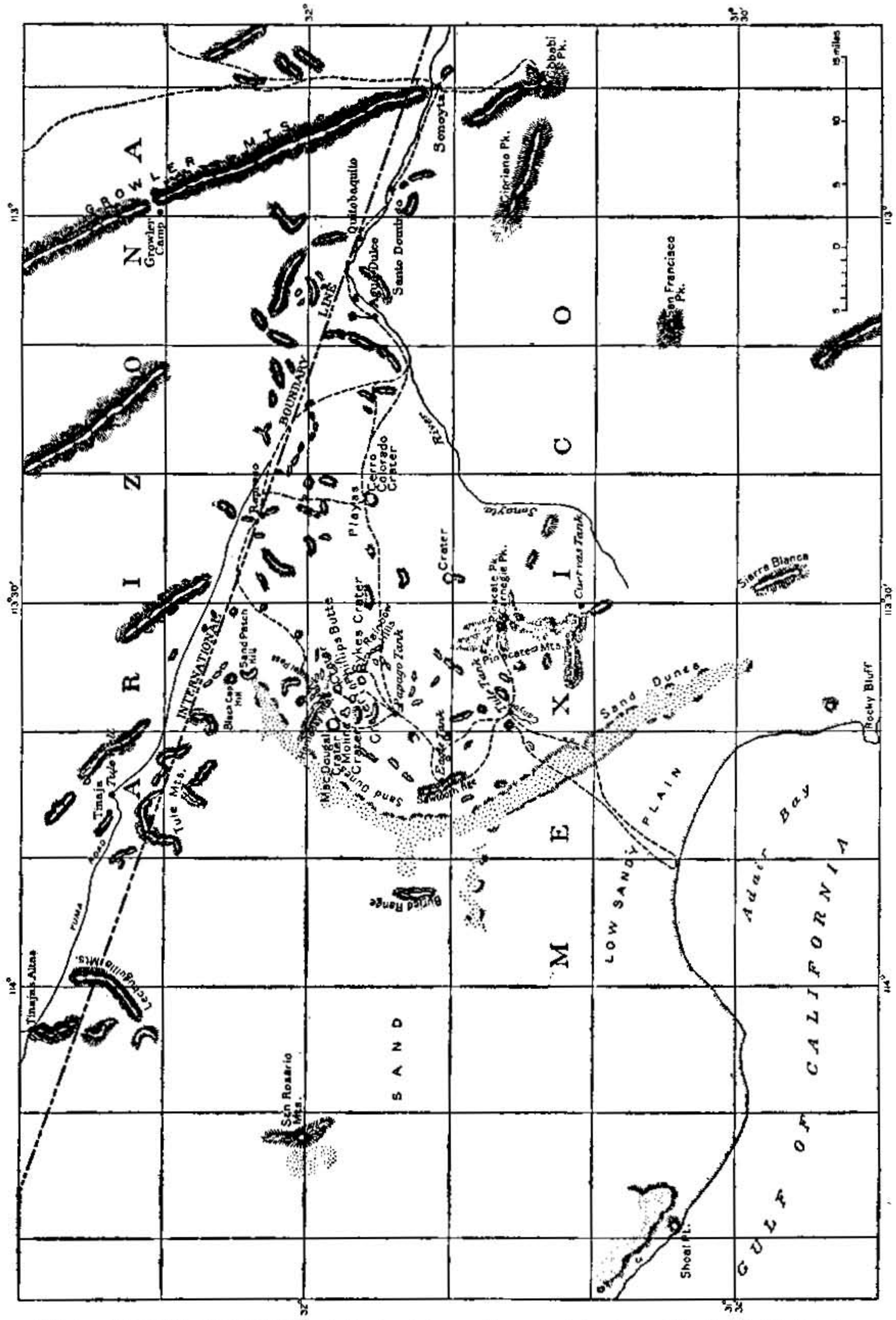

FIG. 1.—Map of the Sonoran Desert Region between Tucson, Arizona, and the Gulf of California.

region but only those plants were taken which were especially interesting or were in suitable condition. In addition a large series of photographs showing the botanical and geographical features was

obtained. A general discussion of the principal facts as to the distribution of the plants has been published by Doctor MacDougal in the Year Book of the Carnegie Institution of Washington for 1908 and a fuller treatment in the Bulletin of the American Geographical Society for December, 1908, and in The Plant World for May and June, 1908. The data respecting the animal life of the region obtained by Dr. W. T. Hornaday and Mr. J. S. Phillips have been published under the title of "Camp-Fires on Desert and Lava" by Doctor Hornaday, a most delightful book dealing with the experiences of the naturalists on the expedition, illustrated with many plates showing characteristic desert shrubs and trees.

The botanical collections, although small, have proved to be most interesting, as was to be expected from an unexplored region. Several of the plants appear to be new and these are here described. Some of those already known are noteworthy, representing forms seldom collected. No botanical collector had ever visited the Pinacate region. At Sonoyta a small collection was made by Dr. E. A. Mearns in 1894. A list of his plants will be found in Bulletin 56 of the U. S. National Museum.

The photographs here reproduced were taken by Dr. MacDougal, and these with the line drawings are the gift of the Carnegie Institution of Washington.

LIST OF PLANTS, WITH DESCRIPTIONS OF NEW SPECIES.

Aristida bromoides H. B. K. Nov. Gen. & Sp. **1:** 122. 1815.
Type locality, "In montibus regni Quitensis, juxta Tambo de Guamote et Llanos de Tiocaxas, alt. 1600 hexap."
Quitovaquito, November 11, 1907, *MacDougal.*

Aristida californica major Vasey, Proc. Calif. Acad. II. **2:** 212. 1889.
Type locality, Magdalena Island, Lower California.
MacDougal Pass, Pinacate Mountains, November 14, 1907, *MacDougal* 32.

Bouteloua polystachya Torr. U. S. Rep. Expl. Miss. Pacif. **5:** 366. 1853.
Chondrosium polystachyum Benth. Bot. Voy. Sulph. 56. 1844.
Type locality, "Bay of Magdalena," Lower California.
Papago Tanks, November 17, 1907, *MacDougal.*

Cenchrus palmeri Vasey, Proc. Calif. Acad. II. **2:** 211. 1889.
Type locality, "Guaymas, Mexico."
Sand hills near the Adair Box, November 20, 1907, *Sykes* 58.

Heteropogon contortus (L.) Beauv.; Roem. & Schult. Syst. **2:** 836. 1817.
Andropogon contortus L. Sp. Pl. 1045. 1753.
Type locality, "In India."
Papago Tanks, November 17, 1907, *MacDougal* 52.

Leptochloa mucronata pulchella Scribn. Bull. Torrey Club **9:** 147. 1882.
Type locality, "Santa Cruz Valley, near Tucson."
Papago Tanks, Pinacate Mountains, November 17, 1907, *MacDougal* 40.

Triodia pulchella H. B. K. Nov. Gen. & Sp. 1: 155. *pl.* 47. 1815.

Type locality, "In subfrigidis, siccis, apricis regni Mexicani inter Guanaxuato, Mina de Bel grado et Cubilete, alt. 1050 hexap."

Agua Dulce, November 11, 1907, *MacDougal*.

Hesperocallis undulata A. Gray, Proc. Amer. Acad. 7: 390. 1868.

Type locality, "Desert plains at Jessup Rapids, Arizona."

This was seen at Walls Well, in southern Arizona, but no specimens were collected. The plant is commonly known as "ajo," and it is from this plant that the Ajo Range receives its name. The word signifies "garlic" and the roots are said to have a strong alliaceous flavor.

Momisia pallida (Torr.) Planch. in DC. Prodr. 17: 191. 1873.

Celtis pallida Torr. Bot. Mex. Bound. 203. 1859.

Type locality, "In western Texas and along the Rio Grande from Fort Duncan to the Gulf and west to Magdalena, in Sonora."

Walls Well, Ajo Mountains, Arizona, November 7, 1907, *MacDougal* 8.

There are three other species of the genus Momisia in Mexico for which the proper names seem not to have been formed. They may, for convenience, be entered here.

MOMISIA ANFRACTUOSA (Liebm.) Rose & Standley.
Celtis anfractuosa Liebm. Vidensk. Selsk. Skr. V. 2: 338. 1851.
Type locality, "Xalcomulco, Vera Cruz."

MOMISIA PLATYCAULIS (Greenm.) Rose & Standley.
Celtis platycaulis Greenm. Proc. Amer. Acad. 39: 78. 1903.
Type locality, "State of Morelos; volcanic hills near Yautepec."

MOMISIA IGUANAEA (Jacq.) Rose & Standley.
Rhamnus iguanaea Jacq. Enum. Pl. Carib. 16. 1762.
Celtis aculeata Swartz, Prodr. Veg. Ind. Occ. 53. 1783.
Mertensia laevigata H. B. K. Nov. Gen. & Sp. 2: 31. *pl. 103*. 1817.
Momisia aculeata Klotzsch, Linnaea 20: 539. 1847.
Celtis iguanaea Sarg. Silva N. Amer. 7: 64. 1895.
Type locality, West Indies.

Phoradendron californicum Nutt. Journ. Acad. Phila. n. ser. 1: 185. 1847.

Type locality, "In the mountains of upper California. Parasitic on the trunks and branches of a Strombocarpus."

Pinacate Region, November, 1907, *MacDougal*.

In his account of the trip Doctor Hornaday writes as follows concerning this plant:[1]

"Throughout our trip we found the large mesquite trees of the valleys and flood plains grievously afflicted with mistletoe. It usually appears as a great, dark-colored bunch 2 feet in diameter, and sometimes we found a dozen clumps in one tree. This parasite, like most others, is destructive when overdone. We saw many hapless trees that had literally been murdered by it and were only lifeless stubs. It was in the valley of the Sonoyta River, near Agua Dulce, that Doctor MacDougal photographed a wide-spreading mesquite whose top was so overloaded with mistletoe that it looked as if a small load of clover hay had been pitched into it." [2]

Eriogonum fasciculatum Benth. Trans. Linn. Soc. 17: 411. 1837.

Type locality, "Upper California."

Walls Well, Ajo Mountains, November 5, 1907, *MacDougal* 9.

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[1] Camp-Fires on Desert and Lava, page 48.

[2] For illustration of this tree, see plate opposite page 48 of the "Camp-Fires."

Eriogonum pinetorum Greene, Muhlenbergia **6:** 3. 1910.

Type locality, "Black Range, Sierra County, New Mexico."

Paso Blanco, November 6, 1907, *MacDougal* 2.

This species has long been confused with *Eriogonum abertianum*, but is readily distinguished from it. Its habit is strikingly different and the calyx is a light pink instead of dark red.

Eriogonum vimineum Dougl.; Benth. Trans. Linn. Soc. **17:** 416. 1837.

Type locality, "Columbia river."

Pinacate Mountains, at 1,200 meters, November 21, 1907, *MacDougal* 71. The specimens appear to belong to this species, although they are not in the best condition for determination.

Rumex hymenosepalus Torr. Bot. Mex. Bound. 177. 1859.

Type locality, "Sandy soils from El Paso to the cañons of the Rio Grande."

No specimens were collected but it was seen at Walls Well in the Ajo Mountains. It is a common southwestern plant whose roots are much used for tanning.

Atriplex canescens (Pursh) James, Trans. Amer. Phil. Soc. **2:** 178. 1825.

Calligonum canescens Pursh, Fl. Amer. Sept. 370. 1814.

Type locality, "In the plains of the Missouri, near the Big-bend."

Walls Well, Ajo Mountains, November 8, 1907, *MacDougal* 4.

Amaranthus palmeri S. Wats. Proc. Amer. Acad. **12:** 274. 1877.

Type locality, "At Larkin's Station, San Diego County, California."

MacDougal Crater, Pinacate Mountains, November 14, 1907, *Sykes*. This is perhaps the commonest species of Amaranthus in the Southwest. Very frequently the plants occur in such abundance that they are cut and cured for hay.

Cladothrix lanuginosa Nutt.; Moq. in DC. Prodr. **13²:** 360. 1849.

Alternanthera lanuginosa Moq. op. cit. 359. 1849.

Type locality, "Secus Salt-river et Red-river."

MacDougal Crater, Pinacate Mountains, November 14, 1907, *Sykes* 29 and 31.

Boerhaavia wrightii A. Gray, Amer. Journ. Sci. II. **15:** 322. 1853.

Type locality, "Pebbly hills near El Paso."

Papago Tanks, Pinacate Mountains, November 16, 1907, *MacDougal* 43.

Wedeliella incarnata (L.) Cockerell, Torreya **9:** 167. 1909.

Allionia incarnata L. Syst. Nat. ed. 10. 890. 1759.

Wedelia incarnata Kuntze, Rev. Gen. Pl. 533. 1891.

Type locality, Peru.

MacDougal Crater, Pinacate Mountains, November 14, 1907, *MacDougal* 30.

Isomeris arborea Nutt.; Torr. & Gr. Fl. N. Amer. **1:** 124. 1838.

Type locality, "St. Diego, California."

Pinacate Mountains, at 600 to 900 meters, November 21, 1907, *MacDougal*.

Wislizenia costellata Rose, Proc. Biol. Soc. Washington **19:** 132. 1906.

Type locality, "Sonora, Mexico. Between Nogales and Guaymas."

Sonoyta, November 8, 1907, *MacDougal* 12.

Krameria glandulosa Rose & Painter, Contr. Nat. Herb. **10:** 108. 1906.

Type locality, "Near El Paso, Texas."

Hornaday Range, Pinacate Mountains, November 14, 1907, *MacDougal* 23.

Acacia greggii A. Gray, Smiths. Contr. Knowl. **3:** 65. 1852.

Type locality, "Dry valley west of Patos, Northern Mexico."

No specimens were collected but the plant was observed throughout the region visited.

Parkinsonia microphylla Torr. U. S. Rep. Expl. Miss. Pacif. **4:** 82. 1856.

Type locality, "Banks of the Colorado, and on Williams' river," Arizona.

This, the common palo verde, is discussed and illustrated by Doctor Hornaday in the "Camp-Fires." Doctor Hornaday speaks of it as follows: [1]

"Of all the tree products of the desert the palo verde is one of the most beautiful and interesting. Its name is Spanish and means 'green tree.' According to its soil and water supply, it may be as large as an adult apple tree—fifteen feet high, with a trunk nine inches in diameter—or as small as a mountain laurel bush three feet high. Almost as far as it can be seen, you recognize it at once as something different and remarkable. Instead of a top that is made up of leaf masses, one laid upon another, you see that its foliage—or rather the masses where its foliage ought to be—is composed of *straight lines*, and angles. The palo verde bears a few tiny leaflets, so small that it would take about twelve of them to cover a postage stamp; but in November they exert no influence whatever upon the general aspect of the tree.

"Regardless of leaves, however, from root to top the palo verde is of the most beautiful green that could be imagined. It is not the bold, waxy, aggressive green of the creosote bush, but the soft, smooth, and delicate green of the asparagus.

"The bark is as smooth as the surface of polished oak, and trunk, branch, and twig are alike persistent green. Even the bark of the trunk has a surface like a robin's egg.

"The terminal twigs are long, straight, and slender, like masses of green darning needles set where the leaves ought to be. The density of their color, added to their unique form, gives the tree as a whole a peculiarly lineated top. This is one of the very few desert trees that is free from thorns.

"This tree is not particularly useful. Its chief purpose is to ornament the arroyos and flood basins of the desert regions, and to furnish brake blocks for desert freight-wagons. It strings along the arroyos, wherever the water supply is a little above the average, but on the open, level plains it is rare. Often from many a square mile it is quite absent. In density and grain, its wood is much like that of the white birch. The trunk consists of a single stem, upon which the branches are set in very abrupt and angular fashion, all of which merely adds to the odd appearance of the tree."

Prosopis velutina Wooton, Bull. Torrey Club **25:** 456. 1898.

Type locality, "Probably first collected with young fruit in the valley of the Nazas in northern (?) Mexico by Gregg."

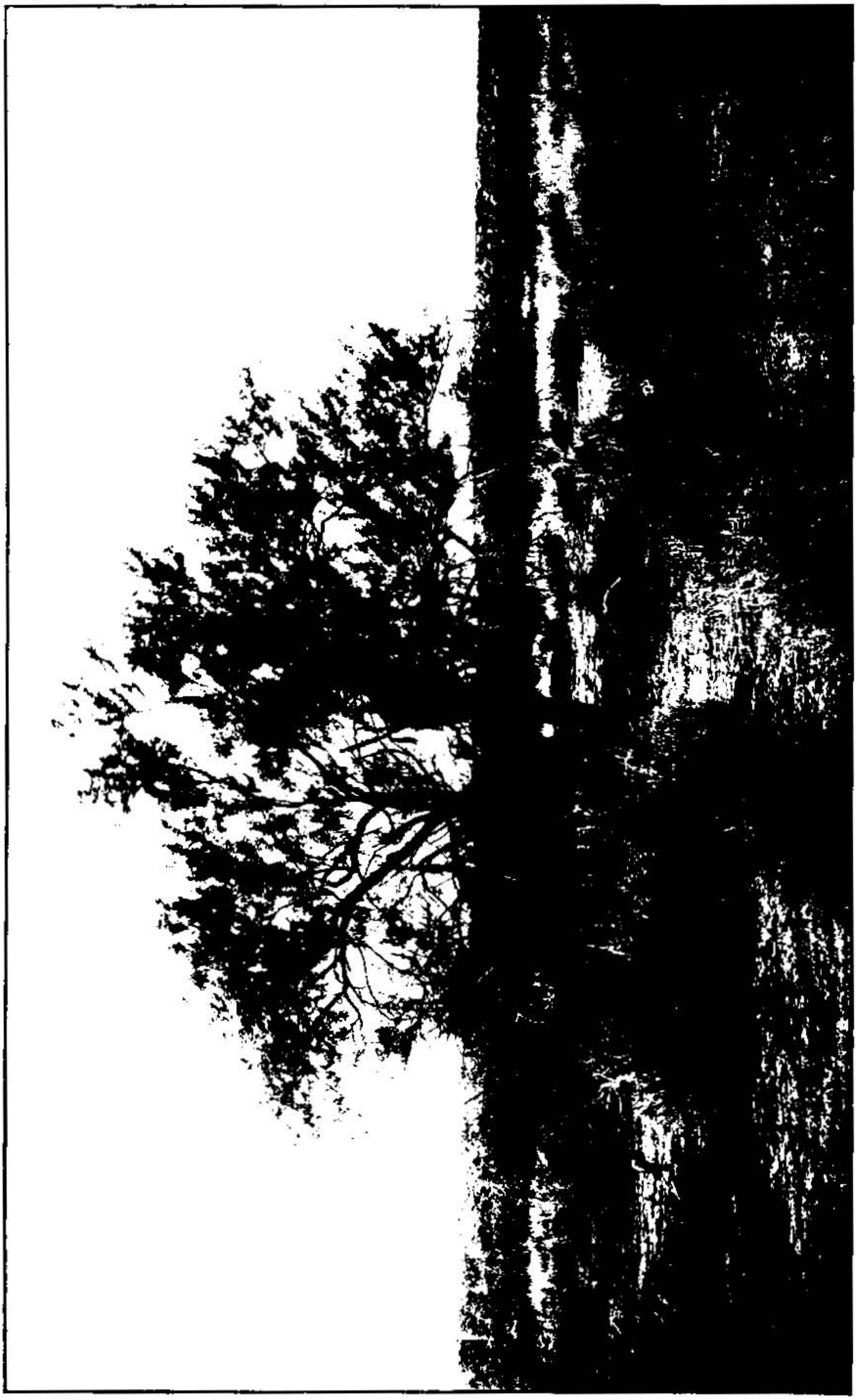
No specimens of this were collected, but it is illustrated in several of the illustrations of the "Camp-Fires." Doctor Hornaday writes of it as follows: [2]

"The honey-pod mesquite is the most persistent bush tree of the deserts. Both in form and size it is much like the palo verde, and in southern Arizona and Mexico the two species are almost inseparable companions. On the desert plains, where water is scarce and dear, the mesquite is a modest little bush three feet high; but along the arroyos, the valleys, and in the business centers of the flood basins, where the water wagon is more in evidence, it develops into a real tree. Often it grows to a height of twenty-five feet, with a writhing trunk twelve or more inches in diameter. In growth habit it is very much like an apple tree—a low, heavy, wide-spreading top with crooked branches that frequently are horizontal, on a short, stout trunk of irregular shape. The bark is gray and the foliage is of a pale gray green tint—not so pleasing as the asparagus green of the palo verde. * * * Both foliage and "beans" are eaten by horses and cattle when grass is not obtainable and hunger is great. Its seeds are greedily eaten by all the small rodents of the deserts, and by many birds also. Although its leaves are very small, the shade of the mesquite is very grateful and comforting.

"The mesquite is well provided with thorns, but, fortunately for the proletariat, they point forward instead of back. Its wood is hard, fine-grained, durable, and the general stand-by for fuel throughout the whole Southwest. Blessed is the desert wayfarer

[1] Page 45; see also plate facing p. 70, same work.

[2] Page 47.



OLNEYA TESOTA A. GRAY.

who has dry mesquite for his camp-fire; for without it fire making is a serious problem. It burns freely, makes a hot fire, and quickly produces a good bed of coals for the baking of bread and the frying of meat.

"In the simple house building of the deserts, mesquite constitutes well-nigh the only wood that is available. The stems are used to support the earth roofs of houses, to build into fences for corrals and cultivated fields, and to repair broken wagons. It is said that the Mexicans also use it in the making of furniture."

Olneya tesota A. Gray, Mem. Amer. Acad. II. **5**: 328. 1855. PLATE 3.

Type locality, "On the table-lands of the Gila."

No specimens of this were collected, either, but it is common about the Pinacates and in southern Arizona, where it is known as ironwood. Of it Doctor Hornaday says:[1]

"The ironwood tree is not of sufficient importance to justify prolonged attention. It looks very much like the mesquite, but its wood is as hard as its name implies, and so heavy that it will not float in water. The largest specimen I noted particularly was a conspicuous part of our aforesaid bivouac on Pinacate. A trunk fully a foot in diameter and twenty feet long was twisted almost into a figure-8 knot, but it was what cattlemen call a 'lazy 8,' for it lay upon the ground."

EXPLANATION OF PLATE 3.—From a photograph by Dr. D. T. MacDougal.

Parosela emoryi (A. Gray) Heller, Cat. N. Amer. Pl. ed. 2. 6. 1900.

Dalea emoryi A. Gray, Mem. Amer. Acad. II. **5**: 315. 1855.

Type locality, "On the desert table-lands of the Gila."

Adair Box, November 20, 1907, *Sykes* 65.

Parosela spinosa (A. Gray) Heller, Cat. N. Amer. Pl. ed. 2. 7. 1900.

Dalea spinosa A. Gray, Mem. Amer. Acad. II. **5**: 315. 1855.

Type locality, "Arroyos on the Gila; and on the Californian desert west of the Colorado."

Sandhills, Adair Box, November 20, 1907, *Sykes* 64.

This is spoken of as the "spiny smoke tree." It is well illustrated in the "Camp-Fires."[2]

Phaseolus wrightii A. Gray, Smiths. Contr. Knowl. **3**: 43. 1852.

Type locality, "Declivity of a mountain, near El Paso."

Papago Tanks, Sonora, November 17, 1907, *MacDougal* 48.

Covillea glutinosa (Engelm.) Rydb. N. Amer. Fl. **25**[3]: 108. 1910.

Larrea glutinosa Engelm. in Wisliz. Mem. North. Mex. 93. 1848.

Type locality, "Olla and Fray Cristobal," New Mexico.

The common creosote bush, occurring nearly throughout the arid Southwest. Again we quote Doctor Hornaday from the "Camp-Fires:"[3]

"Last of the important bushes and trees of the desert—but often it is the first—is the creosote bush. It is by far the most omnipresent representative of the plant world throughout the region we traversed. I think we saw hundreds of square miles of it, and most of all was on the trail from the Ajo mines up to Gila Bend.

"The specimen shown with Mr. Sykes and the grave of the murdered Mexican is an excellent picture of a creosote bush, which may be regarded as the type of ten million others. The creosote bush is a big cluster of small and brittle woody stems, covered with smooth brown bark. The stems do not branch until near their tops, and there they send off a few fine twigs to support the irregular clusters of tiny leaves that form the outer surface of the bush. The leaves are of a rich, bright green color, and so shiny that they look as if recently varnished. They taste unpleasantly like creosote (oil of smoke), and no animal can eat them.

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[1] Page 52. [2] Plate opposite page 182. [3] Page 53.

"The leaves of the creosote bush are so wholly on its outer surface that it would be quite easy to shear them all off, as one shears a sheep, and leave the bush nearly full size but perfectly bare. The usual height of this bush is from two to three feet. The clumps stand about ten feet apart, and usually there are from 100 to 150 per acre. In a few localities we saw some very large specimens, which grew fully ten feet in height."

Kallstroemia grandiflora Torr.; A. Gray, Smiths. Contr. Knowl. **3**: 28. 1852.

Type locality, "Borders of the Gila," New Mexico or Arizona.

MacDougal Crater, Pinacate Mountains, November 14, 1907, *MacDougal* 25.

Chamaesyce pediculifera (Engelm.) Rose & Standley.

Euphorbia pediculifera Engelm. in Torr. Bot. Mex. Bound. 186. 1859.

Type locality, "Sonora."

Quitovaquito, Sonora, November 11, 1907, *MacDougal* 17; MacDougal Crater, Pinacate Mountains, November 14, 1907, *Sykes* 28.

Croton arenicola Rose & Standley, sp. nov.

Low shrub, less than a meter high, much branched, the stems strictly erect, whitish, slender, densely lepidote throughout; leaves linear to linear-oblong or lanceolate, 20 to 35 mm. long, 2 to 6 mm. wide, rounded at the apex, attenuate to the base, densely lepidote-stellate on both surfaces, whitish, on slender petioles 5 to 14 mm. long; flowers dicœcious, both kinds apetalous; staminate flowers in few-flowered racemes 15 to 30 mm. long, naked below, the calyx lobes ovate, densely stellate and lepidote, obtuse, the flowers 4 mm. broad, on pedicels 5 to 8 mm. long; stamens slightly exceeding the sepals; pistillate raceme about 3 cm. long, sometimes less, the flowers on stout pedicels 4 to 6 mm. long, the calyx lobes ovate, obtuse; capsule 10 or 11 mm. high, densely and finely stellate and somewhat lepidote; seeds oval or oblong, 7 or 8 mm. long, variegated with brown and gray, the caruncle stipitate, small.

Type in the U. S. National Herbarium, no. 574267, collected on sand hills about Adair Bay, Gulf of California, in northwestern Sonora, November 20, 1908, by Mr. G. Sykes (no. 62).

This is near *Croton tenuis* but has more abundant pubescence so that the plant appears silvery throughout; the leaves are also narrower, and the seeds are much larger with a different caruncle.

Ditaxis odontophylla Rose & Standley, sp. nov.

Low, 20 cm. high or less, erect or ascending; stems stout, pilose; leaves oblanceolate, attenuate at the base into a short petiole, rather thin, bright green, more or less pilose on both surfaces, broadly obtuse and coarsely dentate near the apex; staminate flowers with linear-oblong sepals and oval, clawed petals, the latter white tinged with purple near the base, the sepals pilose; pistillate flowers with linear-lanceolate, hirsute sepals, the style tips not enlarged; capsule strongly hirsute; seeds subspherical, smooth, brown.

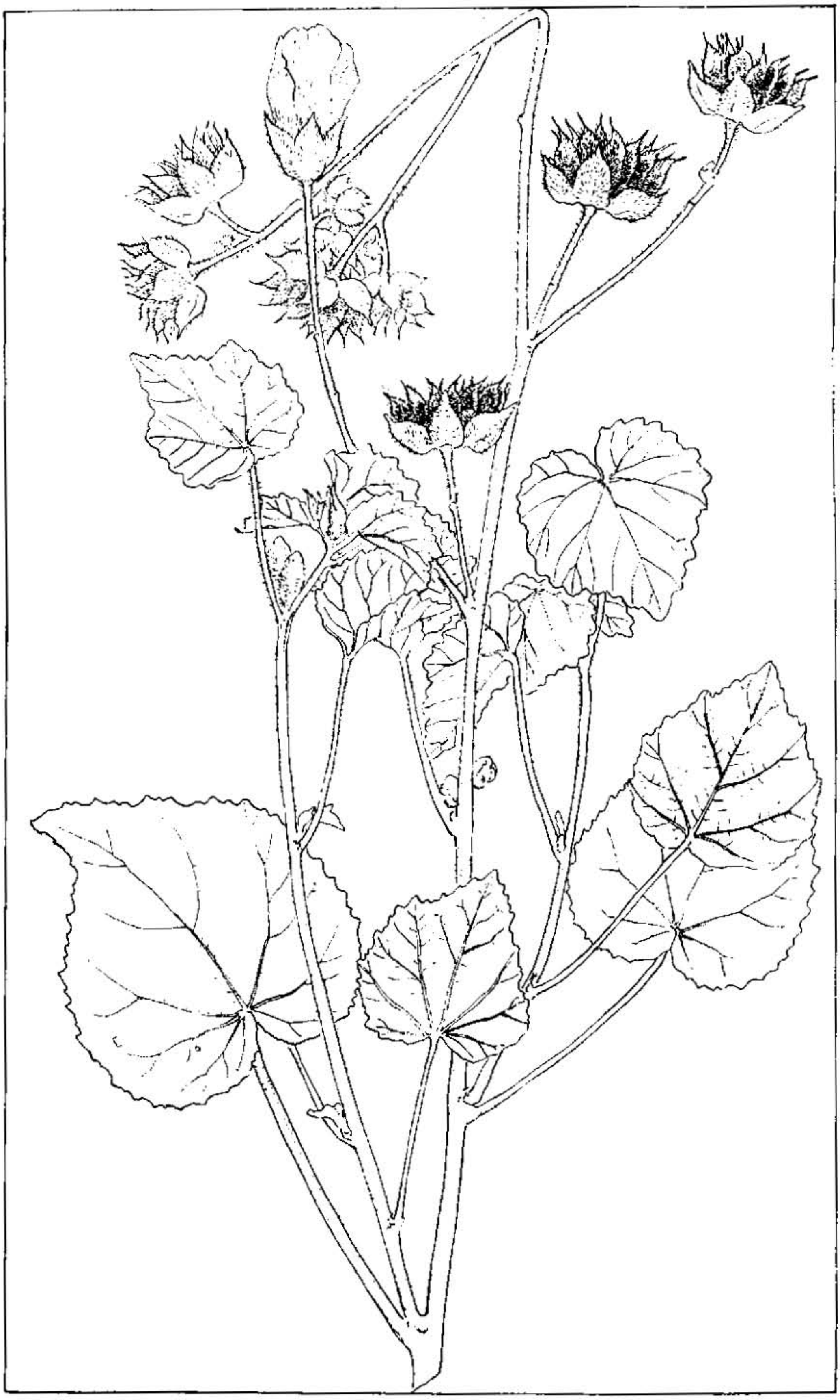
Type in the U. S. National Herbarium, no. 574248, collected at the Papago Tanks, Sonora, November 14, 1908, by Dr. D. T. MacDougal (no. 36).

The plant is similar to *Ditaxis neomexicana* but has very different leaves and much more abundant pubescence.

Here may be inserted a description of another apparently new species of Ditaxis, detected while attempting to determine *Ditaxis odontophylla*.

DITAXIS GRACILIS Rose & Standley, sp. nov.

Low, sparingly branched, slender annual, 30 to 40 cm. high; stems sparingly pilose, pale green; leaves lanceolate or elliptic-lanceolate, 5 to 6 cm. long and 20 to 25 mm. wide, acute, somewhat attenuate at the base, thin, bright green, all except the youngest glabrous, all on slender petioles 10 to 18 mm. long; racemes few-flowered and



ABUTILON MACDOUGALII ROSE & STANDLEY.

SPHAERALCEA MACDOUGALII ROSE & STANDLEY.

axillary; staminate flowers with linear, acute, sepals, their pale green petals broadly lanceolate and one-half longer; pistillate flowers with linear-lanceolate, attenuate sepals 6 to 8 mm. long, the petals spatulate, very short and inconspicuous; style tips not enlarged; capsule hirsute, the mature ones and seeds not seen.

Type in the U. S. National Herbarium, no. 45193, collected at Guaymas, Sonora, in 1887 by Dr. Edward Palmer (no. 624).

A very distinct species, readily separated by its large, thin, finally glabrous leaves with slender petioles.

Another species of Ditaxis from Lower California seems never to have been referred to the correct generic name:

DITAXIS BRANDEGEI (Millspaugh) Rose & Standley.
Argythamnia brandegei Millspaugh, Proc. Calif. Acad. II. **2**: 220. 1889.
Type locality, "San Gregorio," Lower California.

Mozinna spathulata Orteg. Hort. Matr. Dec. **8**: 105. *pl. 13*. 1799.
Jatropha spathulata Muell. Arg. in DC. Prodr. **15** ^{2}: 1081. 1866.
Type locality, "Habitat in Nova Hispania."
Hornaday Range, Pinacate Mountains, November 14, 1907, *MacDougal* 21.

Poinsettia eriantha (Benth.) Rose & Standley.
Euphorbia eriantha Benth. Bot. Voy. Sulph. 51. 1844.
Type locality, "Bay of Magdalena," Lower California.
Pinacate Mountains, at 600 to 900 meters, November 21, 1907, *MacDougal* 69.

Stillingia linearifolia S. Wats. Proc. Amer. Acad. **14**: 297. 1879.
Type locality, "S. California; near Boundary Monument, San Diego."
MacDougal Pass, Pinacate Mountains, November 14, 1907, *MacDougal* 59.

Abutilon macdougalii Rose & Standley, sp. nov. PLATE 4.

Herbaceous throughout, tall, probably about a meter high; stems stout, much branched, densely covered with soft, short, spreading hairs; leaves broadly ovate-cordate, 9 cm. long or usually smaller, the sinus closed, irregularly serrate, thick, velvety-tomentose on both sides, canescent beneath, all on petioles longer than the blades; inflorescence a terminal, sparingly branched panicle, the flowers on pedicels 10 to 15 mm. long; lobes of the calyx triangular-ovate, attenuate, divided two-thirds of the way to the base, densely villous; petals orange yellow, 20 mm. long, more than twice as long as the calyx; carpels slightly surpassing the calyx, 10 in number, villous, with conspicuous, divergent, rather long beaks; seeds brown, glabrous, papillose.

Type in the U. S. National Herbarium, no. 574255, collected in the Pinacate Mountains, November 22, 1907, by Dr. D. T. MacDougal (no. 47).

Near *Abutilon aurantiacum* but with different inflorescence and seeds, and with shorter calyces with narrower lobes.

EXPLANATION OF PLATE 4.—Branch of the type specimen. Natural size.

Hibiscus denudatus Benth. Bot. Voy. Sulph. 7. *pl. 3*. 1844.
Type locality, "Bay of Magdalena," Lower California.
Papago Tanks, Pinacate Mountains, November 20, 1907, *MacDougal*.

Sphaeralcea macdougalii Rose & Standley, sp. nov. PLATE 5.

Stems stout, erect, branched, densely velvety-stellate; petioles 15 to 20 mm. long; leaf blades ovate, obscurely 3-lobed, obtuse, cordate at the base, densely velvety-stellate on both surfaces, prominently veined, the margins somewhat undulate; flowers few, in short terminal racemes; pedicels 1 cm. long or less; bracts subulate, inconspicuous; calyx 10 to 12 mm. high, cleft nearly to the base, the lobes oblong-lanceolate, acute, densely stellate; petals 2 cm. long, purplish red; immature carpels densely stellate on the back, 2-seeded, blunt, nearly smooth on the inner faces.

Type in the U. S. National Herbarium, no. 574253, collected at the Papago Tanks in the Pinacate Mountains, Sonora, November 16, 1907, by Dr. D. T. MacDougal (no. 45).

EXPLANATION OF PLATE 5.—Branch of type specimen. Natural size.

Elaphrium microphyllum (A. Gray) Rose, N. Amer. Fl. **25**[3]: 250. 1911. PLATE 6.

Bursera microphylla A. Gray, Proc. Amer. Acad. **5:** 155. 1861.

Terebinthus microphylla Rose, Contr. Nat. Herb. **10:** 120. 1906.

Type locality, Lower California.

Hornaday Range, Pinacate Mountains, November 14, 1907, *MacDougal* 22; slope of the Pinacate Mountains, November 20, 1907, *MacDougal* 55.

EXPLANATION OF PLATE 6.—From a photograph by Dr. D. T. MacDougal.

Fouquieria splendens Engelm. in Wisliz. Mem. North. Mex. 98. 1848.

Type locality, "Jornada del Muerto," New Mexico.

This is illustrated in several plates of the "Camp-Fires."[1] Concerning this characteristic desert plant Doctor Hornaday writes:[2]

"There is one other arboreal feature of the deserts which, because of its picturesque oddity, I have reserved to the last. It is a product of the plant world unique in character, and standing as much apart from related genera and species as does the prong-horned antelope among hoofed animals. It is the Ocotillo, the Spanish name of which is pronounced o-co-tee'-yo. Next to the giant cactus, it was the most monumental and picturesque thing of plant growth found by us in two hundred miles of fertile deserts.

"The ocotillo is a multiform tree, and there is nothing else that is at all like it. Instead of having a tall main stem and many branches, large and small, it has an exceedingly short stem and many very long, wandlike branches. The leaves grow all along each branch, from bottom to tip. The stem is a big, thick mass of solid wood, *all underneath the earth* (where the earth has not been blown away), and the top of it is large enough to afford holding ground for each branch. From the very limited upper surface of the main stem, starting usually at the level of the ground, there rise a score or more of long, slender rods of light wood, their bases firmly packed together, but otherwise free. They are like slender and very symmetrical fishing rods. As they rise they droop outward and spread apart, until they form a group shaped like a morning-glory vase. When it is in full leaf, the ocotillo is like a bouquet of green wands held at the bottom by an invisible hand.

"The stems vary in number from three to seventy-three or even more. I can vouch for the last-named number by count. The largest ocotillo that I particularly noted had some stems that were, by measurement, eighteen feet long.

"One of the strangest features of this odd multiple-tree is its leaves and thorns. The leaves grow thickly all along the stem, each blade an inch and a half in length. The blade springs full-fledged from the upright woody stem, with no free petiole, and its color is dark pea green. This profusion of leaves gives each stem of the ocotillo a highly pleasing appearance, and denotes water in the not-far-distant yesterday. A large ocotillo in full leaf is a beautiful object, and every line of its ensemble bespeaks development in a land of queer things.

"But mark the transformation.

"When the last rain has become only a distant memory, when the hungry roots have sucked the last drop of moisture from the sandy soil, the hour for the change has struck. Fleshy leaves an inch and a half long are far too luxuriant to last long in a

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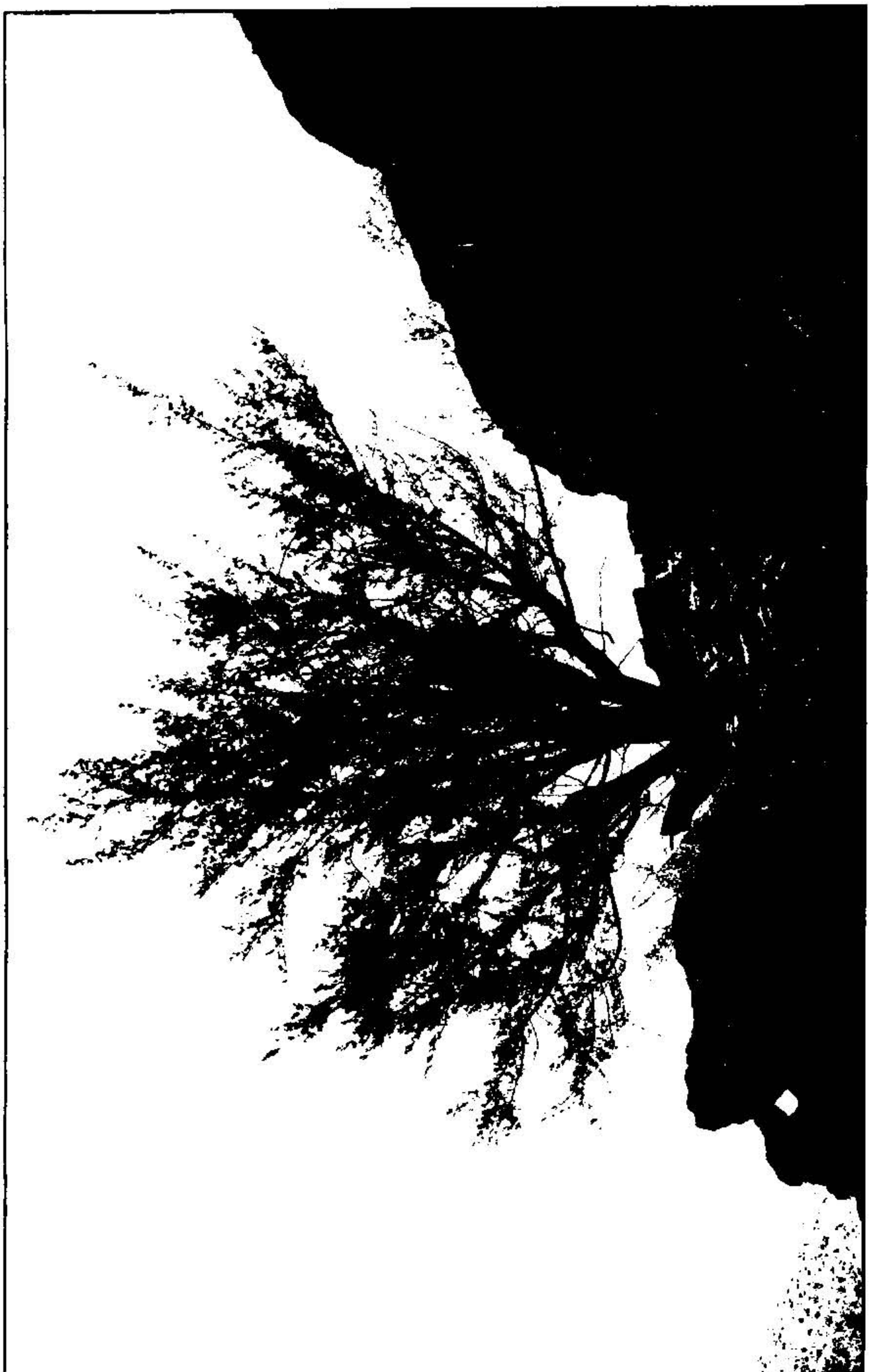
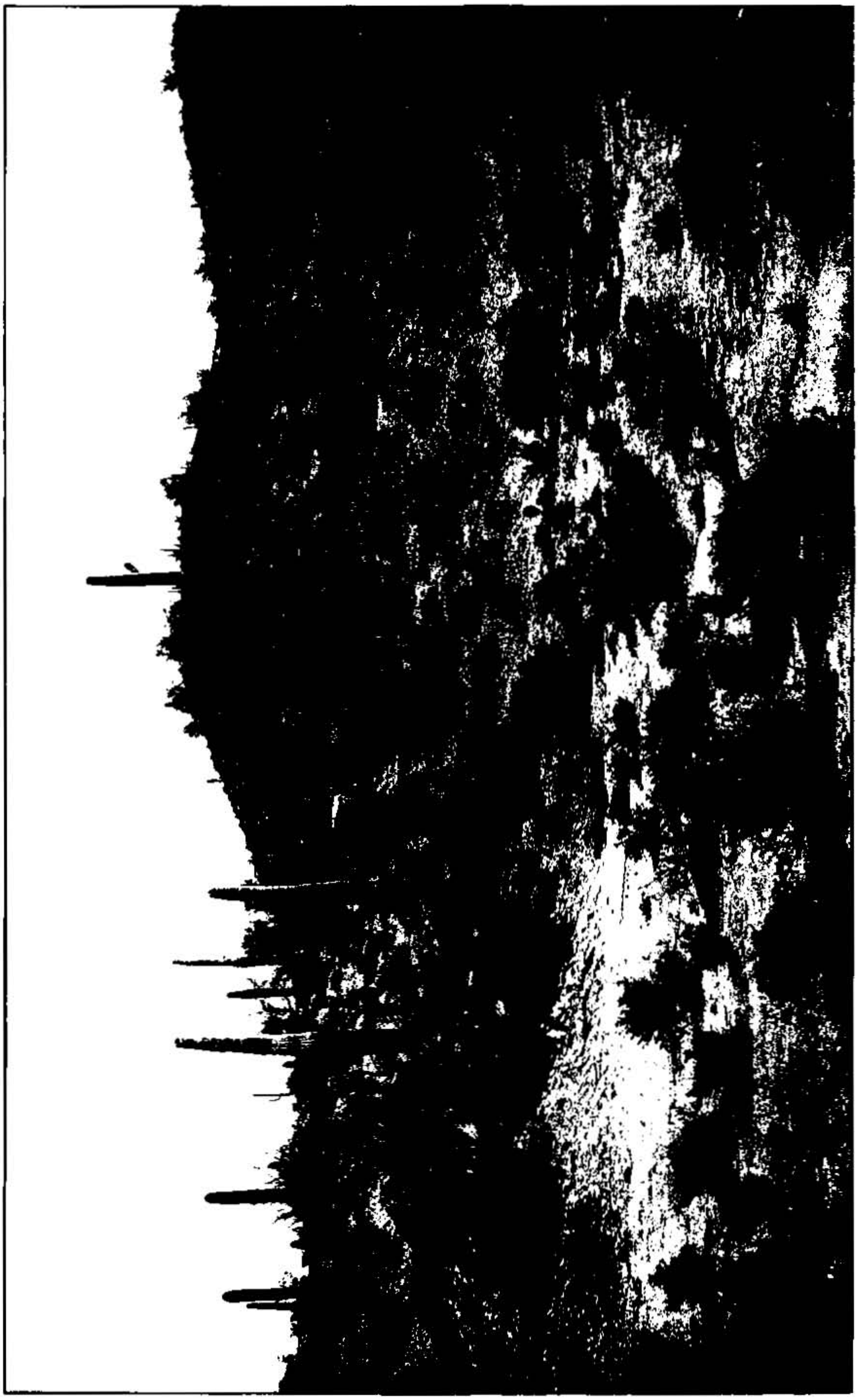
[1] On the plate opposite page 52 several fine specimens are shown, photographed in the Ajo Valley 10 miles south of Montezumas Head, Arizona. A young plant in full leaf is shown opposite page 80; a plant in full leaf, in color, opposite page 100; another opposite page 230.

[2] Page 49.

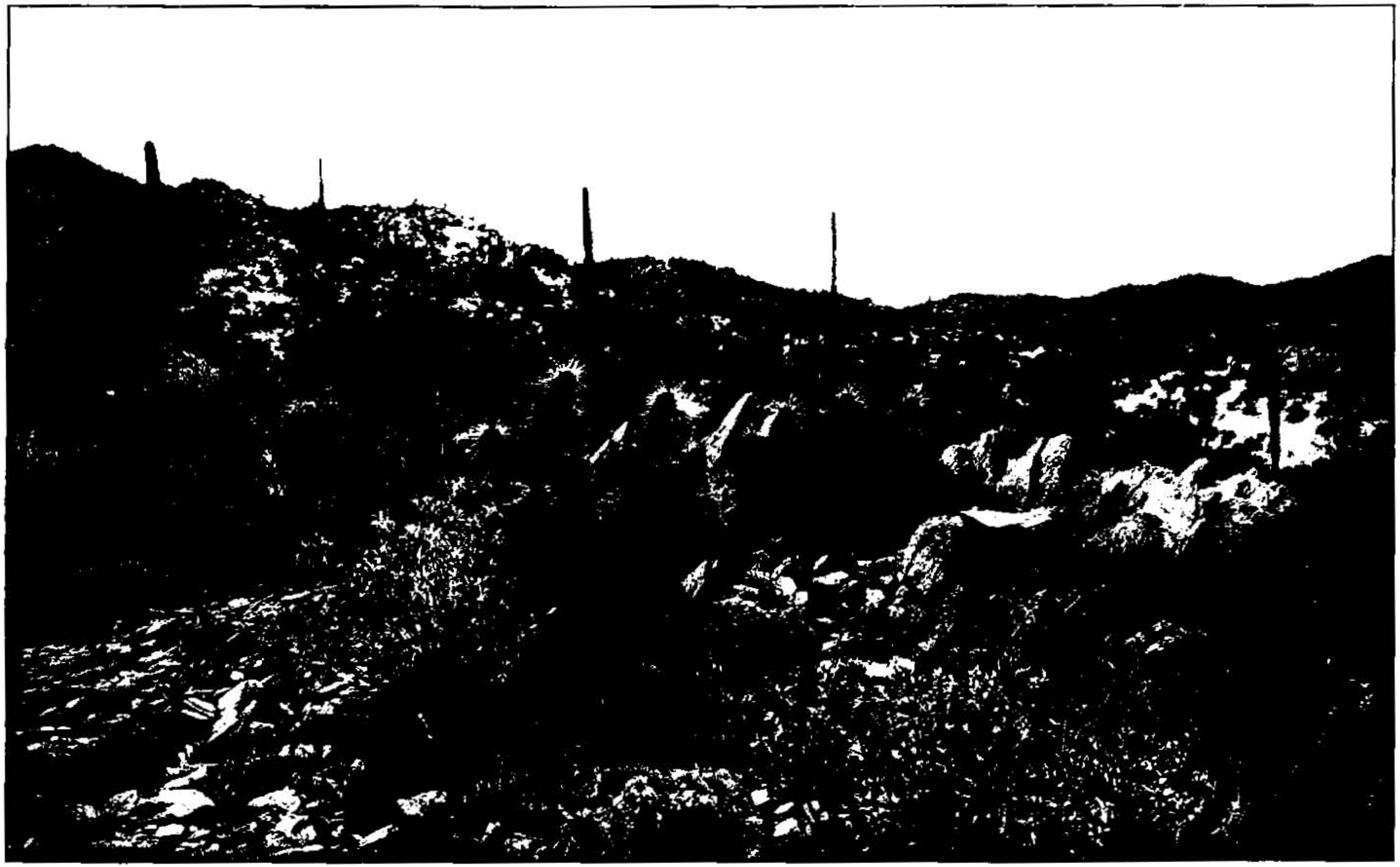


ELAPHRIUM MICROPHYLLUM (A. GRAY) ROSE.



CARNEGIEA GIGANTEA (ENGELM.) BRITTON & ROSE.

ECHINACEA ANGUSTIFOLIA VAR. PALLIDA (NUTT.) RÜMPL.



ECHINOCEREUS ENGELMANNI PARRY RÜMPL.

desert. They dry up, and they drop off—all but the midrib, which takes form as a big, woody *thorn* an inch or more in length. Then and thereafter each stem presents the most frightful array of thorns to be found on anything outside the cactus family. So far as cattle, burros, and wild animals are concerned, an ocotillo in a state of defence is practically impregnable. We saw only two stems that had been barked by food-seeking animals, and that work had been done by wild burros, at great trouble and expense.

"Except on the plains dedicated to the creosote bush and mesquite, the ocotillo stayed with us from Tucson to the very foot of Pinacate Peak. It is the inseparable companion of the giant cactus, but, unlike the latter, it grows larger along the international boundary than fifty miles farther north. On the night that three of us "laid out" on the slope of Pinacate, we found near our bivouac a large dead ocotillo whose rods of clean white wood burned with a brilliant light—too bright to last. These naked rods are used by the Papago Indians in building fences, and screens around the verandas of their adobe houses."

Petalonyx thurberi A. Gray, Mem. Amer. Acad. II. **5:** 319. 1855.
Type locality, "Valley of the Rio Gila."
Sandhills, Adair Bay, November 20, 1907, *Sykes*.

Sympetaleia rupestris (Baill.) A. Gray; S. Wats. Proc. Amer. Acad. **24:** 50. 1889.
Loasella rupestris Baill. Bull. Mens. Soc. Linn. Paris. 1: 650. 1886.
Type locality not ascertained.
Pinacate Mountains, November 21, 1907, *MacDougal* 74

Carnegiea gigantea (Engelm.) Britton & Rose, Journ. N. Y. Bot. Gard. **9:** 188. 1908. PLATE 7.
Cereus giganteus Engelm. in Emory, Mil. Reconn. 158. 1848.
Type locality, along the Gila River, Arizona.
No specimens were collected but many fine photographs were taken. The finest specimen seen is illustrated by Doctor Hornaday in a beautiful colored plate.[1] It was about 60 feet high and had 9 branches, an unusually large number. The species was found to range from Tucson to the Pinacates, and from near sea level to an altitude of 1,200 meters.

EXPLANATION OF PLATE 7.—From a photograph by Dr. D. T. MacDougal.

Echinocactus emoryi Engelm. in Emory, Mil. Reconn. 156. 1848.
Type locality not specifically given; in southeastern Arizona, near the New Mexican line.
A living specimen was collected in the Pinacate Mountains and sent to Washington.

Echinocactus wislizeni Engelm. in Wisliz. Mem. North. Mex. 96. 1848.
Type locality, "Doñana," New Mexico.
No material of this species was taken but Doctor Hornaday gives an illustration [2] of a very large plant from which water is being extracted.

Echinocereus engelmanni (Parry) Rümpl.; Först. Handb. Cact. ed. 2. 805. 1886. PLATES 8, 9.
Cereus engelmanni Parry, Amer. Journ. Sci. II. **14:** 338. 1852.
Type locality, "Mountains about San Felipe," California.
A cluster of living specimens was collected on the Pinacate Mountains and sent to Washington. Doctor Hornaday illustrates a group of these.[3]

EXPLANATION OF PLATES 8, 9.—From photographs by Dr. D. T. MacDougal.

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[1] "Camp-Fires," facing page 72.
[2] Ibid., facing page 216.
[3] Ibid., facing page 236.

Lemaireocereus thurberi (Engelm.) Britton & Rose, Contr. Nat. Herb. **10:** 426. 1909.

Cereus thurberi Engelm. Amer. Journ. Sci. II. **17:** 234. 1854.

Type locality, "Canyon near the mountain pass Bachuachi."

A living specimen and fruit were collected at Sonoyta, Sonora, and sent to Washington. A fine colored illustration of this species is given by Doctor Hornaday.[1] The plant illustrated had 22 stems, the tallest being 20 feet high. The species was first seen at Sierra Blanca and last at the Ajo mines, Arizona, at about the same latitude as Tucson, and these may be considered as the northern limits for the species.

Lophocereus schottii (Engelm.) Britton & Rose, Contr. Nat. Herb. **12:** 427. 1909.

Cereus schottii Engelm. Proc. Amer. Acad. **3:** 288. 1856.

Pilocereus schottii Lem. Rev. Hort. **1862:** 428. 1862.

Type locality, "Toward Santa Magdalena," Sonora, Mexico.

A living specimen was collected at Sonoyta, Sonora, and sent to Washington.

Mamillaria grahami Engelm. Proc. Amer. Acad. **3:** 262. 1856.

Type locality, "Mountains from El Paso southward and westward to the Gila and Colorado, and up the latter river."

Living specimens were collected on the Pinacate Mountains and sent to Washington.

Opuntia bigelovii Engelm. Proc. Amer. Acad. **3:** 307. 1856. PLATE 10.

Type locality, "On Williams River" (Bill Williams River), Arizona.

Common on Hornaday Mountain, Sonora.

EXPLANATION OF PLATE 10.—From photograph by Dr. D. T. MacDougal.

Opuntia chlorotica Engelm. & Bigel. Proc. Amer. Acad. **3:** 291. 1856.

Type locality, "From San Francisco Mountains to Mojave Creek," Arizona.

Near summit of Pinacate Mountains, *MacDougal.*

Opuntia fulgida Engelm. Proc. Amer. Acad. **3:** 306. 1856.

Type locality, "Mountains of western Sonora," Mexico.

Sonoyta, Sonora, *MacDougal.*

Philibertella hartwegii heterophylla (Engelm.) Vail, Bull. Torrey Club **24:** 308. 1897.

Sarcostemma heterophylla Engelm. in Torr. U. S. Rep. Expl. Miss. Pacif. **5:** 362. 1856.

Type locality, "Near Fort Yuma," Arizona.

Walls Well, Ajo Mountains, Arizona, November 7, 1907, *MacDougal* 7.

Cuscuta californica Choisy, Mem. Soc. Phys. Hist. Nat. Genève **9:** 279. 1841.

Type locality, "Nov. [am] Californiam."

MacDougal Crater, Pinacate Mountains, November 14, 1907, *MacDougal* 26. The immature plants are growing on *Kallstroemia grandiflora.*

Euploca aurea Rose & Standley, sp. nov. PLATE 11.

Low, much branched annual, 30 cm. high or less; branches spreading, stout, hirsute; leaves oblong to elliptic or oval, thick, yellowish green, hirsute, small, mostly about 1 cm. long, acutish, rounded at the base, all on short, stout petioles one-third as long as the blades; flowers axillary, scattered; lobes of the calyx linear-subulate, strigose; corolla bright yellow, the limb about 6 mm. wide, the throat somewhat inflated; style long and slender; stigma penicillate; achenes 2, hemispherical, each finally splitting into 2, strigillose, smooth.

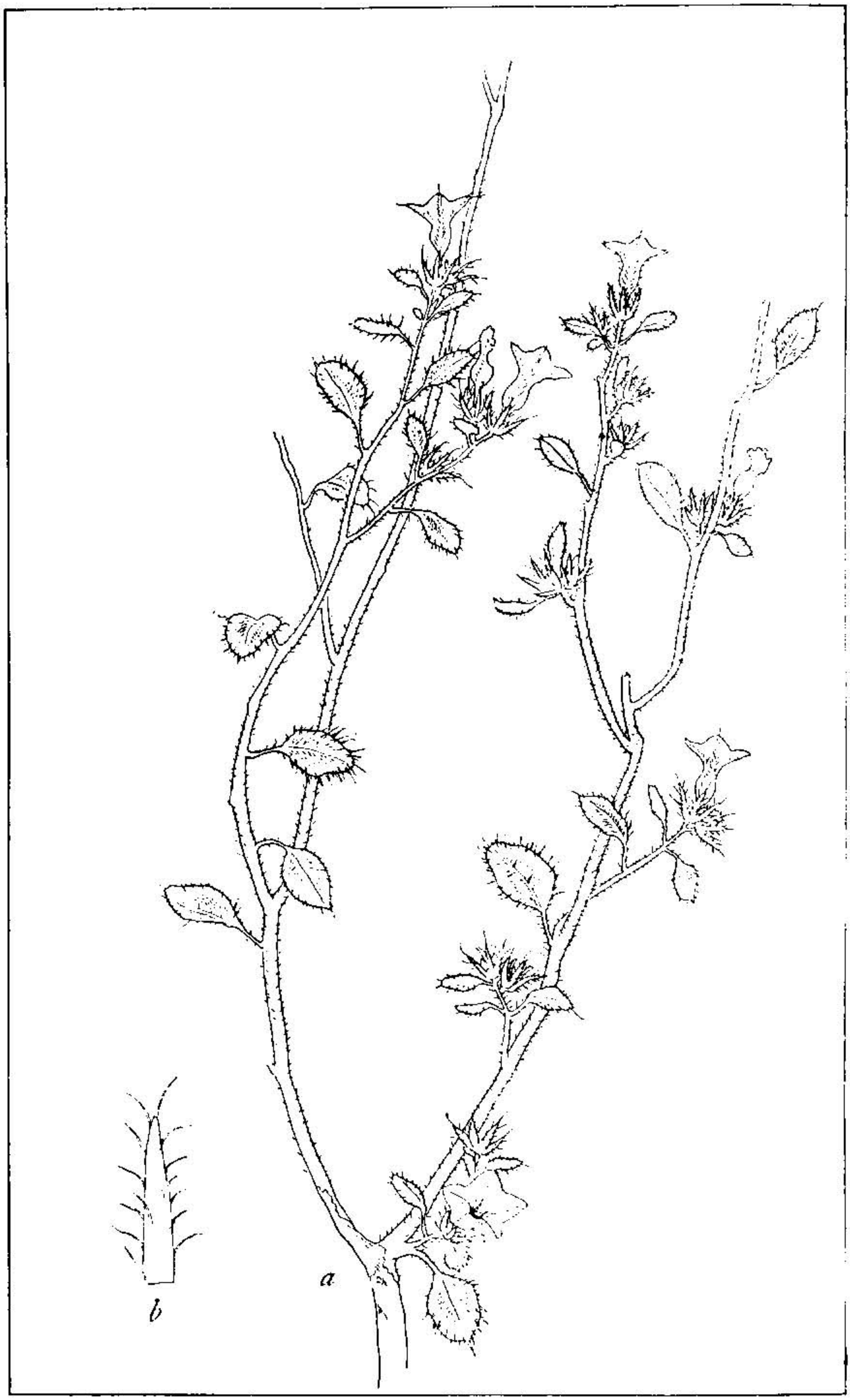
Type in the U. S. National Herbarium, no. 574265, collected on sand hills near Adair Bay, Gulf of California, November 20, 1907, by Mr. G. Sykes (no. 61).

This is not closely related to any other species of the genus, being distinguished chiefly by its yellow corollas and bristling indumentum.

EXPLANATION OF PLATE 11.—*a*, Branch of type; *b*, calyx lobe. *a*. Natural size; *b*, scale 4.

[1] "Camp-Fires," facing page 136.

OPUNTIA BIGELOVII ENGELM.



EUPLOCA AUREA ROSE & STANDLEY.

Here may be inserted the description of another species of Euploca from southwestern Texas.

EUPLOCA RACEMOSA Rose & Standley, sp. nov.

Low, much branched annual, about 30 cm. high; stems slender, spreading, strigose; leaves elliptic, 20 to 25 mm. long, acute at both ends, strigose, all on very short petioles (2 to 4 mm. long); flowers mostly axillary forming slender, one-sided racemes; leaves of the inflorescence much reduced; calyx lobes linear-lanceolate, 5 or 6 mm. long, strigillose; corolla white, its limb 7 mm. in diameter; style long and slender, the stigma penicillate; fruit smooth, strigillose.

Type in the U. S. National Herbarium, no. 45192, collected in southwestern Texas, between September, 1879, and October, 1880, by Dr. Edward Palmer (no. 889).

This is distinguished from *Euploca convolvulacea* by its smaller corolla, different inflorescence, and shorter petioles.

Verbena bracteosa Michx. Fl. Bor. Amer. **2:** 13. 1803.

Type locality, "In regione Illinoensi et in urbe Nash-ville."

Pinacate Mountains, at 900 to 1,200 meters, November 21, 1907, *MacDougal* 73. The specimens are unusually villous but otherwise seem to belong here.

Ramona capitata (A. Gray) Briq. Bull. Herb. Boiss. **2:** 440. 1894.

Audibertia capitata A. Gray, Proc. Amer. Acad. **7:** 387. 1868.

Type locality, "Summit of Providence Mountain, Mohave Desert."

Pinacate Mountain, November 21, 1907, *MacDougal* 72.

Datura discolor Bernh. Linnaea. **8:** Litt. Ber. 138. 1833.

Type locality, "Hab. in India occidentali."

Walls Well, Ajo Mountains, November 7, 1907, *MacDougal.*

Nicotiana trigonophylla Dunal in DC. Prodr. **13**[1]**:** 562. 1852.

Type locality, "In Mexico ad Aguas calientes."

Papago Tanks, Sonora, November 17, 1907, *MacDougal* 41.

Physalis cardiophylla Torr. Bot. Mex. Bound. 153. 1859.

Type locality, "Sonora and California, desert of the Colorado."

Papago Tanks, Sonora, November 17, 1907, *MacDougal.*

Solanum hindsianum Benth. Bot. Voy. Sulph. 39. 1844.

Type locality, "Bay of Magdalena," Lower California.

Pinacate Mountains, November 19, 1907, *MacDougal.*

Antirrhinum chytrospermum A. Gray, Proc. Amer. Acad. **12:** 81. 1877.

Type locality, "Ehrenberg, Arizona."

Papago Tanks, Pinacate Mountains, November 16, 1907, *MacDougal* 44.

Chilopsis linearis (Cav.) Sweet, Hort. Brit. 283. 1827.

Bignonia ? linearis Cav. Icon. **Pl. 3:** 35. *pl. 269.* 1794.

Type locality unknown.

Walls Well, Ajo Mountains, November 8, 1907, *MacDougal* 6.

Anisacanthus thurberi (Torr.) A. Gray, Syn. Fl. **2**[1]**:** 328. 1886.

Drejera thurberi Torr. Bot. Mex. Bound. 124. 1859.

Type locality, "Along water-courses, Las Animas, Sonora."

Walls Well, Ajo Mountains, November 7, 1907, *MacDougal* 10. This plant is known as *tuparosa*, probably a corruption of *chuparosa*—"humming-bird flower."

Ptiloria tenuifolia (Torr.) Raf. Atl. Journ. 145. 1832.

Prenanthes ? tenuifolia Torr. Ann. Lyc. N. Y. **2:** 210. 1828.

Lygodesmia minor Hook. Fl. Bor. Amer. **1:** 205. 1833.

Type locality, "Rocky Mountains."

Pinacate Mountains, November 15, 1907, *MacDougal* 34.

Dicoria calliptera Rose & Standley, sp. nov. PLATE 12.

Branches half a meter long or less, spreading, diffusely branched; stems very slender, finely canescent, striate; leaf blades ovate or broadly oblong, small, 5 to 14 mm. long and 3 to 11 mm. wide, obtuse, narrowed at the base, entire, somewhat crispate, rather thick, finely but not closely canescent on both surfaces, all on slender petioles as long as the blades; outer involucral bracts oblong to ovate, obtuse, the inner saccate, scarious, becoming 5 mm. long, sparingly glandular-viscid, the margins dentate; achenes 1 or 2, oblong, 5 mm. long and 2 mm. wide, somewhat puberulent and viscid, bidentate at the apex, dark brown, the wings scarious, pectinate, more than half as wide as the achene, straw-colored, not incurved.

Type in the U. S. National Herbarium, no. 574268, collected on sand hills near Adair Bay, Gulf of California, Sonora, November 20, 1907, by Mr. G. Sykes, (no. 63).

This is nearest *Dicoria canescens*, but the fruit has much wider, not incurved wings, the inner bracts are much smaller, and the pubescence of the stem is all appressed and not spreading as in that species.

EXPLANATION OF PLATE 12.—*a*, Branch of the type; *b*, staminate floret; *c*, fruiting head; *d*, outer involucral bracts; *e*, achene; *f*, inner involucral bract. *a*, Natural size; *b*, scale 12; *c*, scale 6; *d*, *e*, *f*, scale 8.

Chrysoma laricifolia (A. Gray) Greene, Erythea **3:** 11. 1895.

Type locality, "On mountains, at Guadalupe Pass, New Mexico."

Hornaday Range, Pinacate Mountains, November 14, 1907, *MacDougal*.

Baccharis glutinosa Pers. Syn. Pl. **2:** 425. 1807.

Type locality, "In R. Chilensis ruderatis."

Walls Well, Ajo Mountains, Arizona, November 8, 1908, *MacDougal* 13.

Baccharis sarothroides A. Gray, Proc. Amer. Acad. **17:** 211. 1882.

Type locality, "Southern borders of California, San Diego Co., near the old Mission station, the boundary monument, etc."

Walls Well, Ajo Mountains, November 8, 1907, *MacDougal* 5. The specimens have heads somewhat larger than the typical form and the pappus is about twice as long as in specimens from southern California.

Encelia farinosa A. Gray, Torr. in Emory, Mil. Reconn. 143. 1848.

Type locality not given.

This is well illustrated in a plate of the "Camp-Fires." [1] The name of "white brittle-bush" is there suggested for it.

Isocoma fruticosa Rose & Standley, sp. nov. PLATE 13.

Low, straggling, much-branched shrub; branches stout, covered with rough, gray bark; leaves very thick and fleshy, resiniferous, viscid, simple or usually pinnatifid, the divisions coarsely filiform, alternate, divergent or directed forward, the whole leaf 25 mm. long or less, the lateral divisions usually 2 to 4 mm. long; heads few, 3 to 5, clustered at the ends of the branches, all conspicuously pedicelled; involucral bracts oblong, obtuse, coriaceous, much imbricated; heads narrowly campanulate, 7 to 9 mm. high; pappus pale yellow, 6 mm. long; achenes 2 mm. long or less, sericeous.

Type in the U. S. National Herbarium, no. 574278, collected in MacDougal Pass near the Pinacate Mountains, Sonora, November 14, 1907, by Dr. D. T. MacDougal.

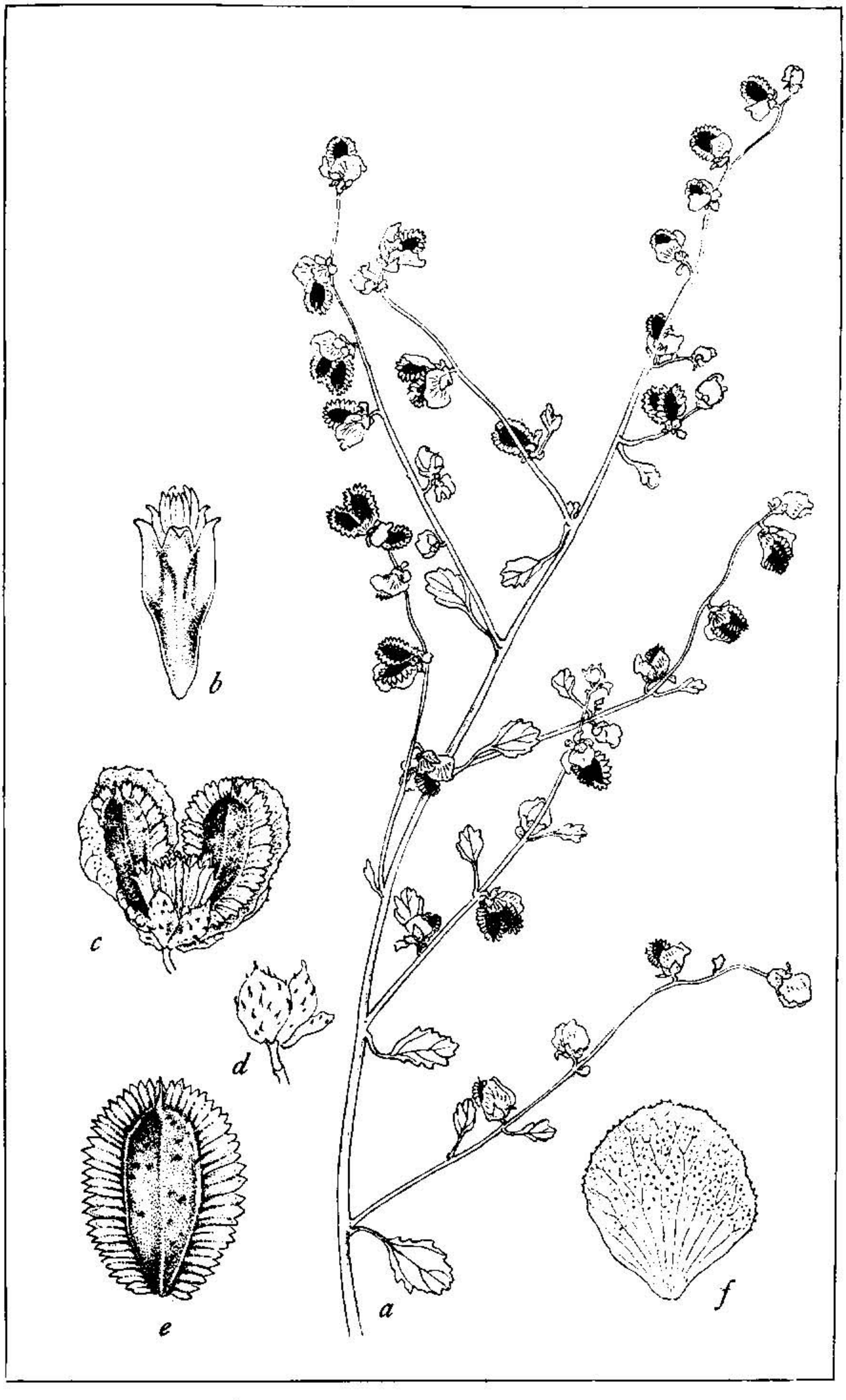
The plant is nearest *Isocoma tenuisecta*, but differs notably in habit and the characteristics of the leaves.

EXPLANATION OF PLATE 13.—*a*, Branch of type; *b*, involucral bract; *c*, head; *d*, floret and immature achene. *a*, Natural size; *b*, scale 12; *c*, scale 4; *d*, scale 8.

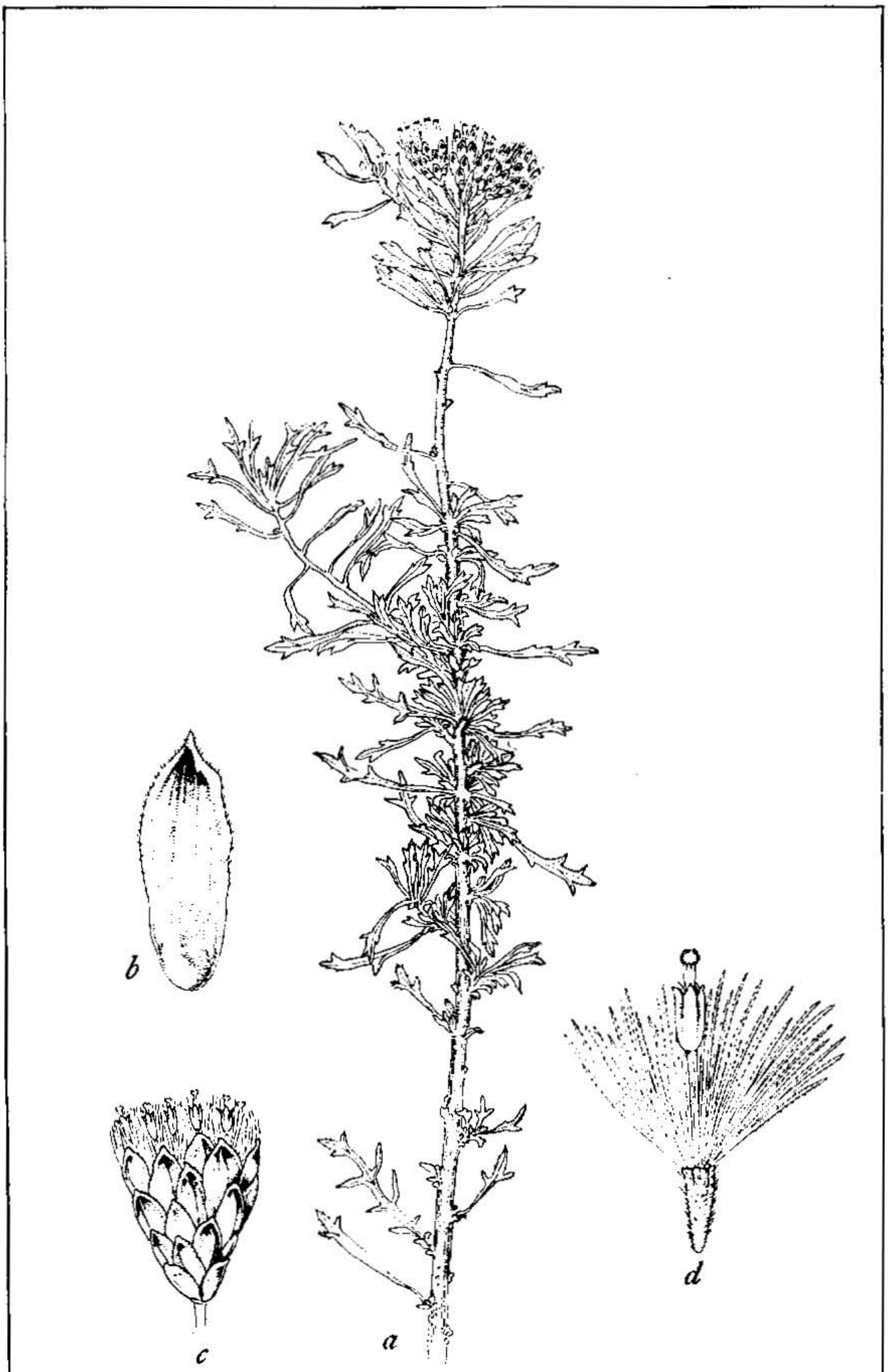
Isocoma limitanea Rose & Standley, sp. nov. PLATE 14.

Stout perennial; stems several from each root, simple below, corymbosely branched above, glabrous except about the inflorescence, there viscid, conspicuously striate;

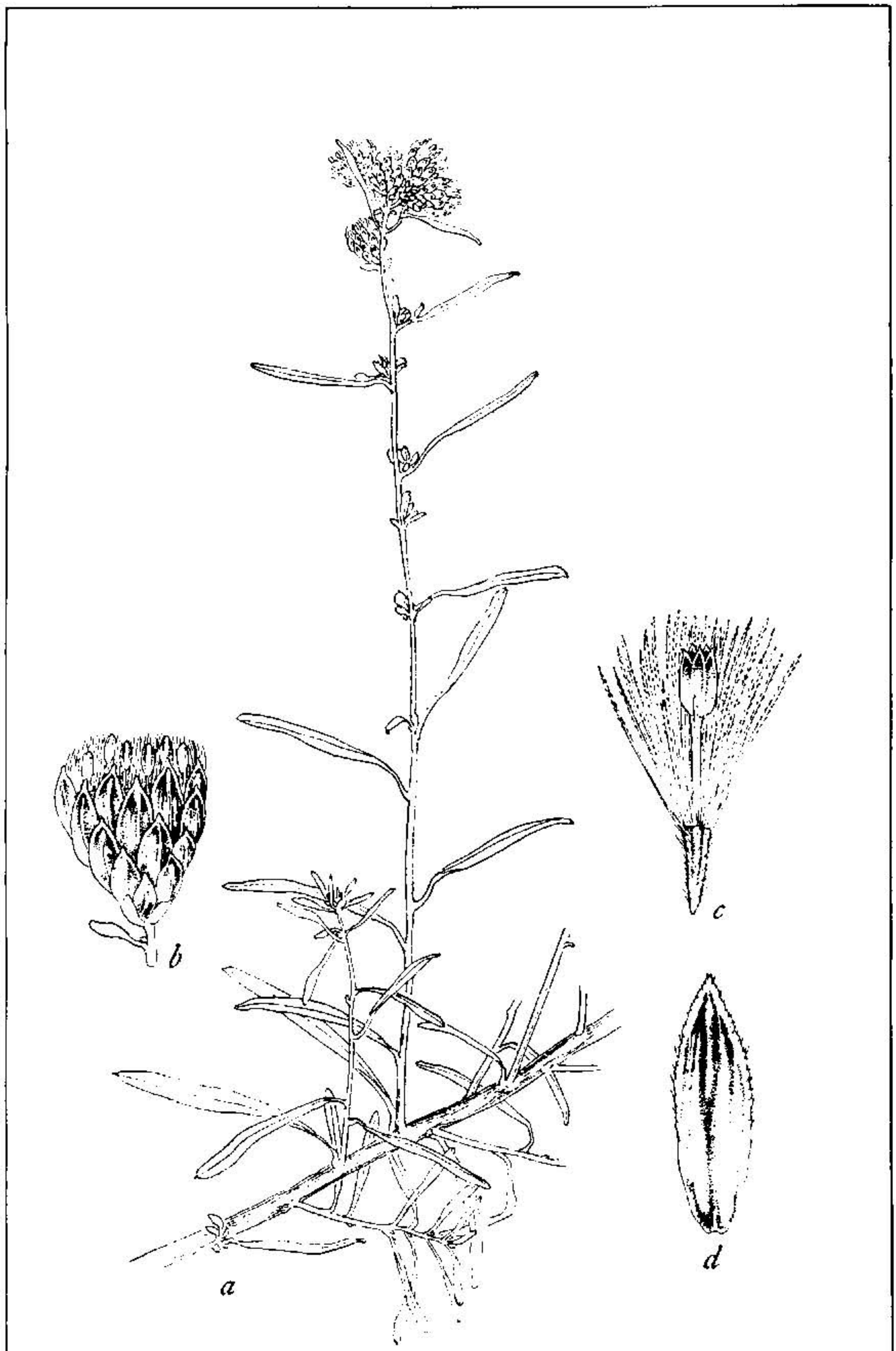
[1] Facing page 182.



DICORIA CALLIPTERA ROSE & STANDLEY.



ISOCOMA FRUTICOSA ROSE & STANDLEY.



ISOCOMA LIMITANEA ROSE & STANDLEY.

SIDERANTHUS VIRIDIS ROSE & STANDLEY.

lower leaves linear-oblanceolate, acutish, attenuate to the sessile base, 55 mm. long or less, dull yellowish green, sometimes whitened with a resinous excretion, the upper leaves smaller and linear, all glabrous, thick, very numerous; inflorescence corymbosely much branched, the heads sessile or short-peduncled, 2 to 5 at the end of each branch, campanulate, 5 mm. high; bracts coriaceous, straw-colored, greenish at the tips, oblong to linear-lanceolate, the outer obtuse, the inner acute, all minutely ciliolate, otherwiso glabrous, much imbricated; achenes 2 mm. long, strigillose, the tawny pappus 4 to 5 mm. long.

Type in the U. S. National Herbarium, no. 574227, collected at the village of Sonoyta, Sonora, November 14, 1907, by Dr. D. T. MacDougal (no. 14).

Although related to the more eastern *Isocoma heterophylla*, our plant may be distinguished at once by its different inflorescence, more glabrous stem, and very different leaves.

EXPLANATION OF PLATE 14.—*a*, Branch of the type specimen; *b*, head; *c*, floret and immature achene; *d*, involucral bract. *a*, Natural size; *b*, scale 5; *c*, scale 10; *d*, scale 14.

Pectis angustifolia Torr. Ann. Lyc. N. Y. **2:** 214. 1828.

Type locality, "On the Rocky Mountains."

MacDougal Crater, November 14, 1907, *Sykes* 27 (in part).

Pectis papposa Harv. & Gray, Mem. Amer. Acad. II. **4:** 62. 1849.

Type locality, "California."

Pinacate Mountains, November, 1907, *MacDougal;* MacDougal Crater, November 14, 1907, *Sykes* 27 (in part).

Perityle emoryi Torr. in Emory, Mil. Reconn. 142. 1848.

Type locality, "The Cordilleras of California."

Pinacate Mountains at 1200 meters, November 21, 1907, *MacDougal* 68.

Porophyllum gracile Benth. Bot. Voy. Sulph. 29. 1844.

Type locality, "Bay of Magdalena," Lower California.

The specimens collected apparently belong to this species, but they are in an unsatisfactory state for determination.

Senecio filicifolius Greenm. ined.

Walls Well, Ajo Mountains, Arizona, November 8, 1907, *MacDougal* 11.

Sideranthus viridis Rose & Standley, sp. nov. PLATE 15.

Biennial or perennial, somewhat woody near the base; stems slender, branched from the base and sparingly above, glabrous below, minutely glandular-viscid above, bright green; leaves linear and entire or sometimes with a few lateral lobes, bristle-tipped, bright green, finely glandular-viscid, small, rather numerous; heads numerous, solitary at the ends of the very slender, leafy branches; involucral bracts linear-lanceolate, irregularly imbricated, green for half their length, viscid, 5 or 6 mm. long; rays numerous, pale yellow, linear, 8 or 9 mm. long; pappus abundant, almost pure white; mature achenes not seen.

Type in the U. S. National Herbarium, no. 574279, collected on the Pinacate Mountains, November 21, 1907, by Dr. D. T. MacDougal.

This is easily separated from the other members of the genus by its bright green stems and leaves, the latter of peculiar form. The pubescence, too, is different from that of our other species.

EXPLANATION OF PLATE 15.—*a*, Root and base of plant; *b*, branch of type; *c*, involucral bract; *d*, flower with young achene; *e*, leaf and axillary branch; *f*, ray floret. *a*, *b*, Natural size; *c*, *d*, scale 8; *e*, *f*, scale 4.

Trixis californica Kellogg, Proc. Calif. Acad. **2:** 182. *f. 53*. 1863.

Type locality, "Cerros Island."

Quitovaquito, Sonora, November 11, 1907, *MacDougal* 16. This is the species that has been passing as *Trixis angustifolia* DC. That, however, is a very different plant, with leaves of different form and with strongly pubescent stems.

Viguiera sp.

Possibly *V. deltoidea* A. Gray. Papago Tanks, Pinacate Mountains, November 17, 1907, *MacDougal* 50. The plants are not in flower and it is impossible to be certain of their proper identification.

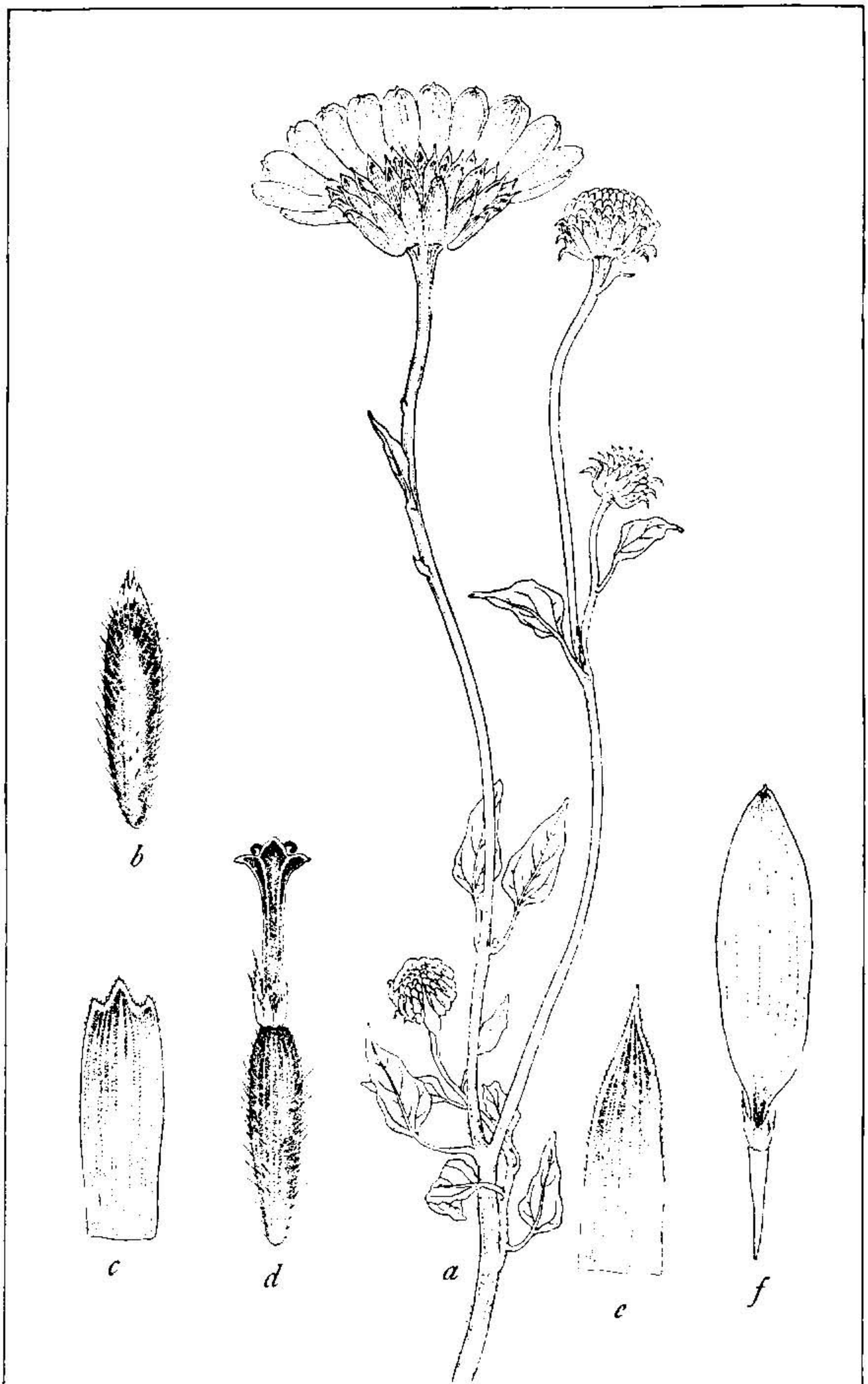
Viguiera sonorae Rose & Standley, sp. nov. PLATE 16.

Apparently a tall plant sparingly branched below; stems stout, finely and rather densely canescent throughout; leaf blades deltoid-ovate, thick, finely and densely canescent, obtuse, subcordate or truncate at the base, all on stout, finely canescent petioles one-third to one-half as long as the blade, the margins undulate, somewhat crispate; heads few, loosely corymbose, on peduncles 10 to 20 cm. long, naked or with a few much reduced leaves; heads subspherical, 15 mm. in diameter and 12 to 14 mm. high; involucral bracts lanceolate, attenuate, finely and densely canescent; chaff of the receptacle oblong, entire or 3-toothed at the apex; achenes 8 mm. long, somewhat 3-angled, loosely and conspicuously pilose; pappus of 2 or 3 short, triangular-lanceolate paleæ at the angles of the achene and of several slightly shorter intermediate paleæ, the pappus finally deciduous, equaled or exceeded by the pilose hairs; rays about 2 cm. long, bright yellow.

Type in the U. S. National Herbarium, no. 574262, collected at the Papago Tanks, Sonora, November 20, 1908, by Dr. D. T. MacDougal (no. 57).

Apparently this is not closely related to any other species. Its nearest relative, perhaps, is *Viguiera canescens*.

EXPLANATION OF PLATE 16.—*a*, Part of type; *b*, achene; *c*, palea of the receptacle; *d*, disk floret; *e*, involucral bract; *f*, ray floret. *a*, Natural size; *b* to *e*, scale 4; *f*, scale 2.



VIGUIERA SCNORAE ROSE & STANDLEY.