

A PRELIMINARY TREATMENT OF THE OPUNTIOIDEAE OF NORTH AMERICA

BY N. L. BRITTON AND J. N. ROSE

In 1904 the writers began a joint study of the Cactaceae of North America. As early as 1897, however, Dr. Rose had begun to send living specimens to Washington. Through the kindness of Dr. B. T. Galloway, Chief of the Bureau of Plant Industry, and Mr. Frederick V. Coville, Botanist of the U. S. Department of Agriculture, arrangements were made to properly care for this collection. It has grown until it now comprises about 5,000 individual plants, filling the greater part of a greenhouse 25 by 100 feet. Some 500 plants have died and these have been preserved as skeleton specimens in the U. S. National Museum. Dr. Britton, on the other hand, upon the organization of the New York Botanical Garden, began also to make a collection of living Cacti. He has now accumulated a large study series and a most attractive exhibition series. The latter is especially fine on account of the number of large species, not a few of which are new to our American collections. These two collections are very rich in species of *Opuntia* and allied genera, and it seems desirable to present a preliminary treatment of the group at this time. The species here enumerated are those of which we have actually examined living plants or specimens, or which from our study of descriptions and illustrations there seems every reason to believe should be recognized. Our collections indicate several new species, only a part of which are here described. The type species is *Cactus opuntia* L.

We have accepted, in general, the several series of *Opuntia* as recognized by the late Professor Schumann, but with considerable modification and with several transpositions of species.

We recognize three genera, belonging to the subfamily Opuntioideae in North America, including Central America and the West Indies. The species of *Opuntia* and *Nopalea* are listed below, while those of *Pereskia* will be found on pages 331-333 of this volume.

LIST OF THE SPECIES OF OPUNTIA

Series CLAVATAE

The series appears to be well characterized by the sheathless spines.

OPUNTIA BRADTIANA (Coul.) K. Brandeg.

Cereus bradtianus COULT. Contr. Nat. Herb. 3: 406. 1896 (April).

Grusonia cerciformis F. REICH. Monatsschr. Kakteenk. 6: 177. 1896 (August).

Opuntia bradtiana K. BRANDEG. Erythea 5: 121. 1897.

Opuntia cerciformis WEBER in Bois, Dict. Hort. 897. 1898.

Type locality: Plains of Coahuila.

Distribution: Coahuila, Mexico.

Illustration: Schum. Gesamtb. Kakteen fig. 101.

OPUNTIA INVICTA Brandeg.

Opuntia invicta BRANDEG. Proc. Cal. Acad. II. 2: 163. 1889.

Type locality: San Juanico, Lower California.

Distribution: Lower California.

Illustration: Cact. Journ. 1: 2.

OPUNTIA PULCHELLA Engelm.

Opuntia pulchella ENGELM. Trans. St. Louis Acad. 2: 201. 1863.

Type locality: Sandy deserts on Walker River, Nevada.

Distribution: Nevada and Arizona.

OPUNTIA BULBISPINA Engelm.

Opuntia bulbispina ENGELM. Proc. Am. Acad. 3: 304. 1856.

Type locality: Saltillo, Mexico.

Distribution: New Mexico to Coahuila.

Illustration: Cact. Mex. Bound. pl. 73. figs. 5, 6.

OPUNTIA GRAHAMI Engelm.

Opuntia grahami ENGELM. Proc. Am. Acad. 3: 304. 1856.

Type locality: Sandy bottoms of the Rio Grande near El Paso, Texas.

Distribution: New Mexico and Texas.

Illustration: Cact. Mex. Bound. pl. 72.

OPUNTIA EMORYI Engelm.

Opuntia emoryi ENGELM. Proc. Am. Acad. 3: 303. 1856.

Type locality: Arid soil, El Paso, Texas.

Distribution: Western Texas to Arizona and northern Mexico.

Illustrations: Cact. Mex. Bound. pls. 70, 71; Cact. Journ. 1: 154.

OPUNTIA SCHOTTII Engelm.

Opuntia schottii ENGELM. Proc. Am. Acad. 3: 304. 1856.

Type locality: Arid soil near the mouth of the San Pedro and Pecos, western Texas.

Distribution: Southern Texas and northern Mexico.

Illustration: Cact. Mex. Bound. pl. 73. figs. 1-3.

OPUNTIA SCHOTTII GREGGII Engelm.

Opuntia schottii greggii ENGELM.; Coult. Contr. Nat. Herb. 3: 444. 1896.

Type locality: San Luis Potosi.

Distribution: Only known from type collection.

Illustration: Cact. Mex. Bound. pl. 73. fig. 4.

OPUNTIA CLAVATA Engelm.

Opuntia clavata ENGELM. in Wislitz. Mem. North. Mex. 95. 1848.

Type locality: Albuquerque, New Mexico.

Distribution: Nevada and New Mexico.

Illustrations: Pac. R. Rep. 4: pl. 22. figs. 1-3; pl. 24. fig. 6; Cact. Mex. Bound. pl. 73. figs. 5, 6.

OPUNTIA PARRYI Engelm.

Opuntia parryi ENGELM. Am. Journ. Sci. II. 14: 339. 1852.

Type locality: Plains of the Mohave River, California.

Distribution: Southern California.

Illustrations: Pac. R. Rep. 4: pl. 22. figs. 4-7; Cact. Journ. 1: 132.

OPUNTIA KUNZEI Rose, sp. nov.

Stem 10 to 15 cm. high, much branched; joints somewhat clavate, light bluish green, 8 to 10 cm. long, strongly tubercled; spines numerous, the longest 4 cm. long, somewhat reddish when young; leaves linear, acute, 8 to 10 mm. long; flowers deeply set in the apex of the joint-like ovary, fragrant, 2.5 cm. long, 4 to 5 cm. broad when

fully open; sepals reddish in bud, ovate, acuminate; petals pale yellow; fruit yellowish, 4 to 8 cm. long, oblong to clavate, sometimes proliferous, the areoles large, white, bearing a fringe of white bristles; seeds white, 4 to 5 mm. in diameter, the commissure very indistinct.

Type in U. S. National Herbarium, no. 535,063, collected by Dr. R. E. Kunze in Pima County, Arizona, 1904.

Perhaps nearest *O. grahamii*, but with larger and different joints and different spines.

The species is named for Dr. Kunze, a valued correspondent and an enthusiastic cactus collector. He has furnished the following interesting data regarding this species:

I found this plant about forty miles south of the Ajo copper mines, in the southwestern part of Pima County, Arizona, and only about 25 to 35 miles north of the Mexican boundary. Immense tracts between the smaller arroyos are covered by this species, and for miles my guide led us through stretches of desert in the Gunsight Mining District, a waterless region, little known except to prospectors. On the eastern slope of the Gunsight Mountain range I collected *Cereus thurberi*, which species has its northern limit at the Ajo copper mines, Ajo being 60 miles south of Gila Bend, on the Southern Pacific Railroad. All the plants of *O. kunzei* were covered with the *Coccus cacti* to such an extent that I was obliged to collect a basketful of such or go without any. My former partner, Mr. L. Kunze, had found this *Opuntia* about the same time, 20 to 25 miles south of Casa Grande, in Pinal County, and all plants he brought in were completely covered with *Coccus*. I succeeded in cleaning only a few plants for cultivation. Those which I collected I threw into a pit, covered the mass with a peck of fine unslaked lime, and two weeks later removed a dozen live and clean plants. I will send you shortly a young plant of *O. kunzei* with an unopened flower bud. I shall try to preserve one of the flowers for you in formaldehyde solution of 2 per cent strength, as well as the fruit.

I thought the spines resembled *Opuntia grahami*, but find it different in shape of fruit as well as in thickness of its rootstock. I compared it with the cut in Cactaceae of Mexican Boundary Report. I have therefore no plant of *O. grahami*.

Series CYLINDRICAЕ

Further study is necessary to effect a natural grouping of the species. We include in this group the three series *Cristatae*, *Humiliores*, and *Deciduae* of Professor Schumann, which are clearly not natural ones, the relative size and number of the tubercles proving to be quite unsatisfactory characters.

OPUNTIA TUNICATA (Lehm.) Link & Otto

Cactus tunicatus LEHM. Ind. Sem. Hort. Hamburg 6. 1827.

Opuntia exuviata DC. Mem. Mus. Paris 17: 118. 1828.

Opuntia furiosa WENDL. Cat. Herrenh. 1835.

Opuntia tunicata LINK & OTTO; Pfeiff. Enum. Cact. 170. 1837.

Opuntia hystrix GRISEB. Cat. Pl. Cub. 117. 1866.

Type locality: In Mexico, but at first supposed to have come from Brazil.

Distribution: Northern Mexico, in the States of Coahuila and San Luis Potosi; Cuba, apparently cultivated; Ecuador (see Schumann, Monatsschr. Kakteenk. 8: 156); Chili (see Söhrens, op. cit. 10: 6).

OPUNTIA PALLIDA Rose, sp. nov.

Stems 5 cm. in diameter, about one meter high, with widely spreading branches, the whole plant often broader than high; old areoles very spiny, often bearing 20 spines or more, these often 3 to 4 cm. long with white papery sheaths; young areoles bearing few spines; ovary tubercled, the areoles either naked or bearing a few bristly spines; flowers pale rose-colored; petals 15 mm. long.

Type in U. S. National Herbarium, no. 451,783, collected by J. N. Rose and Jos. H. Painter near Tula, Hidalgo, Mexico, July 3, 1905 (no. 8290). Additional specimens were collected by E. W. Nelson at the same station, June, 1896 (no. 3879).

This species grows interspersed with *O. imbricata*, but is much lower in stature and has smaller leaves and lighter-colored flowers. It is much more like *O. tunicata*, but that species has yellow flowers and is always smaller.

Illustration: Contr. Nat. Herb. 10: pl. 17. A.

OPUNTIA IMBRICATA (Haw.) DC.

Cereus imbricatus HAW. Rev. Pl. Succ. 70. 1821.

Opuntia imbricata DC. Prod. 3: 471. 1828.

Opuntia rosea DC. Mem. Mus. Paris 17: 118. 1828.

Opuntia decipiens DC. Mem. Mus. Paris 17: 118. 1828.

Opuntia exuviata DC. Mem. Mus. Paris 17: 118. 1828, in part.

Opuntia stellata SALM-DYCK, Cact. Hort. Dyck. 50. 1842.

Opuntia cristata SALM-DYCK, Cact. Hort. Dyck. 50. 1842.

Type locality: Unknown; introduced into England by Loddiges in 1820.

Distribution: Central Mexico.

OPUNTIA ARBORESCENS Engelm.

Cactus cylindricus JAMES, Cat. 182. 1825, not Haw.

Cactus bleo TORR. Ann. Lyc. N. Y. 2: 202. 1828, not H. B. K.

Opuntia arborescens ENGELM. in Wislitz. Mem. North. Mex. 90. 1848.

Type locality: No station given.

Distribution: South Central United States and northern Mexico.

Illustrations: Pac. R. Rep. 4: *pl. 17. figs. 5, 6; pl. 18. fig. 4; pl. 24. fig. 12*; Cact. Mex. Bound. *pl. 75. figs. 16, 17.*

OPUNTIA THURBERI Engelm.

Opuntia thurberi ENGELM. Proc. Am. Acad. 3: 308. 1856.

Type locality: Bacuachi, Sonora.

Distribution: Sonora.

OPUNTIA WHIPPLEI Engelm. & Bigel.

Opuntia whipplei ENGELM. & BIGEL. Proc. Am. Acad. 3: 307. 1856.

Type locality: About Zuni, New Mexico.

Distribution: New Mexico and Arizona.

Illustration: Pac. R. Rep. 4: *pl. 24. figs. 9, 10.*

OPUNTIA SPINOSIOR (Engelm. & Bigel.) Toumey

Opuntia whipplei spinosior ENGELM. & BIGEL. Proc. Am. Acad. 3: 307. 1856.

Opuntia spinosior TOUMEY, Bot. Gaz. 25: 119. 1898.

Type locality: South of the Gila River.

Distribution: Arizona and northern Mexico.

Illustration: Gard. & For. 9: *fig. 1.*

OPUNTIA SPINOSIOR NEOMEXICANA Toumey

Opuntia spinosior neomexicana TOUMEY, Bot. Gaz. 25: 119. 1898.

Type locality: None given, but Toumey writes: Tucson plains, between Tucson and the Santa Catalina Mountains [Arizona].

Distribution: Southern Arizona.

OPUNTIA ACANTHOCARPA Engelm. & Bigel.

Opuntia acanthocarpa ENGELM. & BIGEL. Proc. Am. Acad. 3: 308. 1856.

Type locality: On the mountains of Cactus Pass, about 500 miles west of Santa Fe.

Distribution: Arizona and California; reported also from Utah, Nevada, and Sonora.

Illustrations: Pac. R. Rep. 4: *pl. 18. figs. 1-3; pl. 24. fig. 11*; N. Am. Fauna 7: *pls. 7, 8.*

OPUNTIA VERSICOLOR Engelm.

Opuntia versicolor ENGELM.; Coult. Contr. Nat. Herb. 3: 452. 1896.

Type locality: Tucson, Arizona.

Distribution: Arizona and northern Mexico.

Illustration: Bull. Torr. Club 32: *pl. 9. figs. 4-8.*

OPUNTIA SERPENTINA Engelm.*Opuntia serpentina* ENGELM. Am. Journ. Sci. II. 14: 338. 1852.*Cercus californicus* NUTT.; Torr. & Gr. Fl. N. Am. 1: 555. 1840, not*Opuntia californica* Engelm.

Type locality: Near the seacoast about San Diego, California.

Distribution: Southern California and Lower California.

OPUNTIA ECHINOCARPA Engelm. & Bigel.*Opuntia echinocarpa* ENGELM. & BIGEL. Proc. Am. Acad. 3: 305. 1856.

Type locality: In the Colorado Valley near the mouth of Bill Williams River.

Distribution: Utah, Arizona, and California.

Illustrations: Pac. R. Rep. 4: *pl. 18. figs. 5-10; pl. 24. fig. 8.*

Professor Coulter recognized the following subspecies:

OPUNTIA ECHINOCARPA MAJOR Engelm.*Opuntia echinocarpa major* ENGELM. Proc. Am. Acad. 3: 305. 1856.*Opuntia echinocarpa robustior* COULT. Contr. Nat. Herb. 3: 446. 1896.

Type locality: In Sonora.

Distribution: Arizona, California, and northern Sonora.

OPUNTIA ECHINOCARPA PARKERI Coult.*Opuntia echinocarpa parkeri* COULT. Contr. Nat. Herb. 3: 446. 1896.

Type locality: In San Diego County, California.

Distribution: Southern California.

OPUNTIA ECHINOCARPA NUDA Coult.*Opuntia echinocarpa nuda* COULT. Contr. Nat. Herb. 3: 446. 1896.

Type locality: San Gregorio, Lower California.

Distribution: Lower California.

OPUNTIA STAPELIAE DC.*Opuntia stapeliae* DC. Mem. Mus. Paris 17: 117. 1828.

Type locality: In Mexico.

Distribution: Mexico.

OPUNTIA DAVISII Engelm. & Bigel.*Opuntia davisii* ENGELM. & BIGEL. Proc. Am. Acad. 3: 305. 1856.

Type locality: Upper Canadian, about Tucumcari Hills, near the Llano Estacado.

Distribution: Texas.

Illustrations: Pac. R. Rep. 4: *pl. 16;* Bot. Mag. 108: *pl. 6652.*

OPUNTIA CIRIBE Engelm.

Opuntia ciribe ENGELM.; Coult. Contr. Nat. Herb. 3: 445. 1896.

Type locality: From Comondu and Loreto northward beyond Rosario.

Distribution: Central Lower California.

OPUNTIA TETRACANTHA Toumey

Opuntia tetracantha TOUMEY, Gard. & For. 9: 432. 1896.

Type locality: Five miles east of Tucson, Arizona.

Distribution: Arizona.

Illustration: Bull. Torr. Club 32: pl. 9. fig. 2.

OPUNTIA ALCAHES Weber

Opuntia alcahes WEBER, Bull. Mus. Hist. Nat. Paris 1: 321. 1895.

Type locality: In Lower California.

Distribution: Lower California.

OPUNTIA BERNARDINA Engelm.

Opuntia bernardina ENGELM.; Parish, Bull. Torr. Club 19: 92. 1892.

Type locality: From the Coast Range to the San Bernardino Mountains, California.

Distribution: Southern California.

OPUNTIA TESAJO Engelm.

Opuntia tesajo ENGELM.; Coult. Contr. Nat. Herb. 3: 448. 1896.

Type locality: In Lower California.

Distribution: Lower California.

OPUNTIA PROLIFERA Engelm.

Opuntia prolifera ENGELM. Am. Journ. Sci. II. 14: 338. 1852.

Type locality: Arid hills about San Diego, California.

Distribution: California and Lower California.

OPUNTIA CHOLLA Weber

Opuntia cholla WEBER, Bull. Mus. Hist. Nat. Paris 1: 231. 1895.

Type locality: In Lower California.

Distribution: Lower California.

OPUNTIA FULGIDA Engelm.

Opuntia fulgida ENGELM. Proc. Am. Acad. 3: 306. 1856.

Type locality: Mountains of western Sonora.

Distribution: Nevada to Sonora.

Illustrations: Cact. Mex. Bound. *pl.* 75. *fig.* 18; Bull. Torr. Club

32: *pl.* 9. *fig.* 1.

OPUNTIA MAMILLATA Schott

Opuntia mamillata SCHOTT; Engelm. Proc. Am. Acad. 3: 308. 1856.

Opuntia fulgida mamillata COULT. Contr. Nat. Herb. 3: 449. 1896.

Type locality: On the Sierra Babuquibari in Sonora.

Distribution: Arizona and Sonora.

OPUNTIA BIGELOVII Engelm. & Bigel.

Opuntia bigelovii ENGELM. & BIGEL. Proc. Am. Acad. 3: 307. 1856.

Type locality: Bill Williams River, Arizona.

Distribution: Arizona, California, Sonora, and Lower California.

Illustration: Pac. R. Rep. 4: *pl.* 19. *figs.* 1-7.

OPUNTIA MOLESTA Brandeg.

Opuntia molesta BRANDEG. Proc. Cal. Acad. II. 2: 164. 1890.

Type locality: San Ignacio, Lower California.

Distribution: Lower California.

OPUNTIA CALMALLIANA Coult.

Opuntia calmalliana COULT. Contr. Nat. Herb. 3: 453. 1896.

Type locality: Calmalli, Lower California.

Distribution: Lower California.

Referred by Mrs. Brandegee in *Erythea* 5: 122, to the preceding species.

OPUNTIA CLAVELLINA Engelm.

Opuntia clavellina ENGELM.; COULT. Contr. Nat. Herb. 3: 444. 1896.

Type locality: Near Mission Purissima, Lower California.

Distribution: Only known from type material.

Likewise referred by Mrs. Brandegee to *O. molesta*.

Series MONACANTHAE

Stems very slender; spines usually solitary.

OPUNTIA KLEINIAE DC.

Opuntia kleiniae DC. Mem. Mus. Paris 17: 118. 1828.

Opuntia wrightii ENGELM. Proc. Am. Acad. 3: 308. 1856.

Type locality: Mexico.

Distribution: Texas to Central Mexico.

OPUNTIA LEPTOCAULIS DC.

Opuntia leptocaulis DC. Mem. Mus. Paris 17: 118. 1828.

Opuntia ramuliflora SALM-DYCK, Hort. Dyck. 360. 1834.

Opuntia vaginata ENGELM. in Wisliz. Mem. North. Mex. 100. 1848, in part.

Opuntia frutescens ENGELM. Bost. Journ. Nat. Hist. 5: 208. 1845.

Opuntia virgata LINK & OTTO; Pfeiff. Enum. Cact. 173. 1837.

Opuntia gracilis PFEIFF. Enum. Cact. 172. 1837.

Type locality: In Mexico.

Distribution: South Central United States to southern Mexico.

Illustrations: Pac. R. Rep. 4: *pl. 20. figs. 1-5; pl. 24. figs. 16-19*;
Cact. Journ. 1: 154; Bull. Torr. Club 32: *pl. 10. fig. 9.*

Two varieties are usually recognized.

OPUNTIA RAMOSISSIMA Engelm.

Opuntia ramosissima ENGELM. Am. Journ. Sci. II. 14: 339. 1852.

Opuntia tessellata ENGELM. Proc. Am. Acad. 3: 309. 1856.

Type locality: In California, "near the Colorado."

Distribution: Arizona, California, and Sonora.

Illustrations: Pac. R. Rep. 4: *pl. 21; pl. 24. fig. 20*; Encycl. Am.
Hort. 3: *fig. 1549*; Cact. Journ. 1: 2.

OPUNTIA ARBUSCULA Engelm.

Opuntia arbuscula ENGELM. Proc. Am. Acad. 3: 309. 1856.

Type locality: On the lower Gila near Maricopa village.

Distribution: Arizona and Sonora.

Illustration: Bull. Torr. Club 32: *pl. 9. fig. 3.*

Series CRUCIFORMES (Subgenus CONSOLEA)

This is a sharply defined and homogeneous group with some claim for consideration as a genus, as proposed by Lemaire.

OPUNTIA SPINOSISSIMA Mill.

Opuntia spinosissima MILL. Gard. Dict. ed. 8. no. 8. 1768.

Type locality: Jamaica.

Distribution: Jamaica.

OPUNTIA CATACANTHA Link & Otto

Opuntia catacantha LINK & OTTO; Pfeiff. Enum. Cact. 166. 1837.

Type locality: St. Thomas.

Distribution: St. Thomas, Culebra, Porto Rico.

Illustration: Journ. N. Y. Bot. Gard. 7: fig. 6.

OPUNTIA HAITIENSIS Britton, sp. nov.

? *Cactus ferox* WILLD. Enum. Hort. Berol. Suppl. 35. 1813.

? *Opuntia ferox* HAW. Suppl. Pl. Succ. 82. 1819, not Nutt. 1814.

Trunk somewhat flattened above, 3 to 4 meters high, branching at the top, densely armed with acicular yellowish or gray spines 12 cm. long or less, their bases clothed with yellowish white wool 1 to 2 cm. long; branches obliquely linear-oblong to obovate, 1 to 3 cm. long, 13 cm. wide or less, about 1 cm. thick, obtuse, the areoles somewhat elevated, 1 to 1.5 cm. apart, those of young joints bearing near the edges 3 to 6 acicular spines 1 to 2.5 cm. long, those on the sides of the young joints spineless or with 1 to 3 spines, and with small tufts of grayish wool; older joints bearing at all areoles 5 to 8 gray spines similar to those of the trunk, and brown glochides 6 or 8 mm. long; flowers about 2.5 cm. broad; sepals as broad as long, or broader, apiculate; petals yellow to orange, ovate, apiculate, spreading; stamens much shorter than the petals; ovary cylindrical to obovoid-cylindric, terete or nearly so, 4 to 5 cm. long, its distinctly elevated areoles close together, only 5 or 6 mm. apart, bearing brown glochides 2 mm. long, but no spines.

Gonaives, Haiti, 16 meters altitude, George V. Nash and Norman Taylor, no. 1766, August 16, 1905. Description drawn from living plants and formalin and herbarium specimens at the New York Botanical Garden.

Opuntia ferox is said by Pfeiffer to be of South American origin. Willdenow's description calls for long wool at the areoles, which this Haitian plant has on those of the stem.

OPUNTIA MILLSPAUGHII Britton, sp. nov.

Trunk terete, 7 cm. thick at base, 5 cm. thick at top, 60 cm. high or less, branching at the summit, the branches divaricate-ascending, narrowly oblong, much compressed, 40 cm. long or less, 5 to 10 cm. wide, 1 to 1.5 cm. thick, light green; branchlets obliquely lanceolate, obtuse, as wide as the branches, but shorter, 1 cm. thick or less, floriferous at and near the apex; areoles of the older branches pitted, about 1 cm. apart, those of very young shoots slightly elevated, the

glochides very short, yellow-brown; spines of the trunk 15 cm. long or less, very numerous and densely clothing the trunk, very slender, gray, mostly strongly reflexed, pungent, those of the branches and branchlets restricted to the areoles on their edges, shorter than those of the trunk, but similar, those of the fruit yellow gray, 2 cm. long or less; flowers cupulate, crimson lake, 1 cm. wide; sepals fleshy, ovate, acute, 4 mm. long and wide; petals erect-ascending, obovate, mucronulate, about 4 mm. wide; stamens half as long as the corolla; style about as long as the corolla; stigma oblong, yellowish crimson; fruit compressed-obovoid, 2 cm. long, 1.5 cm. thick, bearing one or two spines at most of the areoles.

Type in N. Y. Botanical Garden, Britton & Millspaugh, no. 5578.

On nearly flat and smooth limestone rocks, along road across Eleuthera Island, at Rock Sound, Bahamas, Britton & Millspaugh 5578, February 22, 1907; Thatch Cay, Long Island, Bahamas, Britton & Millspaugh 6288.

The species is most nearly related to *Opuntia nashii* Britton, now known to be widely distributed in the Bahamas. It differs from this in its spreading rather than erect or ascending branches, in its very much more abundant and formidable armament, in the shape of the joints, and in the pitted areoles, which are spineless except at and near the edges of the joints. The roots of this plant spread out for a distance of nearly a meter from the base of the trunk on the flat limestone surface. We were fortunate in securing excellent living specimens and in transporting them, nearly unbroken, to the New York Botanical Garden.

OPUNTIA NASHII Britton

Opuntia nashii BRITTON, Bull. N. Y. Bot. Gard. 3: 446. 1905.

Type locality: Inagua, Bahamas.

Distribution: Bahama Islands.

Illustration: Journ. N. Y. Bot. Gard. 6: fig. 3.

OPUNTIA RUBESCENS Salm-Dyck

Opuntia rubescens SALM-DYCK; DC. Prod. 3: 474. 1828.

Type locality: Brazil (?).

Distribution: Island of Culebra; Montserrat; South America (?).

Culebra and Montserrat plants agree nearly with the description of this spineless species, which clearly belongs with the Cruciformes, as pointed out by Berger, rather than with the South American series Inarmatae, where it was placed by Schumann.

O. leucacantha Link & Otto, *O. subferox* Schott, and *O. leucosticta* Wendl. are all cited as Mexican, and are not known to us.

Series PUBESCENTES

Characterized by finely pubescent joints and ovaries; but some glabrous species apparently have to be admitted to it.

OPUNTIA DECUMBENS Salm-Dyck

Opuntia decumbens SALM-DYCK, Hort. Dyck. 361. 1834.

? *Opuntia repens* KARW.; Salm-Dyck. loc. cit.

Opuntia irrorata MART.; Salm-Dyck, Cact. Hort. Dyck. 69. 1850.

Type locality: Mexico.

Distribution: Southern Mexico to Guatemala.

Illustration: Bot. Mag. pl. 3914.

OPUNTIA BASILARIS Engelm. & Bigel.

Opuntia basilaris ENGELM. & BIGEL. Proc. Am. Acad. 3: 298. 1856.

Type locality: From Cactus Pass down the valley of the Bill Williams River.

Distribution: Arizona and Sonora.

Illustrations: Pac. R. Rep. 4: pl. 13. figs. 1-5; pl. 23. fig. 14; W. Watson, Cact. Cult. fig. 76; Först. Handb. Cact. ed. 2. fig. 129; Cact. Journ. 1: 132.

OPUNTIA BASILARIS RAMOSA Parish

Opuntia basilaris ramosa PARISH, Bull. Torr. Club 19: 92. 1892.

Type locality: Dry washes and gravelly benches of the Mohave and Colorado deserts.

Distribution: California and Arizona to Utah.

Illustration: Cact. Journ. 1: 167, as *O. basilaris*.

OPUNTIA TRELEASEI Coult.

Opuntia treleasei COULT. Contr. Nat. Herb. 3: 434. 1896.

Type locality: Caliente, in the Tehachapi Mountains, California.

Distribution: California.

OPUNTIA TRELEASEI KERNI Griffiths & Hare

Opuntia treleasei kerni GRIFFITHS & HARE, Bull. N. Mex. Coll. Agr. 60: 81. 1906.

Type locality: Near Kern, California.

Distribution: Southern California.

OPUNTIA MICRODASYS Lehm.*Opuntia microdasys* LEHM. Ind. Sem. Hamburg. 1827.*Opuntia pulvinata* DC. Mem. Mus. Paris 17: 119. 1828.

Type locality: Mexico.

Distribution: Coahuila.

OPUNTIA RUFIDA Engelm.*Opuntia rufida* ENGELM. Proc. Am. Acad. 3: 298. 1856.*Opuntia microdasys rufida* SCHUM. Gesamtb. Kakteen 706. 1899.

Type locality: About Presidio del Norte, on the Rio Grande.

Distribution: Texas, Chihuahua.

OPUNTIA MACDOUGALIANA Rose, sp. nov.

Plant about 4 meters high, with a distinct cylindrical trunk branching from near the base; joints oblong, 30 cm. long by 8 to 10 cm. broad, softly pubescent; areoles distinct, small; spines generally 4, one much longer (2.5 to 4 cm. long), somewhat flattened, yellowish, becoming whitish in age; glochides short, numerous, yellow; fruit globular to oblong, 5 cm. long, the surface divided into diamond-shaped plates, red, with a broad deep cup at apex, the numerous small rounded areoles filled with clumps of yellow glochides, very rarely with one or two spines.

Type in U. S. National Herbarium, no. 453,485, collected by Rose and Painter near Tehuacan, Mexico, August and September, 1905 (no. 9990).

Named for Dr. D. T. MacDougal, of the Carnegie Institution of Washington, who has photographed many of the cacti of Mexico, including this one, and to whom we are indebted for important coöperation in this investigation.

OPUNTIA NELSONII Rose, sp. nov.

Stems 1 to 4 meters high; joints flattened, oblong to pear-shaped in outline, 15 to 20 cm. long by 10 to 15 cm. broad near the top, pubescent, pale yellowish green in herbarium specimens; areoles 2 to 3 cm. apart; spines 2 to 6, yellow, becoming white in age, very unequal, the longer ones 3 to 4 cm. long; bristles many, yellow, becoming brownish; flowers rather small; petals yellow, 10 to 15 mm. long; ovary pubescent, bearing many yellowish brown bristles; fruit "dark red."

Said to be the common species in the region between Juajuapam, Oaxaca, and Retlatzingo, Puebla, altitude 1,440 to 1,950 meters, where it was collected by E. W. Nelson November 19, 1894 (no.

1981, type); also at mouth of Tomellin Canyon by Rose and Painter, September, 1905 (no. 10,110), and by Rose and Rose, September, 1906 (no. 11,386).

Type in U. S. National Herbarium, no. 569,373.

This species is near *O. puberula*, but with differently shaped joints and different spines.

OPUNTIA DEPRESSA Rose, sp. nov.

Low creeping or spreading plant, sometimes 60 cm. high and forming a patch 3 to 4 meters in diameter; joints of a dark glossy yellowish green color, pubescent; when young, obovate, 20 cm. long, usually with one long, somewhat curved spine at each areole, sometimes with 1 to 3 shorter ones, all yellowish; old joints oblong, 30 cm. long, bearing 4 to 6 spines at the areoles; flowers red; fruit small, globular, with large clusters of brown glochides, when immature with a broad deep umbilicus.

Type in U. S. National Herbarium, no. 453,648, collected by Rose and Painter near Tehuacan, Mexico, 1905 (no. 10,146); also collected by Rose and Rose, 1906 (no. 11,428).

OPUNTIA TOMENTOSA Salm-Dyck

Opuntia tomentosa SALM-DYCK, Obs. Bot. 8. 1822.

Cactus tomentosus LINK, Enum. Hort. Berol. 2: 24. 1822.

Opuntia oblongata WENDL. Cat. Hort. Herrnh. 1835.

Type locality: Not cited; doubtless Mexico.

Distribution: Mexico.

Illustration: Monatsschr. Kakteenk. 16: 121.

OPUNTIA PUBERULA Pfeiff.

Opuntia puberula PFEIFF. Enum. Cact. 156. 1837.

Type locality: Mexico.

Distribution: Mexico.

OPUNTIA GOSSELIANA Weber

Opuntia gosseliana WEBER; Schum. Gesamtb. Kakteen Nachtr. 154. 1903.

Type locality: Coast of Sonora on the Gulf of California.

Distribution: Sonora and Lower California.

Illustration: Monatsschr. Kakteenk. 17: 68.

Placed tentatively in the Pubescentes by Schumann although glabrous. Berger suggests other relationships.¹

OPUNTIA VELUTINA Weber

Opuntia velutina WEBER, Bull. Mus. Nat. Hist. Paris 10: 389. 1904.

Type locality: In Guerrero.

Distribution: Only known from the type locality. Not seen by us.

OPUNTIA ATROPES Rose, sp. nov.

Plant 1 to 3 meters high, much branched; joints oblong to obovate, 20 to 30 cm. long, deep green, softly pubescent; young joints somewhat glossy; leaves 4 to 5 mm. long, terete in section, acuminate, pubescent, the tips reddish, standing almost at right angles to the joints; areoles circular, filled with short tawny wool; young spines white or yellowish; old spines 3 to 6 cm. long, somewhat angled, standing almost at right angles to the joints, dark yellow or brown at the base, much lighter, often white above; glochides numerous, long, yellow; petals reddish; ovary pubescent, covered with large cushion-like areoles, with few spines or none, truncate at apex.

Type in U. S. National Herbarium, no. 452,103, collected by J. N. Rose and Jos. H. Painter on the lava beds (pedregal) near Yautepec, Morelos, Mexico, July 12, 1905 (no. 8608).

OPUNTIA DURANGENSIS Britton & Rose, sp. nov.

Joints broadly obovate, about 20 cm. long and two-thirds as wide, pale green, glabrous; areoles 1 to 2 cm. apart, elevated, about 5 cm. wide; spines 3 to 5 at each areole, yellow, stiff, pungent, 1.5 cm. long or less, spreading; glochides brown, 2 to 3 mm. long; flowers yellow, about 5 cm. wide; petals obovate, subulate-tipped; ovary 3 to 4 cm. long, finely puberulent, bearing numerous areoles with many glochides and few terete spines; "fruit white or red;" seeds turgid, about 3 mm. wide.

Type in herbarium of N. Y. Botanical Garden, collected in the vicinity of Durango, Mexico, by Dr. E. Palmer, 1896 (no. 212).

OPUNTIA LEUCOTRICHA DC.

Opuntia leucotricha DC. Mem. Mus. Paris 17: 119. 1828.

Type locality: Mexico.

Distribution: Central Mexico.

We place this species in the Pubescentes rather than in the Chaetophorae to which it was referred by Prof. Schumann.

¹ Monatsschr. Kakteenk. 17: 71.

OPUNTIA PYCNANTHA Engelm.

Opuntia pycnantha ENGELM.; Coult. Contr. Nat. Herb. 3: 423. 1896.

Type locality: Magdalena Bay, Lower California.

Distribution: Lower California.

OPUNTIA PYCNANTHA MARGARITANA Coult.

Opuntia pycnantha margaritana COULT. Contr. Nat. Herb. 3: 424. 1896.

Type locality: Santa Margarita Island, Lower California.

Distribution: Lower California.

An examination of the material in the Brandegee herbarium, both of *pycnantha* and its variety as well as of *O. comonduensis*, showed that they all have pubescent joints and should therefore be transferred to the series Pubescentes.

OPUNTIA COMONDUENSIS (Coult.) Britton & Rose

Opuntia angustata comonduensis COULT. Contr. Nat. Herb. 3: 425. 1896.

Type locality: Comondu, Lower California.

Distribution: Southern Lower California.

As pointed out by Mrs. K. Brandegee, this plant has nothing to do with true *O. angustata*, and, as it appears not to have been published as a species heretofore, we now raise Coulter's variety to specific rank. Through the kindness of Mr. Hall and Mr. Brandegee, we have been permitted to examine the type now in the Brandegee herbarium at the University of California. Coulter has labeled two sheets as such, both collected by Mr. Brandegee at Comondu in 1889.

One of these has hairy joints and the other is glabrous. The former is selected as the type.

Series CRINIFERAE

Characterized by long wool at the areoles.

OPUNTIA PILIFERA Weber

Opuntia pilifera WEBER in Bois, Dict. Hort. 894. 1898.

Type locality: Mexico.

Distribution: Puebla.

OPUNTIA CRINIFERA Salm-Dyck

Opuntia crinifera SALM-DYCK; Pfeiff. Enum. Cact. 157. 1837.

Opuntia lanigera SALM-DYCK, Cact. Hort. Dyck. 65. 1850.

Type locality: Cited as Brazil, probably erroneously.

Distribution: Mexico.

Illustration: Monatschr. Kakteenk. 11: 154.

OPUNTIA SCHEERII Weber

Opuntia schcerii WEBER in Bois, Dict. Hort. 895. 1898.

Type locality: Mexico (?). Unknown to us except by the description.

Series CHAETOPHORAE

Characterized by long weak bristles which are not at all pungent; joints glabrous.

OPUNTIA URSINA Weber

Opuntia ursina WEBER in Bois, Dict. Hort. 896. 1898.

Type locality: Desert of California.

Distribution: Type locality and vicinity.

Illustration: Encycl. Am. Hortic. 3: fig. 1548.

Series DIVARICATAE

A group of low, spreading, small-jointed species, the joints falling away readily when shocked.

OPUNTIA CURASSAVICA Mill.

Opuntia curassavica MILL. Gard. Dict. ed. 8. no. 7. 1768.

Type locality: Curacao.

Distribution: West Indies.

Illustration: Pfeiff. Abbild. Cact. pl. 6. fig. 2.

Plants from the island of Culebra, Porto Rico, brought by Drs. Britton and Wheeler to the New York Botanical Garden, almost exactly match Pfeiffer's figure of this species.

OPUNTIA TAYLORI Britton & Rose, sp. nov.

Prostrate, widely branched; joints oblong to narrowly obovate, 12 cm. long or less, turgid, bright green, 3 to 4 cm. wide, 1 to 1.5 cm. thick; areoles 1 to 1.5 cm. apart, not elevated; spines acicular, 3 to 6 at each areole, yellowish brown, becoming white, 4 cm. long or less; glochides yellowish brown, 3 mm. long; flowers yellow, small, the petals about 1 cm. long; ovary pyriform, 1 to 1.5 cm. long, its areoles with few bristles and spineless.

Type in N. Y. Botanical Garden. Collected between Gonaives and La Hotte Rochee, on road to Terre Neuve, Haiti (Nash & Taylor, 1587, August 12, 1905).

Differs from the following species by its turgid joints and more slender spines.

OPUNTIA TRIACANTHA (Willd.) DC.

Cactus triacanthos WILLD. Enum. Suppl. 34. 1813.

Opuntia triacantha DC. Prod. 3: 473. 1828.

Type locality: Not cited; cultivated in the Berlin Garden.

Distribution: Windward Islands, St. Martin to Guadeloupe.

Professor Schumann's description apparently includes two species, one of which belongs here and one in the Albispinosae. Index Kewensis indicates *O. triacantha* as a synonym of *O. curassavica*, which is improbable.

OPUNTIA PES-CORVI Le Conte

Opuntia pes-corvi LE CONTE; Cham. South. Fl. 145. 1860.

Type locality: Barren sandy places along the coast, Florida and Georgia.

Distribution: Coast of the Southeastern States. Reported from Bermuda, but probably erroneously.

OPUNTIA PUMILA Rose, sp. nov.

Stems low, 30 to 60 cm. high, much branched, the branches readily falling off when touched, velvety pubescent; joints terete in section, or turgid and slightly flattened; areoles small, bearing on old stems several slender spines, the longer ones 3 cm. long; areoles on young joints usually 2, yellowish; ovary pubescent, with few spines or none; petals yellow tinged with red, 15 mm. long; fruit globular, red, 15 mm. long.

Type in U. S. National Herbarium, no. 454,096, collected by J. N. Rose near Oaxaca City, on the road to Mitla, September 5, 1907 (no. 11,306).

For the present we base this species on specimens from a single locality. Our material, however, shows that it, or a group of closely related species, ranges from north Mexico to Guatemala. The specimens examined are all very similar in habit, with narrow, nearly terete branches, but in other respects differ considerably, some being glabrous, while others are velvety-pubescent. We have assigned the species a place in the series *Divaricatae*, but it seems to resemble some South American species, notably *O. aurantiaca*, more closely than any North American type.

Series MICROCARPAE

According to Schumann, characterized by the small fruit. The two species which he refers here probably do not belong to the same series.

OPUNTIA STRIGIL Engelm.

Opuntia strigil ENGELM. Proc. Am. Acad. 3: 290. 1856.

Type locality: Between the Pecos and El Paso, Texas.

Distribution: Texas.

Illustration: Cact. Mex. Bound. *pl.* 67.

OPUNTIA MICROCARPA Schum.

Opuntia microcarpa SCHUM. Gesamtb. Kakteen 714. 1899.

Type locality: Cul de Sac, Haiti.

Distribution: Known only from the type locality.

Not seen by us. Probably not at all related to *O. strigil*.

This name is a homonym of *O. microcarpa* Engelm.¹ If the species proves to be a good one a new name must be proposed. *Opuntia macracantha* Griseb.² from maritime situations in Cuba, was supposed by Professor Schumann to be of this relationship.

Series VULGARES

Prostrate or spreading plants, with few spines at the areoles or unarmed.

OPUNTIA OPUNTIA (L.) Coult.

Cactus opuntia L. Sp. Pl. 468. 1753.

Opuntia vulgaris MILL. Gard. Dict. ed. 8. no. 1. 1768.

Cactus opuntia vulgaris DC. Pl. Succ. Hist. *sub pl.* 138. 1799.

Opuntia italica TENORE, Syll. 241. 1842.

Opuntia intermedia SALM-DYCK, Hort. Dyck. 364. 1850.

Opuntia nana VISIANI, Fl. Dalm. 3: 143. 1852.

Opuntia opuntia COULT. Contr. Nat. Herb. 3: 432. 1896.

Opuntia vulgaris nana SCHUM. Gesamtb. Kakteen 715. 1899.

Type locality: America.

Distribution: Eastern United States.

Illustrations: DC. Pl. Succ. Hist. 2: *pl.* 138*a*; Bot. Mag. *pl.* 2393; Engelm. & Bigel. Pac. R. Rep. 4: *pl.* 10. *figs.* 1, 2; *pl.* 23. *fig.* 13; Bois, Atl. Pl. Jard. *pl.* 124; Britton & Brown, Ill. Fl. *fig.* 2527; Monatsschr. Kakteenk. 14: 124.

¹ Engelm. in Emory, Rep. 158. 1848.

² Cat. Pl. Cub. 116.

OPUNTIA POLLARDI Britton & Rose, sp. nov.

Apparently prostrate and most nearly related to *Opuntia opuntia*; joints obovate, pale green in dried specimens, about 10 cm. long, 6 cm. wide, and apparently less than 1 cm. thick; areoles 1.5 to 3 cm. apart, bearing numerous brown glochides 2 to 3 mm. long, those toward the top of the joint each with a single stout stiff pungent spine 2.5 to 4 cm. long; fruit short-obovoid, 2.5 cm. long, 1.5 cm. thick, with a few areoles bearing tufts of brownish wool but no spines and but few glochides; seeds 4 to 5 mm. wide, much thicker than those of *O. opuntia*.

Biloxi, Harrison County, Mississippi, August 1, 1896, C. L. Pollard (no. 1138). Type in herbarium of New York Botanical Garden.

OPUNTIA MACRORHIZA Engelm.

Opuntia macrorhiza ENGELM. Bost. Journ. Nat. Hist. 6: 206. 1850.

Opuntia mesacantha macrorhiza COULT. Contr. Nat. Herb. 3: 430. 1896.

Type locality: Rocky places on the Upper Guadalupe, Texas.

Distribution: Kansas to Texas.

Illustrations: Pac. R. Rep. 4: *pl. 12. figs. 7, 8; pl. 23. fig. 6*; W. Watson, Cactus Cult. *figs. 82, 83*; Först. Handb. Cact. ed. 2. *fig. 127*.

OPUNTIA AUSTRINA Small

Opuntia austrina SMALL, Fl. SE. U. S. 816. 1903.

Type locality: Miami, Florida.

Distribution: Florida.

OPUNTIA GREENEI (Coult.) Engelm.

Opuntia mesacantha greenei COULT. Contr. Nat. Herb. 3: 431. 1896.

Type locality: Golden City, Colorado.

Distribution: Colorado to Arizona.

This species is clearly distinct, but has never been formally given specific rank, although long ago indicated as deserving it by Dr. Engelmann in manuscript.

OPUNTIA STENOCHILA Engelm.

Opuntia stenochila ENGELM. Proc. Am. Acad. 3: 296. 1856.

Opuntia mesacantha stenochila COULT. Contr. Nat. Herb. 3: 430. 1896.

Type locality: "Canyon of Zuni," New Mexico.

Distribution: Western New Mexico and Arizona.

Illustrations: Pac. R. Rep. 4: *pl. 12. figs. 4-6; pl. 23. fig. 9*.

OPUNTIA PLUMBEA Rose, sp. nov.

Plant low, creeping, 10 cm. high, 20 to 30 cm. broad, few-jointed; joints small, nearly orbicular, 3 to 5 cm. in diameter, of a dull lead color, the surface somewhat wrinkled in dead specimens; areoles rather large for the size of the joints; spines pale brownish, slender, usually porrect, often 3 cm. long, mostly 2 in number, rarely as many as 4, sometimes 1 or even wanting; flowers very small, red; ovary naked; fruit 1.5 to 2 cm. long with a few small areoles and these simply woolly; seeds small, rather turgid, smooth, and with a shallow obtuse margin.

Type U. S. National Herbarium, no. 399,804, collected by Mr. F. V. Coville in the San Carlos Indian Reservation, Arizona, altitude 1,500 meters, June, 1904, and for a time growing in Washington.

The fruit and seeds suggest *O. stenochila* Engelm.

OPUNTIA HUMIFUSA Raf.

Cactus humifusus RAF. Ann. Nat. 15. 1820.

Opuntia humifusa RAF. Med. Bot. 2: 247. 1830.

Opuntia mesacantha RAF.; Ser. Bull. Bot. Geneva 216. 1830.

Opuntia rafinesquii ENGELM. Proc. Am. Acad. 3: 295. 1856.

Type locality: United States.

Distribution: Central United States.

Illustrations: Pac. R. Rep. 4: pl. 10. figs. 3-5; pl. 11; Fl. des Serres pl. 2328; Bot. Mag. pl. 7041; Ill. Fl. 2528; W. Watson, Cactus Cult. fig. 84; Am. Entom. & Bot. 2: fig. 160; Först. Handb. Cact. ed. 2. fig. 126, as *O. rafinesquii arkansana*.

The following forms, referred to *O. mesacantha* by Dr. Coulter, we have not studied sufficiently to enable us to form opinions as to their relationships:

OPUNTIA MESACANTHA PARVA Coult.

Opuntia mesacantha parva COULT. Contr. Nat. Herb. 3: 429. 1896.

OPUNTIA MESACANTHA MICROSPERMA (Engelm.) Coult.

Opuntia rafinesquii microsperma ENGELM. Proc. Am. Acad. 3: 295. 1856.

Opuntia mesacantha microsperma COULT. Contr. Nat. Herb. 3: 429. 1896.

OPUNTIA MESACANTHA OPLOCARPA Coult.

Opuntia mesacantha oplocarpa COULT. Contr. Nat. Herb. 3: 431. 1896.

OPUNTIA GRANDIFLORA Engelm.

Opuntia grandiflora ENGELM. Proc. Am. Acad. 3: 295. 1856.

Opuntia rafinesquii grandiflora ENGELM. Pac. R. Rep. 4: 55. 1856.

Type locality: On the Brazos River, Texas.

Distribution: Texas.

Illustration: Pac. R. Rep. 4: *pl. 11, figs. 2, 3.*

Series SUBINERMES

Upright or bushy plants with few spines or none.

OPUNTIA LANCEOLATA Haw.

Opuntia lanceolata HAW. Syn. Pl. Succ. 192. 1812.

Cactus lanceolatus HAW. Misc. Nat. 188. 1803.

Type locality: South America (?).

Distribution: West Indies.

Plants tentatively referred to this species were collected by Drs. Britton and Millspaugh on Cat Island, Bahamas, but the young joints are quite spiny with yellowish spines about 1 cm. long; the old joints become spineless.

OPUNTIA INERMIS DC.

Cactus opuntia inermis DC. Pl. Succ. Hist. 2: *sub pl. 138.* 1799.

Opuntia inermis DC. Prod. 3: 473. 1828.

Opuntia vulgaris balearica WEBER in Bois, Dict. Hort. 894. 1897, as synonym.

Type locality: Tropical America.

Distribution: Florida and West Indies.

Illustrations: DC. Pl. Succ. Hist. *pl. 138*; Tussac, Fl. Ant. 2: *pl. 34.*

We place this species and the preceding one in series Subinermes rather than Vulgares.

OPUNTIA CRASSA Haw.

Opuntia crassa HAW. Suppl. Pl. Succ. 81. 1819.

Opuntia parvula SALM-DYCK, Hort. Dyck. 364. 1834.

Opuntia glaberrima LINK & OTTO; Pfeiff. Enum. Cact. 153. 1837.

Type locality: Mexico (?).

Distribution: Mexico.

OPUNTIA FICUS-INDICA (L.) Mill.

Cactus ficus-indica L. Sp. Pl. 468. 1753.

Opuntia ficus-indica MILL. Gard. Dict. ed. 8. no. 2. 1768.

Opuntia vulgaris TENORE, Syll. Fl. Neap. 239. 1831, not Mill.

Cactus opuntia GUSS. Fl. Sic. Prod. 559. 1827-28, not L.

Type locality: Tropical America.

Distribution: West Indies and tropical America. Naturalized in the Mediterranean region.

Illustrations: Mem. Acad. Neap. 6: *pl.* 1, 2; W. Watson, Cactus Cult. *fig.* 80; Monatsschr. Kakteenk. 15: 151.

OPUNTIA LAEVIS Coult.

Opuntia laevis COULT. Contr. Nat. Herb. 3: 419. 1896.

Type locality: Arizona.

Distribution: Arizona.

Referred by Professor Schumann to *O. inermis*, but not at all like that species.

OPUNTIA LARREYI Weber

Opuntia larreyi WEBER; Coult. Contr. Nat. Herb. 3: 423. 1896.

Type locality: Queretaro, Mexico.

Distribution: Mexico.

Illustration: Bull. N. Mex. Coll. Agr. 64: *pl.* 1.

Series SETISPINAE

Characterized by the low habit, slender, delicate spines, and small joints.

OPUNTIA FILIPENDULA Engelm.

Opuntia filipendula ENGELM. Proc. Am. Acad. 3: 294. 1856.

Type locality: Alluvial bottoms of the Rio Grande near El Paso.

Distribution: Texas, New Mexico, Chihuahua.

Illustrations: Cact. Mex. Bound. *pl.* 68; W. Watson, Cactus Cult. *fig.* 81; Först. Handb. Cact. ed. 2. *fig.* 131.

OPUNTIA SETISPINA Engelm.

Opuntia setispina ENGELM.; Salm-Dyck, Cact. Hort. Dyck. 239. 1850.

Type locality: Pine woods in the mountains west of Chihuahua (fide Engelm. Proc. Am. Acad. 3: 294).

Distribution: Known only from the type locality.

OPUNTIA TENUISPINA Engelm.

Opuntia tenuispina ENGELM. Proc. Am. Acad. 3: 294. 1856.

Type locality: Sand Hills near El Paso, Texas.

Distribution: Type locality and vicinity.

Illustration: Cact. Mex. Bound. *pl.* 75. *fig.* 14.

Series TUNAE

Bushy plants with abundant yellow spines. The color of the spines is not a wholly satisfactory character.

OPUNTIA CHLOROTICA Engelm. & Bigel.

Opuntia chlorotica ENGELM. & BIGEL. Proc. Am. Acad. 3: 291. 1856.

Type locality: On both sides of the Colorado from San Francisco Mountains to headwaters of Bill Williams River.

Distribution: Arizona, Sonora, New Mexico, Nevada, and California.

Illustration: Pac. R. Rep. 4: pl. 6, figs. 1-3.

OPUNTIA CHLOROTICA SANTA-RITA Griffiths & Hare

Opuntia chlorotica santa-rita GRIFFITHS & HARE, Bull. N. Mex. Coll. Agr. 60: 64. 1906.

Type locality: Celero Mountains, Arizona.

Distribution: Arizona.

OPUNTIA TAPONA Engelm.

Opuntia tapona ENGELM.; Coult. Contr. Nat. Herb. 3: 423. 1896.

Type locality: Near Loreto, Lower California.

Distribution: Known only from the type locality.

Doubtfully included in series Tunae.

OPUNTIA PALMERI Engelm.

Opuntia palmeri ENGELM.; COULT. Contr. Nat. Herb. 3: 423. 1896.

Type locality: Near St. George, Utah.

Distribution: Utah.

OPUNTIA BECKERIANA Schum.

Opuntia beckeriana SCHUM. Gesamtb. Kakteen 722. 1899.

Type locality: Probably Mexico.

Distribution: Mexico.

Known to us only from the description.

OPUNTIA LUCAYANA Britton

Opuntia lucayana BRITTON, Bull. N. Y. Bot. Gard. 4: 141. 1906.

Type locality: Grand Turk Island, Bahamas.

Distribution: Grand Turk.

OPUNTIA DILLENII (Ker-Gawl.) Haw.

Cactus dillenii KER-GAWL. Bot. Reg. 3: pl. 255. 1818.

Opuntia dillenii HAW. Suppl. Pl. Succ. 79. 1819.

Type locality: Not cited.

Distribution: Coasts of Florida, Bermuda, West Indies, and Vera Cruz.

Illustrations: Dill. Hort. Elth. pl. 396. fig. 382; Bot. Reg. loc. cit.; DC. Pl. Succ. Hist. 2: pl. 137, as *Cactus cochenillifer*.

OPUNTIA TUNA (L.) Mill.

Cactus tuna L. Sp. Pl. 468. 1753.

Opuntia tuna MILL. Gard. Dict. ed. 8. no. 3. 1768.

Cactus humilis HAW. Misc. Nat. 187. 1803.

Opuntia humilis HAW. Syn. Pl. Succ. 189. 1812.

Opuntia polyantha HAW. Syn. Pl. Succ. 190. 1812.

Cactus polyanthus SIMS, Bot. Mag. 53: pl. 2691. 1826.

Opuntia horrida SALM-DYCK; DC. Prod. 3: 472. 1828.

Type locality: Jamaica and tropical America.

Distribution: West Indies.

Illustrations: Dill. Hort. Elth. pl. 295. fig. 380; Bot. Mag. loc. cit.; Descourt. Fl. Pict. Antilles pl. 513, as *Cactus opuntia*; Först. Handb. Cact. ed 2. fig. 130, as *O. polyantha*.

Our studies indicate that the common plant of the Jamaica lowlands is to be taken as the type of *Cactus tuna* L.

OPUNTIA CACAPANA Griffiths & Hare

Opuntia cacapana GRIFFITHS & HARE, Bull. N. Mex. Coll. Agr. 60: 47. 1906.

Type locality: Encinal, Texas.

Distribution: Southern Texas.

OPUNTIA LINDHEIMERI Engelm.

Opuntia lindheimeri ENGELM. Journ. Bost. Soc. Nat. Hist. 6: 207. 1850.

Type locality: About New Braunfels, Texas.

Distribution: Texas and Tamaulipas.

Clearly distinct from *O. engelmanni*.

OPUNTIA LINDHEIMERI DULCIS (Engelm.) Coult.

Opuntia dulcis ENGELM. Proc. Am. Acad. 3: 291. 1856.

Opuntia lindheimeri dulcis COULT. Contr. Nat. 3: 421. 1896.

Type locality: Near Presidio del Norte, Texas.

Distribution: Southern Texas.

Illustration: Cact. Mex. Bound. pl. 75. figs. 5-7.

OPUNTIA LITTORALIS (Engelm.) Britton & Rose

Opuntia engelmannii littoralis ENGELM. in Brewer & Wats. Bot. Cal. 1: 248. 1876.

Opuntia lindheimeri littoralis COULT. Contr. Nat. Herb. 3: 422. 1896.

Type locality: Coast of California, Santa Barbara to San Diego.

Distribution: Coast of southern California.

OPUNTIA CUIJA (Griffiths & Hare) Rose

Opuntia engelmannii cuija GRIFFITHS & HARE, Bull. N. Mex. Coll. Agr. 60: 44. 1907.

Type locality: San Luis Potosi, Mexico.

Distribution: San Luis Potosi to Queretaro and Hidalgo.

Illustrations: Bull. N. Mex. Coll. Agr. 60: *pl. 2. figs. 1, 2.*

OPUNTIA OCCIDENTALIS Engelm. & Bigel.

Opuntia occidentalis ENGELM. & BIGEL. Proc. Am. Acad. 3: 291. 1856.

Opuntia lindheimeri occidentalis COULT. Contr. Nat. Herb. 3: 421. 1896.

Type locality: Western slopes of the Californian Mountains, between San Diego and Los Angeles.

Distribution: Southwestern California.

Illustrations: Pac. R. Rep. 4: *pl. 7. figs. 1, 2*; Bull. N. Mex. Coll. Agr. 60: *pl. 3. fig. 2.*

OPUNTIA MEGALARTHRA Rose, sp. nov.

Plants 1 to 4 meters high, often much branched and the arms widely spreading; joints generally orbicular, very large, often 30 cm. or rarely 50 cm. in diameter, glaucous, bluish green, very thick and turgid; areoles distant, 4 to 6 cm. apart, brownish when young, black in age; spines yellow, 2 to 6 at each areole on young joints, on old joints as many as 8, very stout, 4 cm. long or more, more or less flattened or angled; glochides yellow, numerous; flowers lemon-yellow, 7 to 8 cm. broad; fruit globular, oblong, sometimes 7 cm. long, purplish.

Type in U. S. National Herbarium, no. 453,757, collected at Hacienda Palmar, near Pachuca, Hidalgo, Mexico, by Rose & Painter, July 21, 1905 (no. 10,255).

Distribution: A common and widely distributed species in the States of Hidalgo, Queretaro, Zacatecas, and San Luis Potosi.

Series PROCUMBENTES

Depressed or prostrate plants with yellow spines.

OPUNTIA RUBRIFOLIA Engelm.

Opuntia rubrifolia ENGELM.; Coult. Contr. Nat. Herb. 3: 424. 1896.

Type locality: St. George, Utah.

Distribution: Only known from the type locality.

OPUNTIA PROCUMBENS Engelm.

Opuntia procumbens ENGELM. Proc. Am. Acad. 3: 292. 1856.

Type locality: San Francisco Mountains to Cactus Pass, Arizona.

Distribution: Texas to Arizona.

Illustration: Pac. R. Rep. 4: *pl. 6. figs. 4, 5.*

Series FULVISPINOSAE

Bushy or spreading brown-spined plants, the spines sometimes brown only toward the base; fruits fleshy.

OPUNTIA MEGARRHIZA Rose

Opuntia megarrhiza ROSE, Contr. Nat. Herb. 10: 126. 1906.

Type locality: Alvarez, Mexico.

Distribution: San Luis Potosi, Mexico.

OPUNTIA NIGRICANS Haw.

Cactus nigricans HAW. Misc. Nat. 187. 1803.

Opuntia nigricans HAW. Syn. Pl. Succ. 189. 1812.

Cactus tuna nigricans SIMS, Bot. Mag. 38: *pl. 1557.* 1813.

Type locality: Unknown.

Distribution: Mexico.

Illustration: Bot. Mag. loc. cit.

OPUNTIA MACROCENTRA Engelm.

Opuntia macrocentra ENGELM. Proc. Am. Acad. 3: 292. 1856.

Type locality: Sand hills on the Rio Grande near El Paso.

Distribution: Texas to Arizona and Chihuahua.

Illustration: Cact. Mex. Bound. *pl. 75. fig. 8.*

OPUNTIA PHAEACANTHA Engelm.

Opuntia phaeacantha ENGELM. in Gray, Pl. Fend. 2: 352. 1849.

Opuntia phaeacantha nigricans ENGELM. Proc. Am. Acad. 3: 293. 1856.

Opuntia phaeacantha brumca ENGELM. loc. cit. 1856.

Type locality: About Santa Fe and on the Rio Grande.

Distribution: Texas to Arizona and Chihuahua.

Illustration: Cact. Mex. Bound. *pl. 75. figs. 9-15.*

OPUNTIA PHAEACANTHA MAJOR Engelm.

Opuntia phaeacantha major ENGELM. Proc. Am. Acad. 3: 293. 1856.

Type locality: Mountainous regions near Santa Fe.

OPUNTIA MOHAVENSIS Engelm.

Opuntia mohavensis ENGELM. Proc. Am. Acad. 3: 293. 1856.

Type locality: On the Mohave, west of the Colorado, California.

Distribution: Known only from the type locality.

Illustration: Pac. R. Rep. 4: *pl. 9. figs. 6-8.*

OPUNTIA FUSCOATRA Engelm.

Opuntia fuscoatra ENGELM. Proc. Am. Acad. 3: 297. 1856.

Type locality: Sterile places of prairies west of Houston, Texas.

Distribution: Known only from the type locality.

Illustration: Pac. R. Rep. 4: *pl. 11. fig. 4.*

OPUNTIA CAMANCHICA Engelm. & Bigel.

Opuntia camanchica ENGELM. & BIGEL. Proc. Am. Acad. 3: 293. 1856.

Type locality: Llano Estacado, on the Upper Canadian River.

Distribution: Texas to Colorado and Arizona. Reported from Western Kansas.

Illustrations: Pac. R. Rep. 4: *pl. 8. figs. 1-5; pl. 22. figs. 12-15;*
Ill. Fl. fig. 2530.

OPUNTIA TORTISPINA Engelm.

Opuntia tortispina ENGELM. Proc. Am. Acad. 3: 293. 1856.

Type locality: On the Comanche Plains, near the Canadian River.

Distribution: Nebraska to Texas.

Illustrations: Pac. R. Rep. 4: *pl. 8. figs. 2, 3; pl. 23. figs. 1-5;*
Ill. Fl. fig. 2529.

OPUNTIA ENGELMANNI Salm-Dyck

Opuntia engelmanni SALM-DYCK; Engelm. Bost. Journ. Nat. Hist. 6:
207. 1850.

Type locality: From El Paso to Chihuahua.

Distribution: Chihuahua, New Mexico, Texas.

Illustrations: Cact. Mex. Bound. *pl. 75. figs. 1-4;* Bull. Torr. Club
32: *pl. 10. figs. 10-13.*

An examination of the plant collected by Wislizenus north of

Chihuahua (no. 223), in the herbarium of the Missouri Botanical Garden, and labeled by Dr. Engelmann as *O. engelmannii* Salm-Dyck, shows that this species is of the series Fulvispinosae, rather than the series Tunae.

OPUNTIA ENGELMANNII CYCLODES Engelm.

Opuntia engelmannii cyclodes ENGELM. Proc. Am. Acad. 3: 291. 1856.

Opuntia lindheimeri cyclodes COULT. Contr. Nat. Herb. 3: 422. 1896.

Type locality: "On the Upper Pecos, in New Mexico.

Distribution: Western Texas and New Mexico.

Illustrations: Pac. R. Rep. 4: pl. 8, fig. 1; pl. 22, figs. 8, 9.

OPUNTIA VASEYI (Coul.) Britton & Rose

Opuntia mesacantha vaseyi COULT. Contr. Nat. Herb. 3: 431. 1896.

Type locality: "Yuma."

Distribution: Southwestern Arizona.

In our opinion clearly of this series rather than Vulgares.

OPUNTIA CYMOCHILA Engelm.

Opuntia cymochila ENGELM. Proc. Am. Acad. 3: 295. 1856.

Opuntia mesacantha cymochila COULT. Contr. Nat. Herb. 3: 430. 1896.

Type locality: Along the Canadian River east of Llano Estacado, New Mexico.

Distribution: New Mexico and Arizona.

Illustrations: Pac. R. Rep. 4: pl. 12, figs. 1-3; pl. 23, figs. 10-12.

Likewise to be included in Fulvispinosae rather than Vulgares.

OPUNTIA ANGUSTATA Engelm.

Opuntia angustata ENGELM. Proc. Am. Acad. 3: 292. 1856.

Type locality: Zuni, New Mexico.

Distribution: Supposed to extend from New Mexico to California, but doubtless not found in California.

Illustration: Pac. R. Rep. 4: pl. 7, fig. 3.

Engelmann's descriptions and illustrations of this species include two, if not three, distinct ones belonging to Fulvispinosae rather than Procumbentes.

OPUNTIA COVILLEI Britton & Rose, sp. nov.

Joints obovate, 10 to 20 cm. long or more; areoles 2 to 4 cm. apart, pale green, sometimes purplish, slightly glaucous; spines slender,

somewhat angled, 2 to several from each areole, very unequal, the longer ones 6 cm. long, brownish or yellowish brown throughout; glochides numerous, brown; flowers large, yellow; ovary 4 to 5 cm. long, with few areoles and nearly or quite spineless; fruit more or less tuberculate, red; umbilicus broad and somewhat depressed; seeds 5 mm. broad.

Type in U. S. National Herbarium, no. 40,809, collected at San Bernardino, California, by G. R. Vasey in 1891; also collected by Parish and by Coville in the same region. We are not certain whether all the so-called *O. lindheimeri* from southeastern California belongs here or not, but if so, then here should be referred Engelmann's Californian material referred to *O. angustata*.

Series XEROCARPEAE

Spreading flat-jointed plants with dry or nearly dry fruits.

OPUNTIA SPHAEROCARPA Engelm. & Bigel.

Opuntia sphaerocarpa ENGELM. & BIGEL. Proc. Am. Acad. 3: 300. 1856.

Type locality: Mountains near Albuquerque, New Mexico.

Distribution: Known only from type locality.

Illustrations: Pac. R. Rep. 4: *pl. 13, figs. 6, 7; pl. 24, fig. 3.*

OPUNTIA SPHAEROCARPA UTAHENSIS Engelm.

Opuntia sphaerocarpa utahensis ENGELM. Trans. St. Louis Acad. 2: 199. 1863.

Type locality: Utah Basin.

Distribution: Known only from type locality.

OPUNTIA POLYACANTHA Haw.

Cactus ferox NUTT. Gen. 1: 296. 1818, not Willd. 1813.

Opuntia polyacantha HAW. Syn. Pl. Succ. Suppl. 82. 1819.

Opuntia media HAW. loc. cit. 1819.

Opuntia missouriensis DC. Prod. 3: 472. 1828.

Opuntia splendens PFEIFF. Enum. Cact. 159. 1837.

Type locality: Arid situations on the plains of the Missouri.

Distribution: Athabasca to Washington, Nebraska, and New Mexico.

Illustrations: Pac. R. Rep. 4: *pl. 14, figs. 1-3; Bot. Mag. pl. 7046; Ill. Fl. fig. 2531.*

The following subspecies recognized by Dr. Coulter have not been sufficiently studied by us to enable us to express opinions concerning their relationships.

OPUNTIA POLYACANTHA PLATYCARPA (Engelm.) Coult.

Opuntia missouriensis platycarpa ENGELM. Proc. Am. Acad. 3: 300. 1856.

Opuntia polyacantha platycarpa COULT. Contr. Nat. Herb. 3: 436. 1896.

Type locality: On the Yellowstone, Montana.

Distribution: Idaho and Montana to Utah, Colorado, and Nebraska.

Illustration: Pac. R. Rep. 4: pl. 14, fig. 4.

OPUNTIA POLYACANTHA BOREALIS Coult.

Opuntia missouriensis microsperma ENGELM. & BIGEL. Proc. Am. Acad. 3: 300. 1856. Not *O. rafinesquii microsperma* Engelm. loc. cit. 295.

Opuntia polyacantha borealis COULT. Contr. Nat. Herb. 3: 436. 1896.

Type locality: On the Missouri above Fort Pierre, S. D.

Distribution: "From British Columbia to Oregon and South Dakota."—Coult.

Illustrations: Pac. R. Rep. 4: pl. 14, figs. 5-7; pl. 24, figs. 1, 2.

OPUNTIA POLYACANTHA ALBISPINA (Engelm. & Bigel.) Coult.

Opuntia missouriensis albispina ENGELM. & BIGEL. Proc. Am. Acad. 3: 300. 1856.

Opuntia polyacantha albispina COULT. Contr. Nat. Herb. 3: 437. 1896.

Type locality: Sandy Mountains near Albuquerque, New Mexico.

Distribution: New Mexico and Oklahoma.

Illustrations: Pac. R. Rep. 4: pl. 14, figs. 8-10; pl. 23, fig. 18.

OPUNTIA POLYACANTHA WATSONI Coult.

Opuntia polyacantha watsoni COULT. Contr. Nat. Herb. 3: 437. 1896.

Type locality: Wahsatch Mountains, Utah.

Distribution; Nebraska and Wyoming to Colorado, Utah, and New Mexico.

OPUNTIA SCHWERINIANA Schum.

Opuntia schweriniana SCHUM. Monatsschr. Kakteenk. 9: 148. 1899.

Type locality: Near Sapinero, Colorado.

Distribution: Known only from the type locality.

Illustration: Monatsschr. Kakteenk. 9: 148.

This was indicated by Schumann¹ as belonging to the Fulvispinosae, but in his "Keys" to Cactaceae, page 65, is properly placed in the Xerocarpeae, related to *O. polyacantha* (*O. missouriensis*).

¹ Gesamtb. Kakteen. Nachtr. 158.

OPUNTIA TRICOPHORA (Engelm.) Britton & Rose

Opuntia missouriensis tricophora ENGELM. Proc. Am. Acad. 3: 300. 1856.

Opuntia polyacantha tricophora COULT. Contr. Nat. Herb. 3: 437. 1896.

Type locality: Mountains near Albuquerque, New Mexico.

Distribution: New Mexico and Texas.

Illustrations: Pac. R. Rep. 4: *pl. 15, figs. 1-4; pl. 23, fig. 19.*

This species is certainly distinct from *O. polyacantha*. It probably does not belong to this series.

OPUNTIA RHODANTHA Schum.

Opuntia rhodantha SCHUM. Gesamtb. Kakteen 735. 1899.

Type locality: Colorado, at 2,000 to 2,300 meters.

Distribution: Colorado.

OPUNTIA XANTHOSTEMMA Schum.

Opuntia xanthostemma SCHUM. Gesamtb. Kakteen 735. 1899.

Type locality: Mesa Grande, Colorado, 2,000 meters.

Distribution: Colorado.

OPUNTIA HYSTRICINA Engelm. & Bigel.

Opuntia hystricina ENGELM. & BIGEL. Proc. Am. Acad. 3: 299. 1856.

Type locality: Colorado Chiquito and on San Francisco Mountains.

Distribution: New Mexico, Arizona, Nevada, and California.

Illustration: Pac. R. Rep. 4: *pl. 15, figs. 5-7; pl. 23, fig. 15.*

Series TUMIDAE

Low turgid-jointed plants with dry or nearly dry fruits.

OPUNTIA RUTILA Nutt.

Opuntia rutila NUTT.; Torr. & Gr. Fl. N. Am. 1: 555. 1840.

Opuntia erinacea ENGELM. Proc. Am. Acad. 3: 301. 1856.

Type locality: Arid clay hills in the Rocky Mountain range, near the Colorado of the West, about latitude 42°.

Distribution: Wyoming to Arizona and California.

Illustrations: Pac. R. Rep. 4: *pl. 13, figs. 8-11; pl. 24, fig. 4;* Monatsschr. Kakteenk. 14: 105.

The identity of *O. rutila* Nutt. with *O. erinacea* Engelm. was indicated by Dr. Engelmann in the Report of Simpson's Expedition, page 442; Nuttall's type came from southwestern Wyoming and

Engelmann's from the Mohave River. We think it possible that Dr. Engelmann erred in this identification and that *O. rutila* really belongs among the Xerocarpeae.

OPUNTIA ARENARIA Engelm.

Opuntia arenaria ENGELM. Proc. Am. Acad. 3: 301. 1856.

Type locality: Sandy bottoms of the Rio Grande near El Paso.

Distribution: Texas and New Mexico.

Illustration: Cact. Mex. Bound. pl. 75. fig. 15.

OPUNTIA FRAGILIS (Nutt.) Haw.

Cactus fragilis NUTT. Gen. 1: 296. 1818.

Opuntia fragilis HAW. Syn. Pl. Succ. Suppl. 82. 1819.

Type locality: "From the Mandans to the mountains, in sterile but moist situations."

Distribution: Wisconsin to Kansas and British Columbia.

Illustrations: Pac. R. Rep. 4: pl. 24. fig. 5; Ill. Fl. fig. 2532; W. Watson, Cact. Cult. fig. 78.

OPUNTIA BRACHYARTHRA Engelm.

Opuntia brachyarthra ENGELM. Proc. Am. Acad. 3: 302. 1856.

Opuntia fragilis brachyarthra COULT. Contr. Nat. Herb. 3: 440. 1896.

Type locality: Inscription Rock, near Zuni, New Mexico.

Distribution: Colorado and New Mexico.

Illustrations: Först. Handb. Cact. ed. 2. fig. 132; Cact. Journ. 1: 100.

Series ALBISPINOSAE

Tall or large plants with white spines and broad petals.

OPUNTIA OLIGACANTHA Salm-Dyck

Opuntia oligacantha SALM-DYCK, Cact. Hort. Dyck. 241. 1850.

Type locality: Not cited; cultivated in the Vienna garden.

Distribution: Mexico.

OPUNTIA HYPTIACANTHA Weber

Opuntia hyptiacantha WEBER in Bois, Dict. Hort. 894. 1897.

Type locality: Mexico.

Distribution: Mexico.

OPUNTIA STREPTACANTHA Lemaire*Opuntia streptacantha* LEMAIRE, Nov. Gen. & Sp. 62. 1839.*Opuntia pseudo-tuna* SCHUM. in Engl. & Prantl. Nat. Pflanzenf. 36a: 201. 1893, not Salm-Dyck.

Type locality: San Luis Potosi.

Distribution: Mexico.

Illustrations: Engl. & Prantl., loc. cit.; U. S. Dept. Agr. Bur. Pl.

Ind. Bull. 116: pl. 1.

OPUNTIA CANDELABRIFORMIS Mart.*Opuntia candelabriformis* MART.; Pfeiff. Enum. Cact. 159. 1837.

Type locality: Mexico.

Distribution: Mexico.

OPUNTIA SPINULIFERA Salm-Dyck*Opuntia spinulifera* SALM-DYCK, Hort. Dyck. 364. 1834.

Type locality: Mexico.

Distribution: Mexico.

OPUNTIA ROBUSTA Wendl.*Opuntia robusta* WENDL. Cact. Hort. Herrnh. 1835.*Opuntia flavicans* LEMAIRE, Nov. Gen. & Sp. 61. 1839.

Type locality: Mexico.

Distribution: Mexico.

OPUNTIA MEGACANTHA Salm-Dyck*Opuntia megacantha* SALM-DYCK, Hort. Dyck. 363. 1834.

Type locality: In Mexico.

Distribution: Cultivated in Mexico and Jamaica.

Series STENOPETALAE.

Large white-spined plants with narrow petals.

OPUNTIA GLAUDESCENS Salm-Dyck*Opuntia glaucescens* SALM-DYCK, Hort. Dyck. 362. 1834.

Type locality: In Mexico.

Distribution: Mexico.

OPUNTIA GRANDIS Pfeiff.

Opuntia grandis PFEIFF. Enum. Cact. 155. 1837.

Type locality: In Mexico.

Distribution: Mexico.

Illustration: Monatsschr. Kakteenk. 14: 172.

Referred by Schumann to *O. glaucescens*, but doubtless distinct, as indicated by Berger.¹

OPUNTIA STENOPETALA Engelm.

Opuntia stenopetala ENGELM. Proc. Am. Acad. 3: 289. 1856.

Type locality: On battlefield of Buena Vista, south of Saltillo, Mexico.

Distribution: Coahuila to Queretaro and Hidalgo.

Illustrations: Cact. Mex. Bound. pl. 66; Monatsschr. Kakteenk. 14: 172.

Referred by Schumann to *O. glaucescens*, but surely a distinct species, as also indicated by Berger.¹

LIST OF THE SPECIES OF NOPALEA

NOPALEA COCHENILLIFERA (L.) Salm-Dyck

Cactus cochenillifer L. Sp. Pl. 468. 1753.

Opuntia cochinelifera MILL. Dict. ed. 8. no. 6. 1768.

Nopalea cochenillifera SALM-DYCK, Cact. Hort. Dyck. 63. 1850.

Type locality: Jamaica.

Distribution: West Indies and tropical America.

Illustrations: Bot. Rep. pl. 533; Descourt. Fl. Pict. Antilles 7: pl. 515; Bot. Mag. 54: pls. 2741, 2742; Dill. Hort. Elth. fig. 383; Pfeiff. & Otto, Abbild. Cact. 1: pl. 24; Kerner, Hort. 683; Fl. Bras. 4²: pl. 60.

NOPALEA KARWINSKIANA (Salm-Dyck) Schum.

Opuntia karwinskiana SALM-DYCK, Cact. Hort. Dyck. 68. 1850.

Nopalea karwinskiana SCHUM. Gesamtb. Kakteen 752. 1899.

Type locality: In Mexico.

Distribution: Mexico; rare in cultivation.

NOPALEA AUBERI (Pfeiff.) Salm-Dyck

Nopalea auberi SALM-DYCK, Cact. Hort. Dyck. 233. 1850.

Opuntia auberi PFEIFF. Allg. Gartenz. 8: 282. 1840.

Type locality: Cuba.

Distribution: Cuba.

¹ Monatsschr. Kakteenk. 14: 171.

NOPALEA DEJECTA Salm-Dyck*Opuntia dejecta* SALM-DYCK, Hort. Dyck. 361. 1834.*Nopalea dejecta* SALM-DYCK, Cact. Hort. Dyck. 233. 1850.

Type locality: Havana, Cuba.

Distribution: Cuba, and common in cultivation in Mexico.

NOPALEA GUATEMALENSIS Rose*Nopalea guatemalensis* ROSE, Smithson. Misc. Coll. 50: 330. 1907.

Type locality: El Rancho, Guatemala.

Distribution: Arid valleys of Guatemala.

Illustrations: Smithson. Misc. Coll. 50: pls. 41-42.

NOPALEA MONILIFORMIS (L.) Schum.*Cactus moniliformis* L. Sp. Pl. 468. 1753.*Cereus moniliformis* DC. Prod. 3: 470. 1828.*Opuntia moniliformis* STEUD. Nom. 2: 221. 1841.*Nopalea moniliformis* SCHUM. Gesamtb. Kakteen 750. 1900.

Type locality: Tropical America.

Distribution: Haiti.

Illustration: Descourt. Fl. Pict. Antilles 7: pl. 514.

This very interesting species is known to us only from the descriptions and illustration.