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eight feet high, which applies much better to *Opuntia Lindheimeri* than to this species. Again, the spines of *Opuntia Lindheimeri*, under many conditions, might be considered yellow rather than white. However, should the translucent, bone-like appearance of the spines of some forms of *O. Lindheimeri* be called yellow, they are very different indeed from the yellow of the species here described.

The type is No. 9640 D. G., collected at San Antonio, Texas, October 1, 1908. The description is a compilation of one made when the type specimen was collected and previous field notes, together with laboratory examinations of fresh living material.—Plates 9; 13, f. 1.

***Opuntia arizonica* sp. nov.**

A prostrate to ascending species, 8 to 10 dm. high and often widely spreading, sometimes 2.5 m. in diameter but usually about 18 dm., the joints of the main branches mostly on edge and radiating outward but often flattened upon the ground; joints large, subcircular, commonly 2.7 dm. in diameter but mostly about 22 cm., glaucous, blue-green but becoming yellowish green with age; areoles tawny, turning gray-black, large, obovate, about 8 mm. in longest diameter on sides of joints but on edges some, at least, are subcircular and often 10 to 13 mm. in diameter, not enlarging much with age but finally becoming black, and central tissue proliferating irregularly into a low cone; spicules reddish-brown, with abrupt yellow tips, becoming lighter with age, somewhat mottled brown and yellow, about 6 to 10 mm. long, unequal, scattered, but more abundant in upper portion of areole, increasing with age from central proliferating areolar tissue, sometimes becoming 12 or 13 mm. long, sometimes flattened and twisted; spines large, stout, formidable, reddish-brown throughout, soon bleaching distally, becoming irregularly mottled reddish-brown and flesh-colored, then yellow with reddish bases, or yellow throughout, and finally on very old joints dirty gray, flattened, twisted, faintly annular in color but not in structure, 2 to 6, mostly 3 or 4, erect, divergent, but the lower ones usually recurved, and all having a tendency to slope downward in age, the longest 4 to 5 cm. in length; flowers not seen; fruit large, subglobose, somewhat tubercular, pitted at apex, reddish-purple with greenish rind which has some red in its vascular system and pulp mottled, its areoles large, subcircular to obovate, about 4 mm. in diameter, tawny to light gray, bearing spicules about 3 mm. long, and in upper areoles 1 or 2, delicate, fugacious, mottled yellow and brown spines 12 to 25 mm. in length; seeds flattened, angular, quite uniform in size but somewhat irregular in shape, with marginal callus, rather prominent and 1 mm. wide, with distinct deeply notched hilum, about 4 mm. in diameter.

The species differs from *Opuntia Engelmanni*, to which it is most closely related, especially in habit, and in nature of spines and fruit. No. 9560 D. G. is considered to be the same, although its spicules are yellow and its spines much lighter in color. The color of spines and spicules, while of value in taxonomy, can not be used to differentiate species unless accompanied by other characters. There are a score or more of species which have both yellow and brown or reddish-brown spicules.

The type is No. 9559 D. G., collected near Kirkland, Arizona, September 8, 1908. The description was drawn in the field beside the brown spiculed form.—Plates 10; 2, f. 8; 13, f. 8.

***Opuntia subarmata* sp. nov.**

Plant tall, rather compactly branched, erect or ascending, making a shrub 12 to 15 dm. high and 18 or more dm. in diameter; joints broadly oval to obovate, commonly 17 to 25 cm. in diameter, broadly to narrowly rounded above, blue glaucous green changing through yellowish to brownish and finally gray scaly; areoles elliptical to ovate or even subcircular, 3 to 6 mm. in longest diameter, 3.5 to 4.5 cm. apart, tawny changing to gray or black, enlarging but slightly with age; spicules yellow, about 2 mm. in length, never formidable and not increasing with age; spines none; fruit purple throughout, bearing light, tawny, subcircular areoles, 1 or 2 mm. in diameter, having a small central tuft of yellow spicules; seeds flattened, regular, about 4 mm. in diameter, prominently notched at hilum, with marginal callus about $\frac{3}{4}$ mm. in width.

The species is rather closely related to *Opuntia texana*, which in turn belongs to the *O. Lindheimeri* group. It differs from that species mainly in the absence of spines, difference in areoles, and a decidedly larger seed than either of the foregoing species.

The type is No. 9422 D. G., collected near Devils River, Texas, July 22, 1908. The description was written beside the type plants in the field.—Plates 11; 2, f. 1; 13, f. 4.