

or scrambling among bushes; leaves lanceolate, thickish, 2-4 cm. long, 2-4(-8) mm. wide, sparsely appressed hirsute-villous, closely pustulate below and finely so above; spikes solitary or geminate, usually remotely flowered, 5-10 cm. long, occasionally with foliaceous bracts towards base, rhachis brittle and tortuously flattened; corolla inconspicuous, ca. 1 mm. broad; fruiting calyx closely appressed to rhachis, 2-3 mm. long, very asymmetrical, not at all deciduous, base very oblique and downwardly gibbous on axial side; mature calyx-lobes connivent and reaching about equal height; 3 abaxial lobes lanceolate, somewhat strigose, with the thickened midribs deflexed-hirsute; 2 axial lobes partly united, hirsute only on outer margins; nutlets 4, heteromorphous, granulate and muriculate; odd nutlet persistent, axil, broadly lanceolate, 2-3 mm. long, base much developed and distorting the calyx, groove open and broad; consimilar nutlets 1.5-2 mm. long, deciduous, lanceolate, groove closed or very narrow; gynobase narrow, shorter than consimilar nutlets; style shortly surpassed by nutlets or reaching to their tips.—*Pittonia* i. 112 (1887). *Krynitzkia dumetorum* Greene in Gray, Proc. Am. Acad. xx. 272 (1885).

Deserts from western Nevada to Southern California.

NEVADA: Muddy Valley, 510 m. alt., *Kennedy & Goodding 74* (UC). CALIFORNIA: half climbing among bushes at Tehachapi Pass, 1884, *Curran* (G-TYPE); *Kramer, Parish 9810* (UC); *Kramer, K. Brandegee* (G, UC); *Barstow, 1909, K. Brandegee 158* (G, UC); *Lancaster, K. Brandegee* (UC); *Whitewater, 300 m. alt., 1903, Jones* (UC); without locality, *Lemmon* (UC).

An anomalous species very peculiar in habit and in calyx and nutlet developments. Although the tips of the 4 nutlets in each calyx are of equal height, their bases are decidedly not so. The base of the axial one is more developed than that of the others causing the axial side of the calyx to be gibbously distended downwards along the pedicel and thereby making the base of the calyx conspicuously oblique. In habit the species is unique in the genus. It commonly grows about bushes and scrambles up through them, often reaching a meter in height. So sinuous and brittle are the stems that it is commonly quite impossible to disentangle from the supporting bush a perfect specimen of this plant. The pedicels are unquestionably persistent, being as decidedly so as are those of *C. micrantha*. The type of the species is given as having come from Tehachapi Pass. An annotation in the University of California Herbarium gives the type-locality as: Tehachapi Pass, probably at the "Bend," between Mohave and Tehachapi Station.

15. *C. micromeres* (Gray) Greene. Slender usually erect-growing

herb 1-5 dm. tall; stems dull dark-green, short-hirsute throughout; leaves linear to oblong-linear, somewhat hirsute on both surfaces and usually somewhat pustulate beneath, 1.5-4.5 cm. long; spikes commonly ternate, very slender, naked, 2-8 cm. long; corolla inconspicuous, subtubular, ca. 0.5 mm. broad; fruiting calyces very small, 1-2 mm. long, subglobose, fulvous, sessile or nearly so, early deciduous; mature calyx-lobes ovate-lanceolate, decidedly connivent, scarcely surpassing the fruit, margins ciliate, midrib slightly thickened, hirsute and frequently uncinatate; nutlets 4, heteromorphous, triangular-ovate, 0.7-0.9 mm. long, margin subangulate; odd nutlet slightly the largest, smooth or sparsely papillate, next the axial calyx-lobe; consimilar nutlets papillate, groove open, gradually dilated into a small open areola; gynobase equalled by consimilar nutlets but somewhat surpassed by odd one; style short, equalling or barely surpassing the odd nutlet.—*Pittonia* i. 113 (1887). *Eritrichium micromeres* Gray, Proc. Am. Acad. xix. 90 (1883). *Krynitzkia micromeres* Gray, Proc. Am. Acad. xx. 274 (1885).

Central California to northwestern Lower California.

CALIFORNIA: Ione, 1886, *K. Brandegee* (UC); near Mokelumne Hill, 1885, *Rattan 6* (G); Mokelumne Hill, *Blaisdell* (G); new Coulterville Road, Mariposa Co., 1897, *Congdon 42* (G); Tamalpais, 1910, *K. Brandegee* (UC); Antioch, 1889, *K. Brandegee* (UC); moist shaded ground, Cerritos Creek near Berkeley, *Tracy 761* (UC); *Boswell's, Berkeley Hills, Tracy 2074* (G); foothills west of Los Gatos, *Heller 7341* (G, UC); Glenwood, 1900, *Eastwood* (G); Ben Lomond, *K. Brandegee* (UC); Santa Cruz, *Jones* (G, TYPE); seaside, Monterey, *Eastwood 162* (G); on the Salinas road near Del Monte, *Heller 6698* (UC); Point Sur, 1888, *K. Brandegee* (UC); Painted Cave Ranch, Santa Barbara Co., *Eastwood 66* (G, UC); Santa Inez Mts., 1888, *Brandegee* (G); Santa Cruz Island, 1888, *Brandegee* (UC); chaparral burn, La Jolla, *Clements 109* (G, UC); Point Loma, *Brandegee 1622* (G, UC); Point Loma, *Eastwood 2518* (G); Point Loma, 1906, *K. Brandegee* (UC). LOWER CALIFORNIA: near Ensenada, 1882, *Jones* (UC).

This species develops the smallest flowering and fruiting parts known in the genus. Its occurrence is sporadic, and in the south at least somewhat determined by the presence of chaparral-burns.

16. *C. maritima* Greene. Ascending loosely branched herb becoming 1-3 dm. tall; stems commonly reddish, strigose or frequently hirsute; leaves linear to lanceolate, acutish, usually somewhat contracted at the base, 1-3.5 cm. long, 1-4 mm. wide, commonly hirsute, coarsely pustulate; spikes solitary or geminate, 1-6 cm. long, usually more or less crowded and frequently glomerate, irregularly leafy-bracted throughout; corolla inconspicuous, tubular, 1.4-2 mm. long, 0.5-1 mm. broad; fruiting calyx 1.8-3(-3.5) mm. long, ovate-oblong, stiffly ascending, slightly asymmetrical, tardily deciduous, subsessile;

mature calyx-lobes lance-linear, stiff, connivent, midrib of three abaxial lobes thickened and hirsute, margins appressed short hispid-villous or loosely villous; ovules 2 or 4; nutlets 1-4, heteromorphous; odd nutlet frequently alone developing, smooth, shiny, brownish, oblong-lanceolate, 1-2 mm. long, firmly affixed, next the axial calyx-lobe, groove narrow or closed throughout or opening below into a small areola; consimilar nutlets grayish, minutely tuberculate, readily deciduous, slightly smaller but otherwise like odd nutlet; gynobase subulate, $\frac{1}{2}$ - $\frac{2}{3}$ length of nutlet; style about equalling the height of consimilar nutlets.—*Pittonia* i. 117 (1887).

Var. **genuina**. Ovules 2; nutlets 1 or 2; calyx not conspicuously pilose.—*Krynitzkia maritima* Greene, Bull. Calif. Acad. Sci. i. 204 (Aug. 1885). *C. maritima* Greene, *Pittonia* l. c.; Munz & Johnston, Bull. Torr. Bot. Cl. xlix. 38 (1922). *K. ramosissima* of Greene, Bull. Calif. Acad. Sci. i. 203 (Aug. 1885); not *K. ramosissima* Gray (Jan. 1885). *C. ramosissima* of most recent authors.

Nevada to Lower California.

CALIFORNIA: Mohave Desert, 1884, *Curran* (G); dry sand hills near Barstow, 700 m. alt., *Spencer 1950* (G); Maillard Canyon near Barstow, 700 m. alt., *Spencer 2088* (G); gravelly hillsides 17.6 km. west of Needles, 210 m. alt., *Munz & Harwood 3611* (UC); Needles, *Jones 3824* (G); desert sand, mouth of Tahquitz Canyon, 180 m. alt., *Spencer 1523* (G); sandy places near Palm Springs, 120 m. alt., *Spencer 1528, 2067, 2068* and *2071a* (G); rocks near Indian Wells, 8 m. alt., *Spencer 1520* (G); sandy places, Schaffer's Canyon near Mecca, 48 m. below sea-level, *Spencer 2069* (G) and *Munz & Keck 4755* (G); Signal Mt., *Abrams 3177* (G); Mason's, Colorado Desert, 1899, *Brandegee* (UC); in sand, Colorado Desert, *Spencer 195a* and *198* (G); Colorado Desert, 1890, *Wright* (UC); Point Loma, 1884, *Orcutt* (G, UC); windswept arroyos, San Nicolas Island, *Trask 56* and *57* (G); Santa Barbara Island, *Trask* (UC); Catalina Island, 1884, *Lyon* (G); Catalina Island, 1890, *Brandegee* (UC). LOWER CALIFORNIA: northern Lower California, *Orcutt 2257* (UC); Lagoon Head, *Palmer 781* (G, UC); Guadalupe Island, *Palmer 879* (G), *Anthony 241* (G, UC), *Palmer 67* (G), *Greene* in 1885 (G, UC, ISOTYPES of *K. maritima*), *Anthony* in 1896 (UC), *Brandegee* in 1897 (UC); San Benito Island, *Palmer 912* (G), *Pond 21* (G), *Anthony 276* (UC), *Brandegee* in 1897 (UC); Natividad Island, 1897, *Brandegee* (UC); Santa Margarita Island, 1889, *Brandegee* (UC).

Var. **cedrosensis** (Greene), comb. nov. Ovules 4; nutlets 1-4; otherwise as in preceding variety.—*Krynitzkia cedrosensis* Greene, Bull. Calif. Acad. Sci. i. 204 (1885). *C. cedrosensis* Greene *Pittonia* i. 117 (1887); Brandg. Bot. Gaz. xxvii. 454 (1899).

Endemic to Cedros Island.

LOWER CALIFORNIA: Cedros Island, *Palmer 691* (G), *Greene* in 1885 (G, UC, ISOTYPES), *Veitch* (G), *Anthony 289* (G, UC).

Var. **pilosa** Johnston. Ovules 2; nutlets 1 or 2; calyx conspicu-

ously clothed with long white villous pubescence.—Univ. Calif. Pub. Bot. vii. 445 (1922).

Nevada to Lower California, occurring with var. *genuina* but less common.

NEVADA: Logan, 1909, *Kennedy* (UC). CALIFORNIA: Death Valley, *Coville & Funston 480* (G); Furnace Creek, *Parish 10005* and *10050* (UC); Calico, *Parish 9798* (UC); Inyo County, *Rixford* (UC); Kane Springs, Ord Mts., *Hall & Chandler 6807* (UC); Needles, 1884, *Lemmon* (UC); Signal Mt., 1901, *Brandegee* (UC). ARIZONA: Tempe, 1892, *Ganong & Blaschka* (G). LOWER CALIFORNIA: stony ridges, Los Angeles Bay, *Palmer 551* (UC, TYPE; G, ISOTYPE); Santa Agueda, *Palmer 2142* (UC).

A well defined and common species in the Californian deserts and on the coastal islands. The usual form is readily recognized by being biovulate and having reddish strigose stems. It has generally gone as *C. ramosissima* but that name being based on a renaming of *C. racemosa* properly falls into synonymy.

Ser. V. PTEROCARYAE. Nutlets 1-4, tuberculate or papillate or verrucose, lanceolate, with knife-like or conspicuously winged sides, homomorphous or frequently heteromorphous and with the odd nutlet (sometimes alone developing) axial and usually lacking a thin margin; style reaching to tip of nutlet-body or definitely beyond.

Nutlets solitary or rarely 2, usually with a knife-like margin;

calyx obliquely conical at base.....17. *C. utahensis*.
Nutlets 4; calyx symmetrical.

Corolla conspicuous; mature calyx obviously longer than
broad; nutlets always homomorphous.....18. *C. oxygona*.

Corolla inconspicuous; mature calyx nearly as broad as long;
axial nutlet frequently wingless.....19. *C. pterocarya*.

17. ***C. utahensis*** (Gray) Greene. Erectly branched herb 1-3 dm. high; stems closely strigose or more or less appressed short-hirsute; leaves not numerous, strongly reduced above, linear to oblance-linear, 1-5(-7) cm long, 1-4 mm. wide, rounded at apex, commonly pustulate and short-hirsute especially beneath; spikes geminate or sometimes solitary, commonly 0.8-2.5(-5) cm. long, dense, naked; corolla evident, 2-3 mm. broad; fruiting calyces ovate or ovate-oblong, 2-3(-4) mm. long, quite asymmetrical, sessile by a broadly conic oblique base, spreading or somewhat recurved, deciduous, usually densely appressed-hirsute and notably silky; mature calyx-lobes lanceolate, strongly connivent, midrib thick and usually brownish and infrequently bearing spreading or recurved hairs; ovules 4; nutlets 1 or rarely 2, next the abaxial calyx-lobe, 1.7-2.5 mm. long, 1-1.5 mm. broad, pale, broadly lanceolate, granulate, muricate-