

sheets with fruit. As would be suspected almost the whole of Gray's original description is based upon the Arizonian plant. Subsequently Gray excluded Bishop's collection and cited only the Ehrenberg material as representative of his species. For these reasons Palmer's Ehrenberg collection is taken as the type of *C. holoptera*.

2. *C. racemosa* (Wats.) Greene. Long-lived annual often decidedly suffruticose towards the base, 1–10 dm. tall; stems single with numerous ascending branches or many and diffusely branched, younger parts green, inconspicuously strigose and commonly hirsute, older parts woody and becoming brown from the falling away of the pale bark; leaves oblanceolate, acute, hirsute, pustulate, the early ones 3–6 cm. long and 6–12 mm. broad, the later and more abundant 1.5–4 cm. long and 2.5 mm. broad; racemes apparently forked and paniculately disposed, inconspicuously and irregularly bracted, 3–15 cm. long; corolla very inconspicuous, limb ca. 1 mm. broad; fruiting calyces oblong-ovate, ascending, 2–4 mm. long, slightly asymmetrical, tardily deciduous, inconspicuously biserial; pedicels usually well developed, 1–4 mm. long, slender, frequently nodding; mature calyx-lobes lance-linear, somewhat strigose, hirsute along the thickened midrib; nutlets 4, heteromorphous, triangular-ovate, the acute tips slightly out-curved, groove open or closed above but below broadening out into a shallow broadly triangular areola; odd nutlet next the abaxial calyx-lobe, 1–2 mm. long, subpersistent, finely muricate or tuberculate or both, light or dark; consimilar nutlets 0.8–1.5 mm. long, acute, tending to be very narrowly winged, dark with pallid tuberculations; gynobase subulate, $\frac{3}{4}$ length of odd nutlet and about equalling consimilar nutlets; style much surpassing the nutlets, almost as long as the mature calyx-lobes.—*Pittonia* i. 115 (1887); Johnston, Proc. Calif. Acad. Sci. ser. 4, xii. 1147 (1924). *Eritrichium racemosum* Wats in Gray, Proc. Am. Acad. xvii. 226 (1882). *Krynitzkia racemosa* Greene, Bull. Calif. Acad. Sci. i. 208 (1885). *Johnstonella racemosa* Brand, Fedde Repert. in press. *K. ramosissima* Gray, l. c. xx. 277 (1885). *C. suffruticosa* Piper, Proc. Biol. Soc. Wash. xxxii. 42 (1919). *C. racemosa*, var. *lignosa* Johnston, Univ. Calif. Pub. Bot. vii. 445 (1922). *J. racemosa*, var. *lignosa* Brand, Fedde Repert. in press.

Southern Nevada and western Arizona, and southwestward to middle Lower California and Carmen Island; usually growing in rocky places.

NEVADA: semishaded places, Las Vegas Mts., *Gooding* 2381 (G, UC); Petrified Forest Canyon west of Logan, 540 m. alt., *Heller* 10446 (G) and 10447

(G, UC); rocks, Ash Meadows, *Purpus* 6024 (UC). ARIZONA: Grand Canyon, 1885, *Gray* (G); Diamond Creek Canyon, *Wilson* 170 (UC). CALIFORNIA: on and about rocks, Silver Canyon, White Mts. east of Laws, *Heller* 8209 (G); Panamint Canyon, *Hall & Chandler* 7034 (UC, TYPE of *C. racemosa*, var. *lignosa*); Surprise Canyon, *Parish* 10125 (UC); Morongo Wash, 900 m. alt., *Parish* 3337 (UC); among rocks on canyon-side, Palm Canyon, 300 m. alt., *Johnston* 1002 (G); sandy places near Palm Springs, 120 m. alt., *Spencer* 2079 (G); among rocks, Cathedral Canyon near Palm Springs, 150 m. alt., *Spencer* 2078 (G); Borregos Springs, 1894, *Brandegee* (UC); San Felipe Creek, *Eastwood* 2704 (G); Split Mt., 1905, *Brandegee* (UC); canyon near Mesquite Station, *Parish* 775 (G, TYPE of *E. racemosum*; UC, ISOTYPE); desert sand, Colorado Desert, San Diego Co., *Spencer* 254 (G). LOWER CALIFORNIA: Cantillas Mts., 1883, *Orcutt* (G); Cantillas Mts., 1884, *Orcutt* (G, UC); San Julio Canyon, 1889, *Brandegee* (UC); San Sebastian, 1884, *Brandegee* (UC); San Reguis, 1889, *Brandegee* (UC); Santa Maria, 1889, *Brandegee* (UC); Cajon de Santa Maria, 1889, *Brandegee* (UC); talus, Puerto Refugio, Angel de la Guarda Island, *Johnston* 3374 (G); shaley slope, San Estaban Island, *Johnston* 3175 (G); cobble-stone beach, South San Lorenzo Island, *Johnston* 4192 (G); foot of cliff, Las Animas Bay, *Johnston* 3505 (G); Santa Rosalia, *Palmer* 188 (G); foot of gypsum cliff, San Marcos Island, *Johnston* 3621 (G); Carmen Island, *Palmer* 846 (G, UC).

A very distinctive plant to be confused only with *C. holoptera*, which has homomorphous, more broadly winged nutlets. The very diffusely branched form of *C. racemosa*, which is most common in the Mohave Desert, has been described as *C. racemosa*, var. *lignosa*. It may be worthy of recognition.

3. *C. angelica* Johnston. Much branched finely strigose herb 15–25 cm. high; stems spreading, rebranched, brown and glabrous below, strigose and canescent above; leaves linear, 8–24 mm. long, 1–2 mm. broad, loosely strigose, densely and minutely pustulate, ascending; spikes solitary, crowded, slender, naked, 4–9 cm. long, very floriferous; corolla minute, ca. 1 mm. long, ca. 0.5 mm. broad; fruiting calyces oblong-ovate, 1.5–2 mm. long, ascending, sessile, somewhat asymmetrical; mature calyx-lobes linear, erect, ribbed, sparsely hispid, abaxial one slightly the longest and most hispid; nutlets 4, heteromorphous, triangular-ovate, dark with small pale tuberculations, margins sharp and with a very narrow knife-edge, back convex, groove closed above but dilated below into a shallowly triangular areola; odd nutlet next the abaxial calyx-lobe, ca. 0.7 mm. long, somewhat persistent; consimilar nutlets ca. 0.6 mm. long; gynobase narrow, almost as long as the consimilar nutlets; style very much surpassing the nutlets.—Proc. Calif. Acad. Sci. ser. 4, xii. 1143 (1924).

Known only from Angel de la Guarda Island in the Gulf of California.

LOWER CALIFORNIA: on silty flats, Angel de la Guarda Island opposite Pond Island, *Johnston* 4221 (G, UC, ISOTYPES).

A well marked species, probably most related to *C. racemosa*, from which it differs in such developments as smaller and sessile calyces, much smaller nutlets, and narrower leaves. To judge from the description of *C. inaequata* it differs from that species in its denser spikes, and much smaller calyces and nutlets. Except for the very narrowly winged margin, the nutlets of *C. angelica* are very suggestive of those of *C. Grayi*.

4. *C. inaequata* Johnston. Loosely and sparingly branched herb 3-4 dm. high; stems erect or ascending, hispid and strigose or hirsute towards the base; leaves oblanceolate to linear, 2-4 cm. long, acute, not numerous, more or less hispid, pustulate especially underneath; spikes geminate or solitary, 4-12 cm. long, at times sparsely bracted below; corolla inconspicuous, tube shorter than calyx; fruiting calyx ovate-oblong, 2.5-3 mm. long, ascending, pedicels less than 0.5 mm. long; mature calyx-lobes lanceolate, midrib thickened and hirsute, axial lobe most pubescent and thickened; nutlets 4, heteromorphous, triangular-ovate, dark with small pale tuberculations, margins decidedly acute, groove closed above but below gradually dilating into a shallow triangular areola; odd nutlet ca. 1.7 mm. long, somewhat persistent, slightly lighter than the others, next the abaxial calyx-lobe; consimilar nutlets ca. 1.3 mm. long; gynobase equalling the consimilar nutlets but surpassed by odd nutlet; style much surpassing the nutlets.—Univ. Calif. Pub. Bot. vii. 444 (1922). *Johnstonella inaequata* Brand, Fedde Repert. in press.

Southeastern California.

CALIFORNIA: among rocks, Pleasant Canyon, Panamint Mts., 600 m. alt., *Hall & Chandler 6925* (UC, TYPE); *Baxter, Parish 9859* (UC).

The status of this species is problematic, since the collections upon which it was based have not been available to me for several years. The description given above is adapted from a preliminary diagnosis made in 1922. It is possible that the plant is only a form of *C. racemosa*, although it has been noted as differing in its subsessile calyces and less extended duration.

5. *C. pusilla* (T. & G.) Greene. Low plant usually with very numerous prostrate-ascending stems; these very slender, usually strictly branched, 3-15 cm. long, canescent, appressed villous-hirsute; leaves crowded near base of plant but distant above, spatulate-linear to linear, 1-3 cm. long, 1-2 mm. wide, somewhat pustulate and hispid below but less so above; spikes solitary or geminate, 2-8 cm. long, naked or with a few minute bracts; corolla inconspicuous, shorter than calyx, 1.5-2 mm. long, lobes slightly spreading oblong ca. 0.3

mm. long; fruiting calyces 2-2.5 mm. long, broadly ovate, symmetrical, sessile or subsessile, early deciduous; mature calyx-lobes lance-ovate or oblong-lanceolate, hirsute, midrib only slightly thickened; nutlets 4, homomorphous, lucid, ca. 0.8-1.2 mm. long, triangular-ovate, bent, tan-colored with low light-colored tuberculations, margin angled and beveled, groove opened or closed above but expanding below into a shallow open triangular areola; gynobase narrowly pyramidal, about equalling the nutlets; style much surpassing the nutlets, ca. 1/2 length of gynobase.—*Pittonia* i. 115 (1887). *Eri-trichium pusillum* T. & G. Pacif. R. R. Rep. ii. pt. 2, 171 (1856). *Krynitzkia pusilla* Gray, Proc. Am. Acad. xx. 274 (1885).

Southern Arizona and New Mexico southward to Durango.

ARIZONA: near Nogales, 1902, *Orcutt* (UC); Douglas, 1907, *Gooding 2264* (UC). NEW MEXICO: without locality, *Wright 1571* (G, NY). TEXAS: Fort Davis, 1880, *Giard 65* (G); Kent, *Tracy & Earle 105* (UC); El Paso, *Jones 3741* (UC); Llano Estacado, *Pope* (NY, TYPE). CHIHUAHUA: hills and plains near Chihuahua, *Pringle 184* (G, UC); vicinity of Chihuahua, 1300 m. alt., *Palmer 65* (G). DURANGO: Tepehuanes, *Palmer 28* (G, UC); Durango, *Palmer 139* (G, UC) and *227* in pt. (G).

A very distinct species readily recognized by its beveled, bent, lustrous nutlets that just equal the somewhat basally constricted gynobase. The type is given as coming from "Rio Pecos to Llano Estacado, etc. in sandy soil, March." From a study of the journal in Pope's Report, the locality given is found to be within about 100 kilometers traveled between March 24th and 26th 1854. This would make the type locality lie somewhere near the juncture of Ward, Crane and Ector counties, Texas.

6. *C. costata* Brandg. Coarse stiff few-branched herb 1-2 dm. high; stems (especially younger parts) canescent, densely villous-strigose and usually somewhat hirsute as well; leaves lanceolate to linear, 1-3 cm. long, 2-4 mm. wide, broadest near base, apex acute, above villous-strigose and sparsely hispid, beneath more hispid and frequently also pustulate; spikes rigid, 2-5 cm. long, solitary or geminate, sparsely leafy-bracted; corolla inconspicuous, ca. 2 mm. long, tube shorter than calyx, lobes broad and ascending; fruiting calyces ovate-oblong, 4-6 mm. long, subsymmetrical, spreading, deciduous, subsessile; mature calyx-lobes linear-lanceolate, somewhat connivent above with tips slightly spreading, midrib thickened hirsute, margins strigose; nutlets 4, homomorphous or subheteromorphous with the nutlet next the abaxial calyx-lobe slightly the largest, ca. 1.8 mm. long, triangular oblong-ovate, back strongly convex, inconspicuously rugulose or faintly verrucose, face noticeably flat or even