

and *Cryptantha inaequalis*. The dense tufts of soft hairs on the calyxes in the case of *Cryptantha barbigera* and *Cryptantha erinita* help to confirm nutlet characters in these species. Sometimes one or two of the four nutlets differ constantly in size and sometimes in shape and thus give a definite clue to the species. Such clear cases of heteromorphism distinguish species or groups of species. On the other hand, when the four nutlets are of the same size and shape, such a condition is regarded as homomorphic, even though occasionally collections may exhibit fruit in which one or two of the nutlets, due to incomplete development, may be smaller than the others, as for example in *Cryptantha muricata* (Bald Mt., Greenhorn Mts., C. N. Smith 204). In our species generally the nutlets in shape may be ovate, lanceolate or obovate; the dorsal and ventral sides may be flattish, low rounded or high rounded. The groove on the ventral side may be elevated with a plane surface on each side extending to the lateral angles; a ventral structure of this sort is here described as convexly 2-planed.

In general the homomorphic species exhibit a great degree of fluctuating variability in the nutlets; often in shape of the nutlets, frequently in surface sculpturing, commonly as to the number, form or disposition of the tubercles or markings, often in the lateral angles as being acute or obtuse, often also in the ventral groove and the amount of its basal forking. In consequence, the attempt to fix definite limits to species in this group is attended with many erroneous uncertainties and difficulties. Certain morphological features are recombined, it would seem, to a degree that is very great. It is one's experience that each new lot of material derived from the field alters, to some extent, the limits of species as previously worked out. Where accessions of new material are very considerable, one must, in each case, revise anew. In such a revision some new units may be set up, but some old ones may be reduced. By this method a certain stabilization of various species can be maintained. If, on the other hand, there should be an assertion of fixed limits for certain species in various groups, all material just beyond these fixed boundaries would, in consequence, be used in automatically multiplying further units to an excessive degree. Holding narrowly or fixably to the original concept of a published species, or to species limits as set forth in an initial revision, inevitably leads to an ever-lengthening file of units to be offered as new.

A. Nutlets tuberculate, papillate or muricate.

I. NUTLETS WITH OBTUSE OR ACUTE LATERAL ANGLES, NOT WINGED, THOUGH SOMETIMES WITH A MARGINAL RIDGE.

1. Nutlets normally 4 (rarely 1, 2 or 3 but always some plants in a given locality with 4 nutlets).

a. Nutlets all alike or differing very slightly in size.

Spikes loosely corymbose-paniculate or disposed in a narrow panicle or a much reduced panicle, or the spikes sometimes solitary.

Calyx-bristles straight; corolla inconspicuous ($\frac{1}{4}$ to $\frac{3}{8}$ line wide).

Nutlets broadly triangular-ovate; lower leaves opposite; lower San Joaquin Valley..... 1. *C. Hooveri*.

Nutlets ovate-rostrate; leaves alternate; transmontane or mostly high easterly meadows of Sierra Nevada..... 5. *C. andrigena*.

Calyx-bristles at tips of lobes a little curved; corolla 1 to $1\frac{1}{2}$ lines broad; cent. Sierra Nevada foothills..... 3. *C. mariposae*.

Spikes in clusters of 2 to 5, terminating the main branches, the clusters not bracteate at base, borne above the leaves (except sometimes in depauperate plants).

Bristles on calyx-lobes dense, mostly recurved, the upper ones short and equal, the lower ones longer, montane, widely distributed..... 4. *C. simulans*.

Bristles or hairs on calyx-lobes straight, ascending or divergent.

Fruiting calyx 1 to $2\frac{1}{2}$ lines long; corolla $1\frac{1}{2}$ to $3\frac{1}{2}$ lines broad; cismontane.

Calyx in fruit only slightly surpassing nutlets; nutlets triangular-ovate, the lateral angles with an evident ridge toward base..... 5. *C. muricata*.

Calyx in fruit usually much surpassing nutlets; nutlets ovate-rostrate to lanceolate-attenuate, the lateral angles not ridged..... 6. *C. infermedia*.

Fruiting calyx 3 to 5 lines long; corolla $\frac{1}{4}$ to 1 line broad; transmontane deserts; (see also rare, under nos. 5 and 6).

Calyx-lobes conspicuously and densely villous-tufted with long white hairs on lower half, the lobes also long-bristly; flowers spicate, the fruiting spikes 1 to 5 inches long; nutlets ovate-acuminate..... 7. *C. barbigena*.

Calyx-lobes short-silky inside, glabrous outside but bristly on the midrib; flowers glomerate-capitate, the fruiting heads or spikes $\frac{1}{2}$ to 1 inch long; nutlets slender-cuneate or lanceolate-attenuate..... 8. *C. nevadensis*.

b. Nutlets heteromorphous (at least in most flowers).

Calyx 1 to 2 lines long, its bristles straight; transmontane deserts.

Spikes loosely flowered; calyx appressed to rachis, bearing short bristles, persistent; plants tall, with flexuous branches..... 9. *C. dissectiflora*.

Spikes densely flowered; calyx more or less spreading from rachis, bearing long bristles (some exceeding lobes), deciduous; plants low, with straight branches.....10. *C. angustifolia*.
 Calyx $\frac{1}{4}$ line long, armed with uncinata bristles; climontane.....11. *C. micromeres*.

2. *Nutlets solitary (rarely 2 in some flowers).*

- Calyx in fruit erect or spreading.
 Flowers on pedicels $\frac{1}{2}$ to 1 line long; spikes very dense, the calyces so densely woolly or shaggy-hirsute as almost to conceal the flowers; a. Shasta Co.....15. *C. cristata*.
 Flowers sessile or subsessile, not concealed by shaggy hairs.
 Nutlets erect; transmontane deserts and bordering ranges.
 Calyx bristly; corolla $\frac{1}{4}$ line broad (1 to 2 lines in var.); spikes loose.....
 Calyx densely silky-hirsute, the bristles none or few and short; corolla 1 to $1\frac{1}{2}$ lines broad; spikes short and dense.....13. *C. decipiens*.
 Nutlets horizontal; calyx soft-hairy; spikes loose; inner North Coast Range in Yolo, Lake and Colusa Cos.....14. *C. ulkensis*.
 Calyx in fruit recurved; Inyo Co.....15. *C. eucosata*.
 16. *C. recurvata*.

II. NUTLETS WITH WINGED MARGINS OR PROJECTING SHARP MARGINS; CALYX MORE OR LESS BRISTLY; NUTLETS NORMALLY 4; TRANSMONTANE DESERTS (NO. 22 PARTLY CLIMONTANE).

- Spikes with the lower pedicels 1 to 3 lines long; nutlets unequal; stems conspicuously woody at base (perennial); transmontane deserts.....17. *C. racemosa*.
 Spikes with the flowers sessile or subsessile or the pedicels only $\frac{1}{4}$ to $\frac{1}{2}$ line long; stems not woody at base or rarely (annuals).
 Nutlets with a very narrow or line-like margin; corolla inconspicuous ($\frac{1}{4}$ to $1\frac{1}{2}$ lines broad).
 Nutlets homomorphic, light brown.
 Spikes bracteate toward base; nutlets minutely papillate on the dorsal side, smooth on the ventral side.....18. *C. costata*.
 Spikes bracteate throughout; nutlets minutely papillate on both sides.....
 Nutlets heteromorphic, white-papillate on a brown ground on both sides; spikes bracteate or nearly so.....19. *C. saxorum*.
 20. *C. inaequata*.
 Nutlets rather broadly or at least obviously wing-margined.
 All 4 nutlets winged, the wing reddish-brown (same color as body), entire; flowers on pedicels $\frac{1}{4}$ or $\frac{1}{2}$ line long; corolla $1\frac{1}{4}$ lines wide.....21. *C. holoptera*.
 All 4 nutlets winged or the fourth nutlet wingless or nearly so; wing of the nutlet white-chartaceous or light-colored, toothed or erose, the body grayish or slate-color; flowers sessile or subsessile.
 Corolla $\frac{1}{4}$ to $\frac{1}{2}$ line broad; wing of nutlet fimbriate-toothed or erose, as broad as the lanceolate body.....22. *C. pterocarpa*.
 Corolla commonly 2 to 3 lines broad; wing of nutlet erose, $\frac{1}{4}$ to $\frac{1}{2}$ as broad as the ovate body.....23. *C. oxygona*.

B. Nutlets smooth.

I. HAIRS ON CALYX STRAIGHT OR ESSENTIALLY SO AND EITHER ERECT, SPREADING OR REFLEXED.
 1. *Ventral groove median.*

a. Hairs on upper part of calyx erect, ascending or spreading.

- Calyces without bristles, resembling woolly tufts, the hairs soft, all alike; fruiting calyces 1 line long; spikes bractless, short and dense, borne in 2s to 4s on slender or filiform peduncles; nutlet 1; transmontane deserts.....24. *C. gracilis*.
 Calyces with spreading bristles and also with shorter ascending hairs.
 Style less than half as long as nutlets; calyx $\frac{1}{4}$ to 1 line long, with a tuft of bristles toward base; spikes slender, flexuous or curved; nutlet 1, lanceolate, reticulate or attenuate; climontane, Coast Ranges, Kern Co. and coastal S. Cal.....25. *C. microcalyx*.
 Style more than half as long as nutlets.
 Nutlets most commonly lanceolate, acuminate or rostrate, less than half as broad as long.
 Spikes $\frac{1}{4}$ to 3 inches long; Coast Ranges and coastal S. Cal.
 Spikes bractless or with a few bracts near base, mostly $\frac{1}{2}$ to $1\frac{1}{2}$ inches long.
 Nutlet 1, high-rounded on back and face (circular in cross section), slender-rostrate; Lake and Napa Cos.....26. *C. hispidula*.
 Nutlets 1 to 4, low-rounded on back, usually flattened on face, acuminate or attenuate; Coast Ranges and coastal S. Cal.....27. *C. elevandula*.
 Spikes bracteate, short and dense ($\frac{1}{4}$ to $\frac{1}{2}$ inch long); nutlets 4 (or 1); coast line.....28. *C. leucocarpa*.
 Spikes 2 to 5 inches long; Colorado Desert.....29. *C. gauderi*.

- Nutlets most commonly ovate, at least half as broad as long.
 Spikes $\frac{1}{4}$ to 1 inch long, regularly set with many small bracts; nutlets 1 (or 2);
 coastal S. Cal. and transmontane deserts.....30. *C. maritima*.
 Spikes bracteate or with a few bracts near base; nutlets 4 or 3.
 Corolla $1\frac{1}{2}$ to $2\frac{3}{4}$ lines broad; nutlets truncate at base; calyx-lobes linear;
 s. Sierra Nevada and Tehachapi Mts.....31. *C. mohaveana*.
 Corolla $\frac{1}{4}$ to $\frac{3}{4}$ line broad (1 to $1\frac{1}{2}$ lines in var. of no. 32); nutlets mostly
 rounded at base.
 Lateral angles of nutlets obtuse; calyx-lobes linear; Sierra Nevada and
 North Coast Ranges.....32. *C. forryana*.
 Lateral angles of nutlets sharply acute or with a linear margin; calyx-
 lobes lanceolate; high montane in White Mts.....33. *C. suttonii*.
- b. Hairs on upper part of calyx retrorse; nutlets 1 to 4, ovate-lanceolate or attenuate; spikes
 subuliform; inner Coast Ranges and Tehachapi Mts.....34. *C. nemeclada*.**
- 2. Ventral groove eccentric; corolla minute ($\frac{1}{4}$ to $\frac{1}{2}$ line wide).**

- Nutlets 4; plants 3 to 20 inches high; spikes in 1s, 2s or 3s, 1 to 5 inches long; widely distributed,
 s. of Sierran Cal.....35. *C. affinis*.
 Nutlet 1; plants 1 to 5 inches high; spikes very short (1 to $1\frac{1}{2}$ lines long) in terminal glomerules
 and in the leaf-axils; east side or high easterly fescue of the Sierra Nevada.....
 36. *C. glomeriflora*.

II. HAIRS ON CALYX FALCATE-RECURVED OR FALCATE-DEFLEXED; NUTLET 1.

- Nutlets ovate or lanceolate, high-rounded on back, low-rounded or flattish on face; calyx-lobes on
 upper half beset with short spreading curved hairs, at base armed with a tuft of long
 deflexed or spreading bristles or sometimes the bristles extremely reduced or the lobes
 merely short-hispidulose; stem erect, branched.
 Fruiting calyxes appressed to rachis; base of nutlet rounded or subacute; ventral groove not
 forked, ending in a small areola; Sierran, widely distributed.....37. *C. faccidia*.
 Fruiting calyxes spreading from rachis; base of nutlet truncate; ventral groove forked at
 base, with a large areola; inner North Coast Range and cent. and s. Sierra Nevada
 foothills.....38. *C. rostellata*.
 Nutlets ovate, acute, flattened on both faces (compressed); calyx-lobes uniformly beset with short
 curved hairs; stem diffusely branched, the branches very slender or filiform; foothills
 surrounding the San Joaquin Valley.....39. *C. sparsiflora*.

1. C. hooveri Jtn. Stems several from the base, ascending, 3 to 6 inches high;
 herbage ascending-hirsute; leaf-blades linear or filiform, 5 to 11 lines long, the
 lower opposite; spikes very short and dense, borne on short branches and racemously
 disposed so as to make a cylindrical panicle, only the lowest flowers in each spike
 developing fruits, the abortive flowers panicle, only the lowest flowers in each spike
 dilated at base, densely ascending-hirsute and with long spreading bristles,
 $2\frac{1}{4}$ to 3 lines long; corolla minute ($\frac{1}{4}$ line broad), somewhat concealed behind the
 bristly calyx-tips; nutlets 4 (sometimes 3 or 1), triangular-ovate, acute, truncate
 at base, thickly tuberculate on the low-rounded back, convexly 2-planed ventrally,
 the lateral angles sharply defined but a little obtuse, the ventral groove widely
 forked at base and making a broad areola.

Dry sandy flats, 10 to 250 feet: lower San Joaquin Valley from eastern Contra
 Costa Co. to Madera Co. May.

Locs.—Antioch, K. Brandegee; Waterford (13 mi. e. at Gobin ranch), Stanislaus Co., Hoover
 2137; Chowchilla (8 mi. w.), Madera Co., Hoover 1247.

Ref.—CARYOPANTHIA HOOVERI Jtn., *Four. Arn. Arb.* 18:23 (1937), type loc. Chowchilla (8 mi.
 w.), Madera Co., Hoover 558 (isotyp. vidi).

2. C. ambigua Greene. Stem much branched from the base, erect, $\frac{1}{2}$ to $1\frac{3}{4}$
 feet high, ascending-hirsute or strigulose and spreading bristly-hirsute; herbage
 roughly spreading-hirsute throughout; leaf-blades linear, 1 to $1\frac{1}{2}$ inches long,
 thinly hirsutulose and conspicuously bristly-hirsute, the bristles with pustulate-
 dilated bases; spikes commonly loose below, 1 to $2\frac{3}{4}$ inches long, borne in a corym-
 bose panicle; calyx-lobes linear-lanceolate, densely and divaricately long-bristly
 and ascending-hirsute (especially on lower part); corolla 1 line broad; nutlets 4
 or 3, ovate-rostrate, usually flattish on back, thinly tuberculate on a microscopically
 tessellate-papillate ground, the lateral angles obtuse, the ventral side convexly
 2-planed.

Gravelly slopes or flats, 4800 to 5800 feet: Sierra Nevada from Nevada Co. to Modoc Co. and eastern Siskiyou Co. East to Utah, north to Washington, June-July.

Locs.—Truckee, *Some*; Portola, Plumas Co., *K. Brandegee*; Goose Lake, ne. Modoc Co., *Austin & Bruce 2267*; Little Shasta Valley, *Jepson 19,992*; Andeotte sta., n. of Mt. Shasta, *Jepson 20,028*.

Var. *echinella* (Greene) Jepson & Hoover comb. n. Stem erect, branching, 2 to 12 inches high; spikes solitary or somewhat capitate or glomerate at first with the spikes soon loose and the flowers remote or discrete; calyx-lobes linear-lanceolate or filiform, densely villous-ciliate, the strong midrib armed with long scattered spreading bristles; calyx in fruit 2 lines long; corolla minute, $\frac{1}{2}$ to $\frac{3}{4}$ line broad; nutlets narrow-ovate, shortly attenuate or reticulate, minutely but rather thickly muciculate (the muciculations like needle-points), the lateral angles obtuse, the ventral side with mostly closed groove and closed basal fork.—Dry gravelly ground in open woods or on open sandy hills, 2400 to 9000 feet: Sierra Nevada, east side and east slope, and also west slope but mostly on high or easterly summits, from eastern Nevada Co. to Inyo and Tulare Co.; Mt. Poos region to the San Bernardino Mts. East to Nevada and Arizona. July-Aug.

Locs.—Sierra Nevada, east side: Castle Peak, Nevada Co., *Heller 7079*; Tahoe City, *Boring*; Mammoth, Mono Co., *K. Brandegee*; Andrews Camp, Bishop Creek, Inyo Co., *E. J. Brandegee*; Tuber Cañon, Panamint Range, *Hoover*; Sierra Nevada, west slope: Relief Creek, Middle Fork Stanislaus River, *Hoover 2657*; betw. Pumice Flat and Shadow Lake, Madera Co., *Ferris 8282*; Dubbs Creek, Fresno Co., *Jepson 806*; Alta Mtns., Tulare Co., *K. Brandegee*. Intra-mountane S. Cal.: Sawmill Mt., Ventura Co., *Hall 6223*; Ontario Ridge, San Gabriel Mts., *Peterson 3290*; Little Green Valley, San Bernardino Mts., *G. E. Hall 24*.

Refs.—*CRYPTANTHIA AMBIGUA* Greene, Pitt. 1:113 (1887); *Jepson*, Fl. W. Mid. Cal. 444 (1901), ed. 2, 247 (1911), Man. 848, excluding fig. 803 (1925). *Erichthium muriculatum* var. *ambigua* Gray, Syn. Fl. 2:194 (1878), resting initially upon *Erichthium muriculatum* Torr. Phanerogamia of Pacific Coast, Wilkes Exped. 416, t. 13A (1874), type loc. Nisqually, Wash.; not *E. muriculatum* A. DC. *Erichthium ambigua* Gray, Proc. Am. Acad. 20:273 (1885). *C. poly-carpa* Greene, Pitt. 1:114 (1887), type loc. Truckee, *Some*. Var. *ECHINELLA* Jepson & Hoover, *C. echinella* Greene, Pitt. 1:115 (1887), type loc. Castle Peak ("Mt. Stanford"), e. Nevada Co., *Some*.

3. *C. mariposae* Jtn. Stem branching, 3 to 8 inches high; herbage spreading- or ascending-hirsute; leaves oblong or oblanceolate, thickish, 4 to 8 lines long; spikes mostly few, corymbose, $\frac{1}{2}$ to $1\frac{1}{2}$ inches long; calyx-lobes linear, ascending-hirsute and spreading-bristly, the bristles towards the tip shorter and curved; corolla 1 to $1\frac{1}{2}$ lines broad; nutlets 4 (or 2 or 3), ovate, rostrate from a broad body, truncate at base, low-rounded on back, convexly 2-planed on face, obtuse on the lateral angles, thickly or thinly tuberculate, the ventral groove with an open areola at base; style shorter than nutlets.

Serpentine rocks on hillslopes, 1000 to 2000 feet: Sierra Nevada foothills from Calaveras Co. to Mariposa Co. Apr.-May.

Locs.—Harrison Peak, Calaveras Co., *Drey 1423*; betw. Coulterville and Bagby, Mariposa Co., *Hoover 3398*; Mariposa, *Condon*. The nutlets are quite similar to those of *Cryptantha ambigua* and in nearly all other respects *Cryptantha mariposae* is very close to that species, although it is well segregated from it geographically.

Ref.—*CRYPTANTHIA MARIPOSAE* Jtn., Contrib. Gray Herb. 74:73 (1925), type loc. Mariposa, *Condon*.

4. *C. simulans* Greene. (Fig. 416.) Stem slender, lankly or openly branching with very slender branches, 6 to 14 inches high; herbage ascending-hispid; leaf-blades linear, $\frac{1}{2}$ to $1\frac{1}{4}$ inches long; spikes in 1s, 2s or 3s, $\frac{1}{2}$ to $1\frac{1}{4}$ inches long; calyx-lobes narrowly linear and dilated at base or narrow-lanceolate, densely set with bristles, the bristles on upper half uniformly short and downwardly curved, the bristles on lower half longer and spreading or curved downward; corolla $\frac{1}{2}$ to $\frac{3}{4}$ line broad; fruiting calyx 2 lines long; nutlets 4, broadly ovate, shortly rostellately, brown, the flatish back with scattered tubercles set on a ground microscopically but densely tessellate-papillate, the angles rounded, the ventral groove and its basal fork closed.

Dry rocky or gravelly slopes or on flats in the mountains, in granite sand, 2000 to 6700 feet: mountains of Southern California; Tehachapi Mts.; Sierra Nevada

from Kern Co. to Modoc Co. and eastern Siskiyou Co.; North Coast Ranges from Trinity Co. to western Siskiyou Co. East to western Nevada, north to Washington, May-July.

Locs.—S. Cal. mts.: Cuyamaca Peak, *T. Brandegee*; Onstatt Valley, San Jacinto Mts., *Hall*; Little Green Valley, San Bernardino Mts., *G. R. Hall*; Lechoux Cañon, San Antonio Mts., *Parish* 11,944; Mt. Wilson, San Gabriel Mts., *Peirson* 2157; Tehachapi Mts.: near Tehachapi Peak, *Dudley* 347; Sierra Nevada: Round Mdw., Giant Forest, *Jepson* 678; betw. Colony Mill and Marble Fork, Tulare Co., *Jepson* 664a; Huntington Lake, Fresno Co., *A. L. Grant*; Yosemite Valley, *Jepson* 10,467; Calaveras Big Trees, *Greene*; near Alpine Camp, upper Truckee River, Eldorado Co., *H. M. Wheeler*; Truckee, Nevada Co., *Heller* 7040; Millford, Lassen Co., *T. Brandegee*; Mt. Shasta, *T. Walker*; Pandango Pass, Warner Mts., *J. T. Howell* 12,943. North Coast Ranges: summit of New River trail, betw. Dyer's ranch and Hawkins Bar, Trinity Co., *Jepson* 1997; Sisson, Siskiyou Co., *Heller* 8035.

Refs.—CRYPTANTHIA SIMULANS *Greene, Pitt.* 5:54 (1902), type loc. Amador Co., *Hansen*. *C. ambigua* *Jepson*, *Man.* fig. 803 (1925). *C. ambigua* f. *sinuata* *Brand*; *Engelm.*, *Pflzr.* 422:68 (1921). *C. stuebelii* *Brand*; *Fedde*, *Repert. Sp. Nov.* 24:55 (1927), type loc. Yosemite Valley, *Stuebel*.

5. *C. muricata* *Nels. & Mebr.* Stem robust, branching, $\frac{1}{2}$ to 2 feet high; herbage spreading, rough-hirsute; leaf-blades linear, $\frac{1}{2}$ to 1 inch long; spikes rather dense, borne in 2s to 6s (or 9s) terminally on the main axis or often also in 2s or 3s on the lateral branchlets; calyx-lobes lanceolate or linear, $1\frac{1}{2}$ lines long, shortly ascending-hirsute and long spreading-bristly; corolla 2 to 3 lines broad; nutlets 4, triangular-ovate, acute, truncate at base, 1 line long, tuberculate or muriculate dorsally and also sometimes somewhat rugulose, the lateral margins well-defined, ridged towards base, sometimes sharp or sometimes a little rounded, ventral side convexly 2-planed, the ventral groove and its strong basal fork mostly closed.

Gravelly or rocky open slopes or washes or opens in chaparral, 200 to 8000 feet: Coast Ranges from Contra Costa Co. to San Luis Obispo Co.; Sierra Nevada in Kern Co.; Tehachapi Mts.; intramontane and cismontane Southern California from Santa Barbara Co. to Orange Co. May-July.

Locs.—Coast Ranges: Mt. Diablo, *Bosserman* 508; Big Sur, Monterey coast, *Hoover* 2679; Cayama Valley, s. San Luis Obispo Co., *Jepson* 12,158. Sierra Nevada in Kern Co.: Poso Mine, Poso Creek, Greenhorn Mts., *C. Y. Smith* 189; lower Kern Cañon, Greenhorn foothills, *Allison* *Kramer*. Tehachapi Mts.: Tehachapi, *K. Brandegee*. Intramontane and cismontane S. Cal.: Sycamore Cañon, Santa Barbara, *Jepson* 9135; Portal Ridge, n. Los Angeles Co., *Jepson* 17,065; Lewis Valley, s. Los Angeles Co., *Drey* 2648; Castale Creek (mts. above), n. Los Angeles Co., *Jepson* 8233; San Gabriel Cañon, San Gabriel Mts., *Clokey* 5667; Waterman Cañon, San Bernardino Mts., *Jepson* 5524; Strawberry Valley, Mt. San Jacinto, *Jepson* 1299; Anselm Plain, *Alce Xis*.

Note on fruit.—The nutlets, usually brown, are flattish dorsally and commonly carry an obscure median dorsal keel; usually the ventral side is convexly 2-planed though sometimes flattish. The groove is long-forked at base. The style about equals the nutlets. Variation in the surface sculpturing of the nutlets is marked. In the prevailing form the nutlet is densely tuberculate; or it may be thinly tuberculate; sometimes it is tuberculate and roughly sharp rugulose (Mt. Diablo, *Bosserman* 508,—det. R. P. Hoover). In the mountains on the west side of the Mohave Desert, the tubercles may be slender with the apex flat-topped and capped by a microscopic alvea (Cayama Valley, *Jepson* 12,158), or some of the tubercles may be depressed or hollowed at apex



Fig. 416. CRYPTANTHIA SIMULANS *Greene*. a, habit, $\times \frac{1}{2}$; b, n. $\times 4$; c, nutlet, dorsal view, $\times 8$; d, nutlet, ventral view, $\times 8$.

with a definite papilla in the hollow (Portal Ridge, Jepson 17,065), or yet again the tubercle may become somewhat crater-like and bearing a distinct papilla in the crater (Portal Ridge, Jepson 17,059). In all those cases of crater-like tubercles, the tubercles rise from a brown ground. In the case of var. *clokeyi* (Jtn.) Jepson comb. n., the tubercles, likewise crateriform, are set on (a. of Barstow, Mohave Desert).

Var. *Jonesii* Jtn. Stems 1 or few from the base, 5 to 20 inches high, ending in an umbellate cyme, the spikes below the cyme borne on short branches; corolla $\frac{1}{2}$ to $\frac{1}{2}$ line broad.—Hillslopes, Nevada from Nevada Co. to Kera Co.; intramontane and cismontane from Glenn Co. to Monterey Co.; Sierra to Lower California, east to Nevada and Arizona.

Field note.—The most marked habitat or biotype form of *Cryptantha muricata* var. *Jonesii* is developed in colonies which make open stands. The single stem axis of plants in uncrowded of 3 to 9 spikes. Somewhat later, after the terminal cyme is established, the axis below becomes "feathered" with short branches which bear 1, 2, or 3 spikes. The "feathering" may be light or branched. Such a growth form is characteristic of gravelly hillslope in Lake County, in Yosemite, in the San Gabriel Mountains, and other semi-arid stations.

Locs.—Coast Ranges: Alder Spr. (9 mi. e.), w. Glenn Co., Heller 11,450; Blue Lakes, nw. Lake Co., Jepson 21,698; Cache Creek, n. of Lower Lake, Lake Co., Jepson 18,911; Reiff, Knox-ville Ridge, so. Lake Co., Jepson 18,955; Hood's Peak, e. Sonoma Co., *Biodiotis*; Mt. Tamalpais, Grand 73; Sierra Nevada: Bronco, e. Nevada Co., *Sonoe* 306; Jamesburg, Monterey Co., *H. I. Fol-* Grant 184; South Fork Tuolumne River bridge, A. L. Grant 841; Lettes sta., near Sonoma Pass, A. L. 1045; Hospital Rock, Middle Fork Kaweah River, W. Fry 332; Kernville, Z. Brandegee. Intra- montane and cismontane S. Cal.: Arroyo Creek, San Gabriel Mts., Peirson 2470; Fontana, San Bernardino Valley, Clokey 5818; Cajon Cañon, Jepson 6007; Strawberry Valley, Mt. San Jacinto, Wagon Wash near Sentinel Cañon, e. San Diego Co., Jepson 12,429; Palomar Mt., San Diego Co., Jepson 1505a;

Refs.—*CRYPTANTHA MURICATA* Nels. & Mebr., Bot. Gaz. 61:42 (1916). *Myosotis muricata* Prodr. 10:132 (1846), a renaming (not *Eritrichium muricatum* A. DC., *Eritrichium muricatum* A. DC., *Erythraea muricata* Gray, Proc. Am. Acad. 20:273 (1885). *C. muricata* Greene, Pitt. 1:113 (1887); Jepson, (1905), type loc. Salinas Valley. Var. *CLOKEYI* Jepson, C. *horridula* Greene, Pitt. 2:355 (1939), type loc. Barstow (S. of). Clokey 6359. Var. *JONESII* Jtn., Jour. Arn. Arb. 20:387 (1919). *Erythraea jonesii* Gray, Proc. Am. Acad. 20:274 (1885), type loc. Sobledad, Monterey Co., *Jones*. *C. jonesii* Greene, Pitt. 1:113 (1887); Jepson, Fl. W. Mid. Cal. 445 (1901), ed. 2, 347 (1911). *C. vitrea* Eastw., Proc. Cal. Acad. ser. 3, 2:292 (1902), type loc. Bubba Creek, Fresno Co., *Eastw.* Cal. Acad. 1:205 (1885), type from w. Nev., *Curran*. *C. denticulata* Greene, Bull. C. *muricata* var. *denticulata* Jtn., Contrib. Gray Herb. 74:71 (1925).

6. *C. intermedia* Greene. Stem erect and branching above, or diffusely branched from base, $\frac{1}{2}$ to 1 foot high; herbage hispid with both appressed and spreading hairs; leaf-blades lanceolate or linear, $\frac{1}{2}$ to $1\frac{1}{2}$ inches long, sessile or narrowed to obscure petioles; spikes usually in 2s or 3s, sometimes 4s or 5s, at first dense, soon loose, and 1 to $3\frac{1}{2}$ inches long; calyx-lobes linear, $\frac{3}{4}$ to 1 line long, in villous but set with long scattered spreading bristles; corolla $1\frac{1}{2}$ to $3\frac{1}{4}$ lines broad; and coarsely tuberculate dorsally and also ventrally, the lateral angles obtuse at base.

Sandy or gravelly valley floors or washes or on foothill slopes or rocky cañon bottoms, 200 to 6000 feet: Coast Ranges from western Siskiyou Co. to San Luis Obispo Co.; upper Sacramento Valley; Sierra Nevada foothills from Shasta Co. to Tuolumne Co.; western Mohave Desert; cismontane Southern California. South into Lower California. Apr.-June.

Locs.—Coast Ranges: Scott River Valley, w. Siskiyou Co., Gilbert; Hupa Valley, Jepson 2025; Paakenta, sw. Tehama Co., Jepson 16,311; Stonyford, w. Glenn Co., Jepson 16,291; Bell Cañon, Howell Mt., Napa Range, Jepson 18,861; Sobledad, Monterey Co., *Couglon*; Templeton,

San Luis Obispo Co., *Davy* 7596. Upper Sacramento Valley: Crane Creek, w. Tehama Co., *Jepson* 21,097; Chico (3 mi. n.), *Hoover* 334; Marysville Basin, *Heller* 11,203. Sierra Nevada foothills: Tamarack road at Stalker's, ne. Shasta Co., *M. S. Baker* 341; Willow Springs road sta., *Amador Co., Jepson* 15,226; San Antonio Creek, Calaveras Co., *Davy* 1567; Jacksonville, Tuolumne Co., *Hoover* 1557. Mohave Desert: Barstow, *Jepson* 5515. Cismontane S. Cal.: Santa Barbara, *Jepson* 9152; Ojai Valley, *Fletcher* 39; Signal Valley, s. Ventura Co., *Jepson* 8460; San Fernando, *Jepson* 19,220; Arroyo Seco, San Gabriel Mts., *Peirson* 329; Arrastrite Creek, San Gabriel Mts., *Peirson* 462; San Timoteo Cañon, *Jepson* 6084; San Geronimo Pass, *Jepson* 17,079; Strawberry Valley, Mt. San Jacinto, *Jepson* 2267; Riverside, *Jepson* 1212; Anaheim plain, *Alice King*; Escondido, Riverside Co., *Jepson* 19,156; Aguanga, sv. Riverside Co., *Jepson* 17,159; Coota, Palomar Mt., *Jepson* 1514; Escondido, *C. F. Meyer* 18; San Pasqual Valley, San Diego Co., *Jepson* 19,175; Mesa Grande, San Diego Co., *E. Ferguson* 31; Del Mar, San Diego Co., *Jepson* 1618; La Mesa near San Diego, *Jepson* 6689.

Var. rigida Brand. Corolla minute ($\frac{1}{4}$ to $\frac{1}{2}$ line broad).—San Joaquin Valley and its bordering foothills; southwestern Mohave Desert and bordering ranges.

Locs.—Inner South Coast Range: Tassajara Creek, near Mt. Diablo, *Hoover* 3348; Carral Hollow, Alameda Co., *Hoover* 3041; Tres Pinos (4 mi. s.), *Ferris* 8336; Alcaide, sw. Fresno Co., *T. Brandegee*; McKittrick, Kern Co., *Heller* 7783; White Hills, se. San Luis Obispo Co., *Globy* 5823. San Joaquin Valley: Huron, Fresno Co., *Eastwood*; Tulare, *Davy* 3132; Bakersfield, *Davy* 1875; Pampa sta., Kern Co., *Heller* 7645. Sierra Nevada: Long Barn (ridge above), Tuolumne Co., *Hoover* 2501a (det. R. P. Hoover); Poso Creek, Greenhorn Mts., *C. N. Smith* 62; Bodfish, Kern Co., *Jepson* 19,886. Toiyahapi Mts.: Keene, *Jepson* 7159. Southwestern Mohave Desert and its bordering ranges: Palmdale to Little Rock, *Davy* 2291; Victorville (10 mi. s.), *Munz* 12,435; Bahiwin Lake, San Bernardino Mts., *Fosberg* 10,689.

Var. hendersonii (Piper) Jepson & Hoover comb. n. Calyx-lobes linear, dark green, densely short-hispid and sparsely yellowish short-bristly, the midrib prominent; corolla $1\frac{1}{2}$ to 3 lines tuberculate on a microscopically tessellate ground, or varying to quite smooth (even in the same colony), subattilish on back, the lateral angles obtuse or acute; ventral side convexly 2-planed, the groove closed or open.—Dry slopes or gravelly flats, 2000 to 4500 feet; northern Sierra Nevada (transmontane) from Lassen Co. to Siskiyou Co.; Milford, *T. Brandegee*; Surprise Valley, e. Modoc Co., *Jepson* 7843; Deep Creek, Warner Mts., *L. S. Smith* 1115; Andesite, Siskiyou Co., *Jepson* 20,629. North to Idaho and Washington.

Refs.—*CRYPTANTHA INTERMEDIA* Greene, *Pitt.* 1:114 (1887); *Jepson*, *Man.* 848 (1925). *Eriogonum intermedium* Gray, *Proc. Am. Acad.* 17:225 (1882), type loc. Los Angeles, *Yerxa*. *Argyrotekia intermedia* Gray, *Lc.* 20:273 (1885). *C. intermedia* var. *johnstonii* Mohr., *Contrib. Gray Herb.* 56:59 (1918), type loc. Claremont, Los Angeles Co., *Johnston* 1938. (†) *C. hansenii* Brand; *Pedde*, *Repert. Sp.* Nov. 24:58 (1927), type loc. Bascheria, *Amador Co., Hansen* 1728 (referred here by I. M. Johnston). *C. hansenii* var. *psicbella* Brand, *Lc.* type loc. Drytown, *Amador Co., Hansen* 1581. *Var. azuza* Brand; *Engelm.*, *Pfr.* 498:79 (1931). *C. nevadensis* var. *rigida* Jtn., *Contrib. Gray Herb.* 74:68 (1925), type loc. "hills bordering Mohave Desert," *Pringle*. *Var. HENDERSONII* Jepson & Hoover. *C. hendersonii* Piper; *J. C. Nelson*, *Torrey* 20:44 (1920). *Alcornoque hendersonii* A. Nelson, *Erythra* 7:49 (1899), type loc. Potlatch River, Ida., *Henderson*. *C. grisea* Greene, *Pitt.* 5:53 (1902), type loc. Shasta Co., *Baker & Nutting*.

7. *C. barbiger* Greene. Stem freely branched from base, $\frac{1}{2}$ to $1\frac{1}{2}$ feet high; herbage hispid and hirsute; leaves oblong-linear to linear, $\frac{1}{2}$ to $1\frac{1}{2}$ inches long; spikes mostly rather dense, solitary or paniculate, becoming elongated (1 to 5 inches long), the flowers sometimes (at length) remote and less secund; calyx-lobes linear-attenuate, spreading at apex, densely armed (especially below) with long spreading bristles and also bearing on lower part a conspicuous white tuft of long-villous hairs; calyx in fruit 3 to 5 lines long; corolla $\frac{1}{2}$ to 1 line broad; nutlets 4, 3 or 2, ovate, shortly acuminate, 1 line long, grayish-brown, mostly low-rounded dorsally, mostly convexly 2-planed ventrally, densely muriculate-tuberculate, the ventral groove forked at base.

Sandy soil of washes, cañon bottoms and mesas, 500 to 4000 (or 7400) feet; Inyo Co.; eastern Mohave Desert; Colorado Desert. South into Lower California, east to Arizona and Utah. Mar.-Apr.

Note on type locality.—"Santa Barbara Co.," as the locality first cited by Asa Gray (*Syn. Fl.* 2:124) in the original description of this species, appears to be erroneous. There are no stations known to us in Santa Barbara County. No specimens of this species in the Gray Herbarium from Santa Barbara County. The specimen on which the original citation rested (doubtless *Brewer*, cf. *Bot. Cal.* 2:469) is probably now referred elsewhere. In any event this matter is now resolved, since I. M. Johnston (*Contrib. Gray Herb.* 74:66) has selected "Utah, Parry 171," as the type.

Locs.—Inyo Co.: Silver Cañon, White Mts., Heller 8270; Quail Spr., left-hand fork of Johnson Cañon, Panamint Range, Jepson 19,745; Mohave Desert: Mitchell Caverns, Providence Mts., Jepson 18,220; Willow Spgs. (over below), Old Dad Mts., Jepson 20,297; Kelso (5½ mi. ne.), Conehilla Range, Paradise Mts. (4½ mi. ne.), Jepson 20,331. Colorado Desert: Bordo Cañon, Yesidro, Jepson 8805; Yaqul Well, e. San Diego Co., Jepson 11,654; Palm Cañon of San Diego Co., Jepson 8647; Vallecito, e. San Diego Co., Jepson 17,115; Box Cañon, Blair Valley, e. Imperial Co., Jepson 11,779.

Var. *fergussonae* Mehr. Corolla 3 to 3¼ lines broad.—Palm Springs of Mt. San Jacinto, north-west Colorado Desert.

Refs.—*CRYPTANTHIA BARBEREA* Greene, Pitt. 1:114 (1887); Jepson, Man. 849 (1925). *Eri-trichium barbigerum* Gray, Syn. Fl. 2:194 (1878), "8, California from Santa Barbara Co. to S. Utah and Arizona, Parry, Falsner, Smart, Rothrock." *Erythraea barbigerum* Gray, Proc. Am. Acad. 20:273 (1885), "only from the a. parts of Cal. and the adjacent w. part of Ariz." Var. *FERGUSSONAE* Mehr., Contrib. Gray Herb. 56:59 (1918), type loc. Palm Springs (of San Jacinto); *Margaret C. Ferguson* det. *C. fergusonae* Brand; Fedde, Repert. Sp. Nov. 24:58 (1927).

8. *C. nevadensis* Nels. & Ken. Stems slender, flexuous or weak, branching, sometimes diffuse, 5 to 12 inches high; herbage appressed-hispid; flowers as if sub-capitulate glomerate on the ends of the branches, or the inflorescence sometimes becoming spicate and ½ to 1 inch long; calyx-lobes linear-filiform, densely short-silky on the inside and margins, the back glabrous or comparatively glabrous save calyx in fruit 3 to 4½ lines long; nutlets narrowly lanceolate-attenuate or narrowly tuberculate, the angles rounded or obtuse; ventral side convexly 2-planed, the groove forked at base, partially open, or closed.

Sandy flats, mesas and cañon bottoms, often supported by desert bushes, 800 to 4000 feet: Inyo Co.; eastern Mohave Desert; Colorado Desert. South into Lower California, east to Arizona, Nevada and Utah. Mar.-Apr.

Locs.—Inyo Co.: Black Cañon, White Mts., Duran 571; Hole-in-the-Rock Spr., Daylight Pass, Panamint Range, Jepson 6962; Johnson Cañon, Panamint Range, Jepson 19,562; Hannupah Cañon, Panamint Range, Mohave Desert: Avawats Mts., Jepson 17,321; Paradise Spgs., Allisoas Jepson 17,360; Calico Mts., Jepson 5407; Barstow, Jepson 5393; Newberry (lava sv.), Nevada 507a; Kelso, Jepson 20,571; Amboy Crater, Jepson 20,512. Colorado Desert: Deep Cañon, Santa Rosa Mts., Clary 1649; Vallecito, e. San Diego Co., Jepson 8347.

Refs.—*CRYPTANTHIA NEVADENSIS* Nels. & Ken., Proc. Biol. Soc. Wash. 19:157 (1906). *Kryptanthia barbigerum* var. *graysi* T. Bodge, Zool. 5:228 (1906), type loc. Mohave Desert, T. *Brodavogae*, *C. arvensis* Hal., Muhl. 2:243 (1906), type loc. Laws (3 mi. w.), Inyo Co., Heller 8203 (not "8203"). *C. barbigerum* var. *graysi* Mehr., Proc. Am. Acad. 51:548 (1916); Jepson, Man. 849 (1925).

9. *C. dumetorum* Greene. Stem branching from the base, diffuse, 5 to 13 inches high, thinly appressed-hispid; leaf-blades linear-lanceolate to ovate, ½ to 1½ inches long, loosely hispid and conspicuously white-pustulate; spikes in 2s and 4s, at length loose, ½ to 4 inches long; calyx-lobes linear to narrow-lanceolate, warty-corrugated, the spreading or deflexed bristles arising from the warts; corolla ½ line broad; style about equaling nutlets; nutlets 4, narrow-lanceolate, 1 large and 3 (or 2 or 1) small, all thickly muriculate dorsally and ventrally, the angles obtuse, the ventral groove closed in the small nutlets, not forked but small-areolate at base; ventral groove in large nutlet broad, nearly covering ventral face; fruiting calyxes appressed to rachis, 1¼ to 1½ lines long.

Desert flats or slopes of desert ranges, 1000 to 3500 feet: Conehilla Desert; western and central Mohave Desert. East to Nevada. Apr.-May.

Ecol. note.—*Cryptantha dumetorum*, usually an inhabitant of desert plains, is most commonly found growing under the protection of desert shrubs. The stems grow up through the shrub, flexuously spreading or reclining amongst its branches; they are weak and brittle and can be disengaged from the supporting twigs only with some difficulty.

The calyx is fleshy; its lobes, tending to be involute-teretish, are 4; the upper one (next the axis) is broad and cleft at apex, the 3 lower are narrow and entire. The 4 nutlets are equal or

subequal at apex, but the large nutlet (next the axis) is inserted lower on the gynobase than the other three. It is sometimes smooth dorsally on lower part and its groove is always open, not only open but widely gaping, sometimes so wide as to cover almost wholly the breadth of the ventral face of the nutlet.

Locs.—Conechilla Desert: Whitewater sta., Jones. Mohave Desert: Lancaster, K. Brandegee; Kramer, Parish 9810; Randsburg, K. Brandegee; Barstow, K. Brandegee; Willow Spr. (cove below), Old Dad Mts., Jepson 20,393; Kelso sand dunes, Jepson 20,550.

Refs.—*CRYPTANTHIA MICROMERIS* Greene, Pfl. 1:112 (1887). *Kryzitzkia dumetorum* Greene; Gray, Proc. Am. Acad. 20:372 (1885), type loc. "Tehachapi Pass," Carron, that is, according to the collector, somewhere between "Tehachapi Pass" (the lower pass, in which Cameron sta. is situated) and Mohave sta. *C. intermedia* var. *dumetorum* Jepson, Man. 849 (1925).

10. *C. angustifolia* Greene. Stem erect or diffusely branched from or near the base, 2 to 8 inches high; herbage densely hispid with white hairs, the hairs commonly pustulate at base; leaf-blades narrowly linear, 3 to 12 lines long; flowers usually densely 2-ranked, the spikes $\frac{1}{2}$ to 2 (or $3\frac{1}{2}$) inches long, cymose-paniculate at ends of branches; calyx-lobes filiform or linear, densely short-villous with spreading hairs and with many spreading bristles, the bristles often yellowish and nearly as long as the calyx-lobes or sometimes longer; corolla minute ($\frac{1}{2}$ line broad); nutlets 4, ovate to lanceolate, $\frac{1}{2}$ line long, 1 nutlet large and 3 (or 2) small or 2 large and 2 small, the back minutely and thickly papillate, the ventral groove (often open) usually widened downward into a triangular areola at base, the lateral angles rounded or sharply defined.

Brushy flats, sandy plains, washes or playas, -10 to 3500 feet: Inyo Co.; eastern Mohave Desert; Colorado Desert. East to Utah and western Texas, south to Mexico. Mar-May.

Locs.—Layo Cr., Argus Range (n. end), Jepson 19,567; Emigrant Wash, Death Valley, Jepson 19,571. Mohave Desert: betw. Inyokers and Trona, C. N. Smith 70; Seaville Lake, Jepson 7148; Tiofort Mt., Jepson 17,262; Barstow, Jepson 5386; Yermo, Jepson 15,806; Twenty-nine Palms, T. Brandegee; Lavin, Jepson 15,468; Kelso sand dunes, Jepson 20,547; Summit road sta., Marble Mts. (s. end), Jepson 18,152; Danby, Jepson 18,371; Essex, Jepson 18,156; Needles, Jepson 5482. Colorado Desert: Palo Verde Valley, Scheffinger 17; Painted Cañon, Mecca Hills, Jepson 11,636; County Well, Conechilla Mts., n. of Indio, Jepson 6026; betw. Indio and Fargo Cañon, Clery 2067; Palm Sprs. of San Jacinto, Jepson 6062; Bailey Well, w. Imperial Co., Jepson 17,066; San Felipe Narrows, ne. San Diego Co., Jepson 12,540; Calexico, Dury 7955; Ft. Yuma, Jepson 11,738.

Refs.—*CRYPTANTHIA ANGUSTIFOLIA* Greene, Pfl. 1:112 (1887); Jepson, Man. 847 (1925). *Eritrichium angustifolium* Torr., Pac. R. Rep. 5:363 (1807), "not rare in Cal.," more specifically Ft. Yuma, Thomas (cf. Contrib. Gray Herb. 74:39). *Kryzitzkia angustifolia* Gray, Proc. Am. Acad. 20:372 (1885).

11. *C. micromeres* Greene. Stem rather widely branched at or above the base, 4 to 14 inches high, the branches very slender; herbage rough-hispid almost throughout with spreading dull-colored hairs; leaf-blades oblong to linear, $\frac{1}{4}$ to 1 inch long; spikes geminate to quinately, terminal or subterminal, bractless, not dense, 2 to 4 inches long; calyx $\frac{1}{2}$ line long, its linear or lanceolate lobes armed with uncinately bristles as long as the calyx; corolla minute ($\frac{1}{2}$ line broad); nutlets 4 (or 3), triangular-ovate, acute, 3 (or 2) smaller, minutely white-muriculate on a light-brown ground, $\frac{1}{2}$ line long, the fourth or odd nutlet dark brown and smooth or mainly so, $1\frac{1}{4}$ to $1\frac{1}{2}$ times larger than the small ones; ventral groove open below middle and forked at base.

Sandy soil of hillslopes, rocky hilltops and mesas, frequent on chaparral "burns," 10 to 1000 feet: Sierra Nevada foothills from Amador Co. to Mariposa Co.; Coast Ranges (mainly the outer ranges) from Marin Co. to Monterey Co.; coastal Southern California from Santa Barbara Co. to San Diego Co. South to northern Lower California. Apr-May.

Locs.—Sierra Nevada foothills: Drytown, Amador Co., Hansen 428; Gein Mine, Calaveras Co., Jepson 1766; Coulterville (5 mi. w.), Mariposa Co., Hoover 3419. Coast Ranges: Mt. Tamalpais, K. Brandegee; Berkeley Hills, Tracy 2674; Mt. Diablo, Bowersman 1901; Soquel Cañon, Santa Cruz Mts., Jepson 21,125; Pajaro Hills, sw. Monterey Co., Chandler 439; Del Monte, Mon-

terey Co., *Heller 6698*; Pt. Sur, Monterey coast, *K. Brandegee*. Coastal S. Cal.; San Marcos Pass, Santa Ynez Mts., *Jepson 20,290*; Santa Cruz Isl., *Margaret Stason*; Santa Catalina Isl., *T. Brandegee*; La Jolla, *Clements 159*; Ft. Loma, San Diego, *T. Brandegee 1622*.

Refs.—*CRYPTANTHIA MICROMERES* Greene, *Phil.* 1:113 (1887); *Jepson*, *Fl. W. Mid. Cal.* 445 (1901), ed. 2, 347 (1911), *Man.* 848 (1925); *Erythraea micromeres* Gray, *Proc. Am. Acad. 19-30* (1883), type loc. Santa Cruz, *Jones*. *Krynitzkia micromeres* Gray, *l.c.* 20:274 (1885).

12. *C. crinita* Greene. Stem rather strictly branched from near base, 7 to 12 inches high; herbage hirsute, the bases of the hairs on the leaves pustulate-discoid; leaf-blades linear, $\frac{1}{2}$ to 1 inch long; spikes borne on very slender peduncles, very dense and densely woolly, the calyx-lobes so shaggy-hirsute as almost to conceal the individual flowers; flowers spreading, borne on pedicels $\frac{1}{2}$ to 1 line long; calyx-segments linear, obtuse, in fruit $2\frac{1}{4}$ to 3 lines long; corolla $1\frac{1}{2}$ to 2 lines broad; nutlet 1, broadly ovate, rostrate, $1\frac{1}{2}$ lines long, the low rounded back with a few scattered tubercles on a microscopically papillate-tessellate ground.

Gravelly creek bottoms, 450 to 550 feet: head of the Sacramento Valley in Shasta Co. Apr.-May.

Geog. note.—A remarkable species, both in aspect and technical character, *Cryptantha crinita* inhabiting an area perhaps not exceeding five by ten miles as at present known. Three stations are here cited: Stillwater Creek at Leighton, *M. S. Baker*; Salmon Creek bridge, 5 mi. e. of Redding, *Hoover 2280*; Cow Creek.

Refs.—*CRYPTANTHIA CRINITA* Greene, *Erythraea* 3:66 (1895), type loc. Cow Creek, Shasta Co., *M. S. Baker*; *Jepson*, *Man.* 849 (1925).

13. *C. decipiens* Hel. Stems several from the base, erect or ascending, slender, 4 to 12 inches high; herbage strigose or ascending-hispid; leaf-blades linear, $\frac{1}{2}$ to 1 inch long; spikes ternate, very slender, slightly flexuous, in fruit somewhat loose or the calyces at least discrete; calyx-lobes linear-filiform, ascending-hirsute and hispidulose, the 3 outer armed on lower part with a dense tuft of deflexed or horizontally spreading bristles, the 2 inner densely hirsute at base with erect hairs; corolla minute ($\frac{1}{4}$ line broad); fruiting calyx 2 lines long, the tips of the lobes dotted, or finely tuberculate and short-rugulose, the lateral angles obtuse, sometimes acutish.

Desert flats, sandy mesas and arid valleys, 500 to 4500 feet; southern Sierra Nevada in Kern Co.; Inyo Co.; Mohave and Colorado deserts. East to Nevada and Arizona. Mar.-May.

Locs.—Kern Co.: Kernville, *T. Brandegee*. Inyo Co.: Johnson Cañon, Panamint Range, *Spra.* (cove below), Old Dad Mts., *Jepson 20,294*; Paradise Mts. ($4\frac{1}{2}$ mi. n.e.), *Jepson 20,330*, Colorado Desert; Whitewater River, *Jones*; Andrews Cañon, San Jacinto Mts., *Pirion 2368a*; Palm Cañon of San Ysidro, *Jepson 8307*; Blair Valley, e. San Diego Co., *Jepson 8687*; Coyote Wells (s.), Imperial Co., *Jepson 11,758*.

Var. *corollata* Jtn. Stems generally taller (6 to 18 inches high); herbage spreading-bristly; corolla 1 to 2 lines broad.—South Coast Ranges, towards the interior from Contra Costa Co. to Inyo Co., *Hoover 3364*; San Miguelito Rancho, Jolon, Monterey Co., *Jepson 1642*; Alameda, *sw. dege*; Tehachapi Mts. (Pt. Tejon), *Contrib. Gray Herb.* 74:61, and south to Santa Barbara Co. (Hobbs Cañon, San Rafael Mts., *Hall*) and Ventura Co. (Ojai Valley).

W. Bot. 13:6 (1910), type loc. Tucca, Ariz., *Jones*. Var. *corollata* Jtn., *Contrib. Gray Herb.* 74:61 (1925), type loc. Ojai Valley, Ventura Co., *Hobby 21*. *C. corollata* Jtn., *Journ. Arn. Arb.* 18:24 (1937).

14. *C. utahensis* Greene. Stem branched from base, the branches erect or with decumbent base, 6 to 19 inches high; herbage ascending-hispid; leaf-blades linear, $\frac{1}{4}$ to $2\frac{1}{4}$ inches long; spikes very short and dense ($\frac{1}{4}$ to $\frac{1}{2}$ inch long), glomerate in 2s and 3s or paniculate; calyx-lobes linear-lanceolate to oblong-lanceolate,

densely silky-hirsute with ascending hairs, not bristly or the few short slender bristles also ascending; corolla 1 to $1\frac{1}{2}$ lines broad; nutlets solitary, sometimes 2, adhering closely to the gynobase, ovate-acuminate or lanceolate, $1\frac{1}{4}$ lines long, finely muriculate on the flattish or curved back, convexly 2-planed ventrally, the angles acute or linearly white-margined, the ventral groove gradually widening toward the base or nearly closed; areola open, broadly forked; fruiting calyces spreading horizontally, equaling or only slightly exceeding the nutlet.

Desert washes or brushy rocky slopes, 500 to 5000 feet: Inyo Co., Mohave and Colorado Deserts. East to southern Utah. Apr.-May.

Locs.—Inyo Co.: Black Cañon, White Mts., Dumas 572; Alabama Hills near Lone Pine, Kenner 60n; Santa Rosa Wash, pass betw. Inyo Mts. and Coso Mts., Jepson 19,535; Darwin Wash, near Keystone Mine, Kenner 28; Argus Range (n. end), Jepson 19,561; Hole-in-the-Rock Spr., Daylight Pass, Grapevine Mts., Jepson 19,807; Hannupah Cañon, Panamint Range, Jepson 6086; Johnsons Cañon, Panamint Range, Jepson 19,514. Mohave Desert; Domingos ranch (near), Providence Mts., Jepson 18,577; Granite Mts. (s. of Avawatz Mts.), Jepson 17,294; Ord Mts., Jepson 5891. Colorado Desert; Cottonwood Spr., w. side Eagle Mts., Jepson 12,550; Palm Spr. of San Jacinto, Wilder 870; Ebbens Wash, Santa Rosa Mts., Gray 2073.

Refs.—*CRYPTANTHIA STAKEENSIS* Greene, Pitt. 1:120 (1847); Jepson, Man. 849 (1925). *Argemone stakeana* Gray, Syn. Fl. 2:427 (1856), type loc. St. George, Utah, Palmer. *Eritrichium holopterum* var. *submolle* Gray, Proc. Am. Acad. 13:374 (1878), type loc. St. George, Utah, Palmer. *C. submolle* Cov., Contrib. U. S. Nat. Herb. 4:166 (1893).

15. **C. excavata** Bdg. Stem branching above the base, 5 to 9 inches high, the branches long and slender; herbage ascending-hispid, the hairs on the leaves with pustulate bases; leaf-blades linear, 3 to 9 lines long; spikes in 2s and 3s, becoming elongated and 1 to 4 inches long, the flowers rather remote; calyx-lobes linear, soft-hairy, furnished with a few slender short bristles, the tips of the lobes spreading; corolla 1 to $1\frac{1}{2}$ lines broad; nutlet 1, borne horizontally, strongly obcompressed and keeled dorsally, ovate-acuminate in side view, obscurely tuberculate on a microscopically papillate-tessellate ground, the ventral groove opening below into a large triangular areola, the areola deeply excavate; fruiting calyx $1\frac{1}{4}$ lines long, as broad as long.

Sandy banks in the hills, 300 to 1000 feet: inner North Coast Range from Yolo Co. to Colusa Co. Apr.-May.

Geog. note.—A species characterized by very remarkable nutlets, both as to structure and as to position in the calyx, *Cryptantha excavata* is an extremely narrow endemic with a longitudinal range of about twenty-nine miles. Detailed knowledge of its localized occurrence is almost wholly lacking and only three stations are here cited: Cache Creek Cañon, w. Yolo Co., C. F. Baker 2886; e. Lake Co., K. Brandegee; Sites, w. Colusa Co. The single nutlet is set horizontally in the calyx with the beak pointing outward from the axis and protruding between the two outer calyx-lobes.

Refs.—*CRYPTANTHIA EXCAVATA* T. Bdg., Bot. Gaz. 27:452 (1899), type loc. Sites, Colusa Co., K. Brandegee. *C. abortiva* Greene; Baker, West. Am. Fls. 2:16 (1903), Cache Creek Cañon, w. Yolo Co., C. F. Baker 2886, nomen nudum.

16. **C. recurvata** Cov. Stem slender, more or less branched from base, 2 or 3 to 9 inches high, appressed-hispid; leaves with somewhat spreading hairs, the blades linear-oblancoate, $\frac{1}{4}$ to $\frac{3}{4}$ inch long; spikes in 2s or 3s, bractless, becoming loose; calyx spreading, in fruit a little recurved, 1 to $1\frac{1}{2}$ lines long, the lower half densely bristly with stiff divergent hairs; calyx-lobes linear; corolla minute ($\frac{1}{2}$ line broad), scarcely exerted; nutlet 1, ovate-lanceolate, very finely papillate, rounded on the angles, slightly incurved at apex, carinate, $\frac{3}{4}$ line long, its pericarp fragile.

Sandy soil in cañons of desert ranges, 3000 to 5000 feet: Inyo Co. East to Utah, north to eastern Oregon. Apr.-May.

Locs.—Panamint Range; Coldwater Cañon near Laws, K. Brandegee; Silver Cañon, White Mts., Heller 8221.

Refs.—*CRYPTANTHIA RECURVATA* Cov., Contrib. U. S. Nat. Herb. 4:165, t. 16 (1893), type loc. Surprise Cañon, Panamint Range, Coville & Funston 713; Jepson, Man. 847 (1925).

17. **C. racemosa** Greene. Stem profusely branched throughout, $\frac{1}{2}$ to 1 or 2 feet high, the ultimate branchlets almost filiform, the main stem and larger branches

woody; branches and leaves appressed-hispid and spreading-bristly, or the branches sometimes not bristly; leaf-blades linear, acuminate, $\frac{1}{2}$ to 1 inch long; inflorescence loosely racemose-paniculate, the flowers on spreading pedicels, the pedicels $\frac{1}{2}$ to 1 bristly and appressed-hispid; corolla 1 line broad, constricted at throat; spreading-ovate-lanceolate, unequal, 1 larger (though sometimes abortive), 3 smaller and white-dotted with tubercles and bordered by a narrow or white-linear margin, the ventral groove open below the middle and gradually widening to base.

Gravelly washes, sandy plains or rocky walls of desert cañons, 100 to 4000 feet; Inyo Co.; Colorado Desert. South to Lower California, east to western Arizona and Nevada. Apr.-June.

Field note.—*Cryptantha racemosa* is coarsely woody at base. It forms a diminutive bush in laterals, fully as closely and densely intertwined as those of *Eriogonum heermanni*. Sometimes this species is biennial but in California more frequently perennial. And by perennial is meant that the individual produces flowers in more than one season, a fact determinable by one who studies much the desert cañons. In its most extreme or well-developed form, *Cryptantha racemosa* is a depressed globose plant which in aspect has a marked resemblance to some species of *Galium*, branches are armed with small bristles which to the skin of the botanical explorer are penetrating and painful, suggesting the minute spicules of casti.

Locs.—Inyo Co.: Inyo, T. Brandegee; Argus Range (n. end), Jepson 19,563; Titus Cañon, Jepson 7133; Johnson Cañon, Panamint Range, Jepson 6911; Surprise Cañon, Panamint Range, Parish 3337; betw. Pilsen Well and County Well, n. of Indio, Jepson 6013; Painted Cañon, Mecca Hills, Jepson 11,676; Cottonwood Spr., Eagle Mts., Jepson 12,580; Borrego Sprs., e. San Diego Diego Co., T. Brandegee; San Felipe Narrows, e. San Diego Co., Jepson 12,523; Devils Cañon, e. San Diego Co., C. F. Meyer 421; Myers Creek bridge, w. Imperial Co., Jepson 11,797.

Refs.—*CRYPTANTHA RACEMOSA* Greene, Phil. L. 115 (1887); Jepson, Man. 847 (1925). *Eriogonum racemosa* Wats., Gray, Proc. Am. Acad. 17: 226 (1882), type loc. Mesquite Cañon, above also cited but did not go on this trip see. S. B. Parish. *Cryptantha racemosa* Greene, Bull. Cal. Johnstonella racemosa Brand; Fodge, Report, Sp. Nov. 21: 249 (1925). *C. racemosa* var. *lignosa* Jtn., Univ. Cal. Publ. Bot. 7: 445 (1925), type loc. Panamint Cañon, Inyo Co., Hall & Chandler 7034. *Johnstonella racemosa* var. *lignosa* Brand, Lc. *C. suffruticosa* Piper, Proc. Biol. Soc. Wash. 33: 45 (1919), type loc. Camp Muchacho, Colorado Desert, Orcutt 2070.

18. *C. costata* Bdg. Stems many from the base, freely branched, conspicuously leafy and densely white-hirsute when young, forming a roundish or bushy plant 3 to 10 inches high; herbage gray, appressed-hispid and with scattered spreading bristles; leaf-blades narrowly lanceolate-attenuate or coarsely filiform, $\frac{1}{2}$ to 3 inches long, often surpassing the spikes; spikes dense, bracteate towards base, $\frac{1}{2}$ to 1 inch long or reduced and head-like; flowers minute, the bracts and sepals closely beset with long rigid white or yellowish bristles with softer shorter hairs between; calyx-lobes narrowly linear-lanceolate, sparsely set with long spreading bristles and thinly short-hirsute; corolla $\frac{1}{2}$ to 1 line broad; nutlets 4, light-brown, oblong-lanceolate, the back rounded and obscurely and very minutely papillate but lute so as to make on the smooth ventral side a shallow hollow on each side of the ventral groove; groove dilated from the middle downward.

Gravelly hillslopes and benches and in sand dunes, -250 to 1200 feet; Inyo Co.; eastern Mohave Desert; Colorado Desert. East to Arizona. Feb.-May.

Locs.—Inyo Co.: FURBER Creek ranch, Death Valley, J. Griseb. Mohave Desert; Basso, Mohave River sink, Jepson 6869; Needles, Colorado Desert; Blythe Jet, Muns & Harwood 2387; betw. Scaview and Salton Sea, Gray 2066; Mecca (sandhills n.), Parish 8465; Borrego Sprs.

Refs.—*CRYPTANTHA COSTATA* Bdg., Bot. Gaz. 27: 453 (1899), type loc. Borrego Sprs., w. 48: 46 (1916), type loc. Needles, Jones 3841. *C. scabra* Mcbr., Contrib. Gray Herb.

19. *C. saxorum* Jepson sp. n. Stem widely branching from the base, $1\frac{1}{2}$ to $2\frac{1}{2}$ inches high, forming small plants 2 to 4 inches broad; herbage spreading-hispid, the hairs of the leaves pustulate-dilated at base; leaves lanceolate, sessile, 4 to 12 lines long; spikes short and dense (4 to 9 lines long), conspicuously bracteate; calyx short-bristly, densely tufted with white hairs at base; corolla $\frac{1}{2}$ line wide; nutlets 4, equal, ovate, light brown, thinly papillate both sides, the marginal wing very narrow or lineate; dorsal side of nutlets low-rounded, the ventral side low but convexly 2-planed; ventral groove closed, with forked areola at base; style $\frac{1}{4}$ longer than nutlets.—(*Planta pygmaea*, $1\frac{1}{2}$ – $2\frac{1}{2}$ unc. alta, 2–4 unc. lata, e basi late diffusa; herba patenti-hispida, foliorum pilis basi pustulato-dilatatis; folia lanceolata sessilia, 4–12 lin. longa; racemi breves (4–9 lin.), densi, valde bracteati; calyx setis brevibus praeditus, basi pilis albis dense caespitosus; corolla $\frac{1}{4}$ lin. lata; nuculae 4, aequae, ovatae, pallido-fulvae, utrimque sparsopapillatae, ala marginali perangusta vel lineata; dorsum nuculae depresso-rotundatum, venter depressus tamen convexo-biplanatus; sulcus ventralis ocellus, basi areola furcata; stylus $\frac{1}{4}$ longior nuculis.)

Lava hills, 3000 feet: near Tiefort Mt., eastern Mohave Desert. Apr.

Ref.—*CRYPTANTHA SAXORUM* Jepson: type loc. lava hill 1 mile sw. of Bicycle Lake, near Tiefort Mt., Mohave Desert, Jepson 20,950 (yp. in Herbario Jepseniano).

20. *C. inaequata* Jtn. Stem erect, branching from the base or above, 5 to 12 inches high; herbage spreading-bristly, the bristles pustulate-dilated at base; leaf-blades narrowly linear or linear-oblancoate, very dark green, $\frac{1}{2}$ to $1\frac{1}{4}$ inches long; spikes soon somewhat loose, $\frac{1}{4}$ to $1\frac{1}{2}$ inches long; calyx-lobes linear-filiform, short-villous and sparsely long-bristly; corolla $\frac{1}{2}$ to $1\frac{1}{2}$ lines broad; nutlets 4, ovate (the apex obtusish), 1 large and not evidently margined, 3 slightly smaller and with a narrow whitish margin, conspicuously sprinkled on back with whitish papillae on a brown ground, the ventral side convexly 2-planed, the ventral suture opening downward into an open forked areola; style $\frac{1}{4}$ longer than nutlets.

Rich soil pockets in cañon bottoms of rocky desert ranges or lava flats, 200 to 4000 feet: eastern Mohave Desert; eastern Inyo Co. East to Nevada. Apr.

Geog. note.—*Cryptantha inaequata* represents a case of an adequate but long unrecognized species which masqueraded, so to speak, in the shadow of *C. holoptera*. Its nutlets, too, save for the linear margin, resemble closely the smaller nutlets of the four in *Cryptantha angustifolia*. *Cryptantha inaequata* has, however, the advantage of differentiating characters other than those of the nutlet. That it escaped critical notice previous to 1922 is due, doubtless in part, to its rarity. Even to this time few collections have been made.—Eastern Mohave Desert: Lavin, Jepson 15,456; Baxter, Paria 9859. Inyo Co.: Argus Range (n. end), Jepson 19,551; Furnace Creek wash, Funeral Mts., Jepson 6936.

Refs.—*CRYPTANTHA INAEQUATA* Jtn., Univ. Cal. Publ. Bot. 7:444 (1922), type loc. Pleasant Cañon, Paramount Range, Inyo Co., Hall & Chandler 6925. *Johnstonella inaequata* Brand; Fedde, Report. Sp. Nov. 21:250 (1925).

21. *C. holoptera* Mebr. Stem erect, branching, $\frac{1}{2}$ to $1\frac{1}{2}$ feet high; herbage grayish, the leaves and stems spreading-bristly, the stems also appressed-hispid; leaf-blades oblong to linear or lanceolate, $\frac{1}{2}$ to $1\frac{1}{2}$ inches long, thickly white-dotted with pustules at the base of the bristles; spikes with minute scattered bracts, openly paniculate, $\frac{1}{2}$ to $1\frac{1}{2}$ inches long, the flowers at length discrete; calyx-lobes lanceolate, $\frac{3}{4}$ (in fruit $1\frac{1}{4}$) lines long, thickly set with short ascending bristles; corolla $1\frac{1}{4}$ lines wide; nutlets 4, equal, truncate at base, $\frac{3}{4}$ line long, white-papillate upon a brownish ground and wing-margined, the wing entire and slightly turned outward, same color as body and $\frac{1}{4}$ to $\frac{1}{3}$ as wide as the body; dorsal side of the nutlets a little flattish, the ventral side convexly 2-planed, the ventral groove widened downwards from about the middle.

Gravelly or rocky ground, 50 to 3500 feet: eastern Mohave Desert; Colorado Desert. East to Arizona. Apr.

Locs.—Mohave Desert: The Caves, Mohave River sink, Paria 9855. Colorado Desert: Four-S ranch, 25 mi. ne. of Ogilby, Mans & Hitchcock 12,173; Painted Cañon, Mecca Hills, Jepson 11,678; Split Mt. (near Fish Mt.), T. Brandegee; Calixico, Dwy 8007.

Refs.—*CRYPTANTHA HOLOPTERA* Mch. Contrib. Gray Herb. 48:44 (1916); Jepson, Man. 848 (1925). *Eritrichium holopterum* Gray, Proc. Am. Acad. 12:81 (1876); type loc. Karaburg, Pitt. 1:58 (1887).

22. *C. pterocarya* Greene. Stem slender and loosely branched or diffusely much branched from base, 5 to 9 inches high, rather densely leafy at base, less leafy above; herbage hispid with appressed or spreading hairs; leaf-blades linear, $\frac{1}{2}$ to 1 inch long, the basal ones conspicuously tessellate-pustulate; spikes in 2s or 3s, short ($\frac{1}{4}$ to $\frac{1}{2}$ or rarely $\frac{3}{4}$ inch long), bractless, at first glomerate; calyx-lobes linear, in fruit becoming ovate, densely or thinly soft-hairy and somewhat yellowish, sometimes with a few bristles; corolla $\frac{3}{4}$ to $\frac{1}{2}$ line broad; fruiting calyx 1 to 2 lines long, the nutlet wings protruded between the lobes so as to give an angular wing-margined, the wings white-chartaceous, as broad as body or somewhat broader, crenate or fimbriate-toothed, especially towards apex (or 1 nutlet wingless and of a different color).

Gravelly slopes of cañons and dry desert mesas, wholly transmontane, 200 to 5700 feet; Colorado and Mohave deserts; southern Sierra Nevada in Kern Co.; Inyo and Lassen Cos. East to Texas, north to Washington. Apr.-June.

Locs.—Colorado Desert: Myers Creek bridge, sw. Imperial Co., Jepson 11,785; San Felipe Mts., Jepson 12,564. Mohave Desert: Chuckwalla Bench, Schellenger; Cottonwood Spr., Eagle Eyes, Jepson 18,158a; Hole-in-the-Wall, Providence Mts., Barnwell, New York Mts., Jepson 5472; below; Old Dad Mts., Jepson 20,404; Newberry (lava sw.), Needles 509; Old Mt., Jepson 15,487; Barstow, Jepson 20,362; Kramer, Jepson 17,305; Paradise Mts. ($\frac{1}{2}$ mi. nr.), Jepson 20,326; 477; Red Rock Cañon, e. end El Paso Mts., Johnson Kramer, Southern Sierra Nevada in Kern Co.; Kernville, T. Brandegee. Inyo Co.: Johnson Cañon, Panamint Range, Jepson 19,601; tensin! Flat, Jenner 29; Hole-in-the-Rock Spr., Daylight Pass, Grapevine Mts., Jepson 19,809; T. Brandegee.

Refs.—*CRYPTANTHA PTEROCARYA* Greene, Pitt. 1:120 (1887); Jepson, Man. 849 (1925). *Eritrichium pterocaryum* Turb. Bot. Mex. Bound. 142 (1859).—In this work Turvey is for the first time publishing the name, *Eritrichium pterocaryum*, not as originally new in this publication, but new as derived from a manuscript later issued as his Phanerogamia of the Pacific Coast, Wilkes Exped. 415, pl. 15 (1874), this name being first based on a collection made at Walls Walla, Wash. (Pickering & Breckinridge), which locality may, therefore, be regarded as the type locality. *Eritrichium pterocaryum* Gray, Proc. Am. Acad. 12:81 (1876), type loc. e. Utah, Purdy. *Eritrichium pterocaryum* var. *pectinatum* Gray, l. c. 10:61 (1874), type loc. e. Utah, Purdy. *Eritrichium pterocaryum* var. *pectinatum* Gray, l. c. X. cycloptera Greene, Bull. Cal. Acad. 1:207 (1885), type loc. Tucson, Ariz., Pringle. *Eritrichium pterocaryum*, Pitt. 1:120 (1887). *C. pterocarya* var. *cycloptera* Mch., Contrib. Gray Herb. 48:44 (1916). *C. pterocarya* var. *purpusii* Jepson, Man. 849 (1925), type loc. Argus Mts., Inyo Co., Purpus 5433.

23. *C. oxygona* Greene. Stem slender, branching, 5 to 14 inches high; herbage ascending hispid; leaf-blades long-linear, $\frac{1}{2}$ to $1\frac{1}{4}$ inches long; spikes short, gemmily-hirsute and short-bristly; in fruit becoming a little loose; calyx-lobes densely $1\frac{1}{2}$ lines long, slightly exceeding nutlets; nutlets 4, the body ovate, short-attenuate, thickly papillate, 1 line long; 3 of the nutlets bordered by a membranous erose wing $\frac{1}{4}$ to $\frac{1}{2}$ as broad as the body, the fourth nutlet wingless or nearly so; ventral groove closed or slightly open, forked at base; style about equalling nutlets.

Gravelly washes or rich flats, 300 to 5000 feet: inner South Coast Range and the bordering San Joaquin Valley plain; Tehachapi Mts.; Sierra Nevada from Madera Co. to Kern Co.; Mono Co.; northern Mohave Desert; San Gabriel Mts.; Santa Rosa Mts. East to Nevada. Mar.-May.

Locs.—Inner South Coast Range (on east slope) and its bordering San Joaquin Valley plain: Originalita Valley (bordering hills), w. Merced Co., Hoover 4370; Arroyo Hondo wash, w. Fresno Co., Hoover 1876; Alcalde, sw. Fresno Co., T. Brandegee; McKittick, Kern Co., Heller

7789. Sierra Nevada: near Minarets, Madera Co., *Coyndon*; Erakine Creek, Kern Co., *Purpus* 5309. Tehachapi Mts.; Tehachapi Pass, *K. Brandegee*. Mono Co.: Watterson Mdw., *Emsw* 5. Northern Mohave Desert: Red Rock Cañon, El Paso Mts., *Allison Krumes*. San Gabriel Mts.; lower Pine Flats and Chisno, *Peirson* 2463. Santa Rosa Mts.: Vandewater Flat, *Hall* 1161; Coyote Cañon, *Hall* 2549.

Refs.—*CRYPTANTHIA OXYGONA* Greene, *Phil.* 1:120 (1887). *Eritrichium oxygonum* Gray, *Proc. Am. Acad.* 19:89 (1883), type loc. "hills bordering Mohave Desert," *Pringle*. *Krynitzkia oxygona* Gray, *Lea* 20:277 (1885).

24. *C. gracilis* Osterh. Stem branched from the base, 3 to 11 inches high, the branchlets ending in bractless spikes; herbage spreading-hispid; leaf-blades narrowly linear, 4 to 10 lines long, sessile or subsessile, the hairs pustulate-dilated at base; spikes very dense and remaining dense, short (2 to 7 lines long), borne in clusters of 2 to 4 on slender or filiform peduncles; calyx 1 line long, its lobes linear-filiform, black-tipped, densely tufted with erect soft hairs (especially below) and furnished with 1 or 2 or several very slender long bristles set at or near the apex; corolla minute ($\frac{3}{4}$ to $\frac{1}{2}$ line broad), the limb very definitely elevated above the contracted mouth of the relatively large calyx; nutlet 1, ovate-acuminate, smooth, $\frac{1}{2}$ to $\frac{3}{4}$ line long, flattish dorsally or a little curved from base to apex, the lateral angles definite and sometimes a little sharp, the ventral side convexly 2-planed, the nutlet thus nearly 3-sided like a buckwheat grain; basal areola small; style $\frac{3}{4}$ as long as nutlet.

Desert hillslopes and flats, 3000 and 5700 feet: eastern Mohave Desert; Inyo Co. East to Colorado. May.

Locs.—Eastern Mohave Desert: Fountain Cañon, Providence Mts., *Jepson* 18,192; Gilroy Cañon, Providence Mts., *Jepson* 18,233; Barawell, New York Mts., *K. Brandegee*. Inyo Co.: Black Cañon, White Mts., *Durand*.

Refs.—*CRYPTANTHIA GRACILIS* Osterhout, *Bull. Torr. Club* 30:236 (1903), type loc. Glenwood Sprs., Garfield Co., Colo., *Osterhout* 2389. *C. hillmanii* Nels. & Ken., *Proc. Biol. Soc. Wash.* 19:157 (1906), type loc. Huffaker ranch near Reno, Nev., *Hillman*. *C. gracilis* var. *hillmanii* M. & J., *Bull. Torr. Club* 49:39 (1925).

25. *C. microstachys* Greene. Stem rigidly erect, branched from the base or above, greenish or sometimes dark reddish, slender, 3 to 12 (or 18) inches high; herbage spreading-hirsute throughout; leaf-blades linear or linear-lanceolate, $\frac{1}{2}$ to 2 inches long; spikes very slender, generally ternate, at length elongated (1 to $\frac{3}{4}$ inches long) and flexuous or a little curved, the flowers discrete; calyx-lobes linear-attenuate above the lanceolate base, finely short-hairy and bristly, the 3 outer lobes densely, divergently and unequally long-bristly, usually on lower half, the longer bristles often longer than the lobes; fruiting calyx ascending, $\frac{1}{2}$ to 1 line long; corolla $\frac{1}{2}$ to $1\frac{1}{2}$ lines broad; nutlet 1, lanceolate or ovate-attenuate or crenulate, smooth and polished, rounded dorsally and ventrally (that is, circular in cross-section) or the ventral side slightly 2-planed, the groove mainly closed.

Slopes and cañons in the foothills, often in open woods or in chaparral, especially characteristic of the Adenostoma formation, 50 to 3000 feet: inner and middle Coast Ranges from Glenn Co. to San Luis Obispo Co.; Sierra Nevada in Kern Co.; cismontane Southern California. Apr.-June.

Locs.—Coast Ranges: Alder Sprs. (9 mi. e.), Glenn Co., *Heller* 11,444; Epperson road sta., sw. Colusa Co., *K. Brandegee*; Runney (4 mi. n.), Yolo Co., *Hoover* 3190; Bell Cañon, Howell Mt., Napa Range, *Jepson* 18,868; Dutton Cañon, Yuba Mts., *Jepson* 21,124; Antioch, *K. Brandegee*; Orster Ridge, Mt. Diablo, *Bowersman* 2183; Soquel Cañon, Santa Cruz Mts., *Jepson* 21,123; Estrella, San Luis Obispo Co., *Jared*. Sierra Nevada in Kern Co.: Bald Mt., Greenhorn Mts., *C. N. Smith* 290. Cismontane S. Cal.: North Fork Seymour Creek, Mt. Piñon, *Peirson* 3234; Painted Cave ranch, Santa Ynez Mts., *Earlewood*; Topanga Cañon, Santa Monica Mts., *Burber*; Rubio Cañon (foothills e.), San Gabriel Mts., *Peirson* 172; San Bernardino, *Fairch* 3645; San Jacinto River cañon, *Jepson* 1281; Campo (10 mi. w.), San Diego Co., *Mans & Johnston* 12,628.

Refs.—*CRYPTANTHIA MICROSTACHYS* Greene, *Phil.* 1:116 (1887). *Krynitzkia microstachys* Greene; Gray, *Proc. Am. Acad.* 20:269 (1885), type loc. Fort Tejon, Kern Co., *Xantus* 84.

26. *C. hispida* Greene. Stem erect, slender, widely branching above the base, 5 to 15 inches high; herbage spreading-hispid; leaf-blades linear, 4 to 9 lines

long; spikes ternate or geminate, soon loose, $\frac{1}{2}$ to 3 inches long; calyx 1 to $1\frac{1}{4}$ lines long, its lobes linear, densely short-hispid with spreading hairs, the lower part of the outer lobes tufted with a row of deflexed or spreading bristles; the lower part to $1\frac{1}{2}$ lines broad; nutlet 1, smooth, polished, ovate or lanceolate but narrowed into a slender beak, almost circular in cross-section (high-rounded on back, rounded on face), the ventral groove shortly forked at base; style shorter than nutlet.

Rocky slopes, 1000 to 3000 feet: Lake Co. to Napa Co. Apr.-June.
 Geog. note.—*Cryptantha hispida* is restricted to areas of serpentine in Lake County and Napa County. The following stations may be cited: ridge e. of Indian Valley, in Lake Co., Hoover 2558; near Cobb Valley, sv. Lake Co., T. Walker; Snell Valley, in Napa Co., Jepson 18,825; Limekiln Creek, n. of Pope Valley, Napa Co., Jepson 18,812; Moore's Creek, Howell Mt., Napa Co., Tracy 1575; betw. Monticello and Pope Valley, M. S. Baker. Although very close to *Cryptantha cleveandii* morphologically, *Cryptantha hispida* is geographically segregated from that species and in addition occupies a different sort of habitat. The differences between the two units, as here accepted, are difficult to express in precisely differentiating terms. *Cryptantha hispida* has very slender stems, *Cryptantha cleveandii* rather stoutish ones. The nutlet of *Cryptantha hispida* is very thick and rounded and markedly and rather abruptly slender beaked, face, that is, it is slightly compressed, and is lanceolate, sometimes with attenuate apex, rarely with spreading hairs, the midrib of the lobes armed with a row of bristles mostly on lower part, bristles spreading or sometimes markedly deflexed. The calyx in *Cryptantha cleveandii* is clothed with ascending hairs and throughout with divergently spreading long bristles. The difference between these two, as indicated, may not be strong enough to sustain *Cryptantha* invariable, the characters as drawn for *Cryptantha hispida* are constant and uniform in all collections made in the various parts of its area.

Refs.—*CRYPTANTHA HISPIDA* Greene; Baker, West. Am. Plants 2:16 (1903), nomen nudum; Brand in Engler, *Pflz.* 4:22:60 (1931), type loc. Knoxville, in Napa Co., C. F. Baker 2966.

27. *C. cleveandii* Greene. Stems branching from the base or subsimple, slender, 3 to 18 inches high; herbage appressed- or spreading-hispid; leaf-blades linear to oblong, $\frac{1}{4}$ to $\frac{1}{2}$ or 1 inch long; spikes geminate or ternate or paniculate, $\frac{1}{2}$ to $1\frac{1}{2}$ inches long, dense or at length loose; calyx 1 to $1\frac{1}{2}$ lines long; calyx-lobes linear, hirsute-appressed and markedly spreading-bristly throughout; corolla $\frac{1}{4}$ to $1\frac{1}{4}$ lines broad; nutlets 1 to 4, lanceolate, attenuate or acuminate, smooth and polished, rounded dorsally, convexly 2-planed ventrally or flatish; groove closed, and the basal areola small, open; style $\frac{2}{3}$ as long as nutlets, or equaling or slightly surpassing them.

Rocky or sandy hillslopes, especially luxuriant on "burns" in the chaparral, 5 to 2500 feet: South Coast Ranges from Stanislaus Co. to San Luis Obispo Co.; coastal Southern California. South to Lower California. Mar.-May (or Aug.).

Geog. note.—In the South Coast Ranges, *Cryptantha cleveandii* extends toward the coast but is also found in the inner ranges. At the southern extremity of its distribution it is strictly distinguishable.

Local.—South Coast Ranges: Puerto Cañon, w. Stanislaus Co., Hoover 4337; betw. Scott Valley and Felton, Santa Cruz Mts., Yates 2254; Big Sur River (east cliffs s.), Hoover 2678; Jolon Coast Range, w. Kern Co., *Higgins* 7977; Tehachapi Mts., Annette (2 mi. ne.), in inner South S. Cal.; Ricknell sta. sv. Santa Barbara Co., Jepson 12,678; Purisima Hills, near Lompoc, Jepson 11,954; Santa Cruz Isl., *Prideaux*; Huonnet, Ventura Co., Peirson 5774; Santa Catalina Isl., *Fosberg* 10,647; Santa Monica Cañon, Santa Monica Mts., Barber 116; San Diego, Greene.

In the form called *Cryptantha hispidissima* Greene, the style equals the nutlets or slightly surpasses them, whereas in *Cryptantha cleveandii* the style is $\frac{2}{3}$ as long as the nutlets or slightly significant, and the former binomial is, therefore, reduced to synonymy. When *Cryptantha cleveandii* exhibits large corollas (2 to $2\frac{1}{2}$ lines wide) it is var. *rosea* Jtn., ranging from San Luis Obispo Co. (Arroyo Grande, Jepson 20,263) and Santa Barbara Co. (Purisima Hills, Jepson

Var. *dissita* (Jtn.) Jepson & Hoover comb. n. Stem stoutish, branching; calyx 2 to $3\frac{1}{4}$ lines long; corolla 3 lines broad; nutlets 1 to 2, ovate, attenuate or subrotate; style slightly exceeding nutlets.—Chaparral hills, 1300 to 1500 feet: western Lake Co. (Scott Valley, Tracy 1744).

Refs.—*CRYPTANTHIA CLEVELANDII* Greene, Pitt. 1:117 (1887), type loc. San Diego, *Cleveland* & Greene, *C. rufosum* Greene, Pitt. 1:160 (1888), type loc. San Jose, *Rattan*. *C. abramisii* Jtn., Contrib. Gray Herb. 63:52 (1922), type loc. San Pedro Hills near Malaga Cove, Los Angeles Co., Abrams 3129. *C. hispida* var. *abramisii* Brand; Engler, *Pflur.* 4st-60 (1921). *C. brandegei* Jtn., Lc. 68:53, type loc. Santa Rosa Isl., *T. Brandegei*. *C. hispidissima* Mehr., Contrib. Gray Herb. 48:43 (1915). *C. clevelandii* var. *hispidissima* Jtn.; Munz, Man. 427 (1935). Var. *FLOROSA* Jtn., Contrib. Gray Herb. 74:95 (1925), type loc. Linda Vista, San Diego Co., *Macbride* & *Payson* 797. Var. *DURRITIA* Jepson & Hoover. *C. diastia* Jtn., Jour. Arn. Arb. 29:333 (1939), type loc. "near foot of grade w. of Lakeport," Lake Co. (i.e., probably near Highland Sprs.), *M. S. Baker* 8956.

28. *C. leiocarpa* Greene. Stem commonly branched from the base, 5 to 18 inches high, the branches many, ending in a short spike or in a dense glomerule of spikes; herbage hispid with spreading hairs, often densely so; leaf-blades linear, $\frac{1}{2}$ to 1 or 1 $\frac{1}{4}$ inches long; spikes leafy-bracted at base, rarely bractless, mostly short and glomerate, $\frac{1}{4}$ to $\frac{1}{2}$ inch long; calyx-lobes linear or linear-lanceolate, sometimes oblong, dark green, ascending-hirsute and spreading-bristly, 2 to 3 lines long; corolla $\frac{1}{4}$ to $\frac{1}{2}$ lines wide; nutlets usually 4, rarely 1, narrowly ovate or lanceolate-rostellate, smooth, rounded dorsally, flattish ventrally, the lateral angles marked by a somewhat definite line but essentially obtuse, the ventral groove minutely forked at base or the fork obsolete.

Sand dunes, sandy flats or grassy headlands, 5 to 500 feet; along the coast line from Los Angeles Co. to Humboldt Co. North to southern Oregon. Apr.-June.

Geog. note.—On morphological grounds *Cryptantha leiocarpa* is weakly and incessantly distinguishable from *C. clevelandii*. By restricting, as is here done, citations of stations to the coast line, the practical effect of morphological weakness is thereby lessened. It is hoped, then, this device may aid, negatively or positively, further inquiry: Playa del Rey, Los Angeles Co., *Fairish* 11,864; Santa Rosa Isl., *T. Brandegei*; Point Pinos, Monterey Co., *K. Brandegei*; Presidio, San Francisco, *Jepson* 21,129; Ft. Reyes, Marin Co., *Curran*; Bodega Head, Sonoma Co., *K. Brandegei*; Cape Mendocino, *Tracy* 9939 (nutlets convexly 2-planned on face).

Refs.—*CRYPTANTHIA LEIOCARPA* Greene, Pitt. 1:117 (1887); *Jepson*, Fl. W. Mid. Cal. 445 (1901), ed. 2, 348 (1911), Man. 850 (1925). *Echinopspermum leiocarpum* F. & M., *Ind. Sem. Hort.* Petrop. 2:96 (1836), type loc. Ft. Ross, Sonoma coast; *Linnaea* 11; *Litt.-Ber.* 104 (1837); *Erythra* 2:140 (1894). *Krynitzkia leiocarpa* F. & M., Lc. 7:52 (1841). *Eritrichium leiocarpum* Wats., Bot. King 244 (1871). (1) *C. leiocarpa* var. *eremocarpoides* Brand; Engler, *Pflur.* 4th:53 (1921), type loc. Monterey, *J. Ball*.

29. *C. ganderi* Jtn. Bushy-branching plant 4 to 15 inches high; herbage spreading-hispid; leaf-blades linear or linear-lanceolate, mostly sessile, $\frac{3}{4}$ to 1 inch long; spikes mostly solitary, loose, 3 to 5 inches long; calyx 4 lines long, tufted on lower half with long divergent bristles, the lobes linear-filiform, densely ascending-hirsute on lower half inside; corolla minute ($\frac{1}{2}$ line wide); nutlet 1, smooth, ovate-rostrate, low-rounded or flattish dorsally, flattish ventrally, the lateral angles obtuse, the ventral groove widely forked at the sub-truncate base of nutlet.

Desert valleys, 700 to 1100 feet; Borrego Valley, northeastern San Diego Co., Colorado Desert. South to Lower California and Sonora (Jour. Arn. Arb. 20: 386). Apr.

Tax. note.—In all its single features *Cryptantha ganderi* resembles closely various California species of *Cryptantha*. In the sum total of its characters, however, it seems an unusual plant and would be expected to have that which it apparently does not have, a distinctive or unique feature of a kind which in many cases characterizes other southwestern species of this genus. Dorsally, the nutlets bear a few widely scattered microscopic mucronations or needle-like points—but these represent very obscure and inconsiderable structures.

Ref.—*CRYPTANTHIA GANDERI* Jtn., Jour. Arn. Arb. 20:386 (1939), type loc. Borrego Valley, San Diego Co., *Gander* 5328 (merotyp. vidi).

30. *C. maritima* Greene. Stem usually stout with many ascending branches, 5 to 11 inches high; herbage rufescent, hispid, often also appressed-hirsute; leaves linear, somewhat thickened, $\frac{1}{2}$ to 1 inch long; spikes densely flowered, elongate in age, freely bracteate, the bracts linear, 1 to 3 lines long; calyx-lobes linear-oblong to filiform, 1 line long, spreading-bristly (some bristles as long as the lobes) and

densely tufted with soft hairs (the hairs ascending and subequal) or the tufts often early deciduous; corolla $\frac{1}{4}$ line broad; nutlet solitary or usually so, ovate-attenuate, smooth, brown, rounded dorsally, a little rounded or convexly 2-planed ventrally, the angles sharply defined and subacute, the groove closed.

Gravelly washes, sandy flats in cañon-bottoms, and coastal mesas, 100 to 3500 feet: Inyo Co.; eastern Mohave Desert; western Colorado Desert; San Diego coast; Santa Barbara Isls. Mar.-May.

Locs.—Inyo Co.: Inyo, *T. Brandegee*; Furnace Creek, Funeral Mts., *Parish*. Eastern Mohave Desert: Needles (11 mi. w.), *Mason & Harwood 3611*. Western Colorado Desert: Painted Cañon, *Mocca Hills, Jepson 11,635*; Coachella (wash c.), *Schellenger 25a*; Bailey Well, w. Imperial Co., *Jepson 17,993*; Vallecito, e. San Diego Co., *Jepson 8563*; Split Mt. (near Fish Mt.), *Parish 1922*. Santa Barbara Isls.: Santa Barbara Isl., *Trask*; Santa Catalina Isl., *T. Brandegee*; San Nicolas Isl., *Trask 56*; San Clemente Isl., *Murberger 186*. San Diego coast: Pt. Loma, *Orcutt*.

Var. *pilosa* Jtn. Calyx densely tufted with soft ascending hairs, the tips of the lobes with a few divergent long bristles.—Inyo Co.; eastern Mohave Desert; Colorado Desert. East to Nevada and Arizona, south to Lower California. It is often associated with the species but has a markedly distinctive appearance. The ventral face of the nutlets is sometimes flattish and the lateral angles sometimes obtuse.

Locs.—Inyo Co.: Hole-in-the-Rock Spr., Daylight Pass, Grapevine Mts., *Jepson 19,808*; Range (n. end), *Jepson 19,553*. Mohave Desert: Needles, *Levenson*; Ashley Crater, *Jepson 20,204*; Kane Spr., Ord Mt., *Hall & Chandler 6807*; Calico, *Parish 9798*. Colorado Desert: Painted Cañon, *Mocca Hills, Jepson 11,635a*; Coachella (wash c.), *Schellenger 25t*; Signal Mt., *T. Brandegee*.

Refs.—*CRYPTANTHIA MARITIMA* Greene, *Pitt.* 1:117 (1887); *M. & J.*, *Bull. Terr. Club* 49:38 (1922). *Krynitzkia maritima* Greene, *Bull. Cal. Acad.* 1:204 (1885), type loc. Guadalupe Isl., *L. Cal., Palmer, Greene, K. remotissima* Greene, l.c. 1:203 (Aug. 1885); not Gray (Jan. 1885). *C. remotissima* Greene, *Pitt.* 1:116 (1887); *Jepson, Man.* 847 (1925). Var. *PILOSA* Jtn., *Univ. Cal. Publ. Bot.* 7:445 (1922), type loc. Los Angeles Bay, l. Cal., *Palmer 551*.

31. *C. mohavensis* Greene. Stem branching low, forming a bushy plant 4 to 13 inches high; herbage spreading-hispid; leaf-blades linear, $\frac{1}{4}$ to $1\frac{1}{2}$ inches long; spikes $\frac{1}{4}$ to $1\frac{1}{2}$ inches long, borne in terminal glomerules or in terminal loose clusters; calyx-lobes linear, ascending-hirsute and sparingly spreading-bristly; corolla $1\frac{1}{2}$ to $2\frac{1}{4}$ lines broad; nutlets 4, ovate-acute, truncate at base, smooth, polished, flattish or subflattish dorsally, somewhat flattish on the ventral side or convexly 2-planed, the lateral angles obtuse.

Sandy flats, 2000 to 6000 feet: mesa borders of the Tehachapi Mts. or in their lower cañons; southern Sierra Nevada in Tulare and Inyo Cos. East to Nevada. May.

Locs.—Tehachapi Mts.: betw. Mohave sta. (Mohave Desert) and Cameron sta. (lower Tehachapi Pass), *K. Brandegee*; Bena sta. (near Caliente), *Heller 7642*. Inyo Co.: Grays, South Fork Oak Creek, *E. W. Austin 629*; Andrews Camp, Bishop Creek, *K. Brandegee*.

Refs.—*CRYPTANTHIA MOHAVENSIS* Greene, *Pitt.* 1:120 (1887); *M. & J.*, *Bull. Terr. Club* 49:38 (1922). *Krynitzkia mohavensis* Greene, most probably in the lower Tehachapi Pass). *C. fallax* Greene, *Pitt.* 5:54 (1902), type loc. Te-Culbertson 4537 (seems to belong here.—R. Y. Hoover). *C. torreyana* var. *racemosa* Jepson, *Man.* 850 (1925).

32. *C. torreyana* Greene. Stem erect, usually stout, branched from the middle or the base, 7 to 21 inches high; herbage spreading rough-hispid; leaf-blades linear, $1\frac{1}{2}$ to $2\frac{1}{4}$ inches long; spikes in 1s, 2s or 3s, $\frac{1}{4}$ to 1 inch long and dense, or sometimes elongated and loose (2 to 3 inches long); calyx-lobes narrowly linear, spreading-bristly and ascending-hirsute; corolla minute ($\frac{1}{4}$ to $\frac{1}{2}$ line broad); fruiting calyx much exceeding fruit, 2 to 4 lines long, a little constricted at summit of nutlets, the tips of the lobes spreading; nutlets 4, ovate, acute, smooth, a little flattish on back, convexly 2-planed ventrally, the lateral angles obtuse, the groove and its short basal fork closed.

Grassy open or half-shady or brushy hillslopes, 1500 to 6600 (7300) feet: North Coast Ranges from Sonoma Co. to western Siskiyou Co.; west slope Sierra Nevada from Kern Co. to eastern Siskiyou Co.; east side Sierra Nevada from Mono Co. to Modoc Co. East to Utah and Wyoming, north to British Columbia. May-June.

Locs.—Coast Ranges: Santa Rosa Creek cañon, Sonoma Co., M. S. Baker 629; South Mill Creek (head), se. of Ukiah, Jepson 9234; Eden Valley, se. Mendocino Co., Jepson 21,122; Long Valley, cent. Mendocino Co., Tracy 5806; South Yollo Bolly, se. Trinity Co., Jepson 21,134; Chamise Mt., near Shelter Cove, se. Marin Co., Jepson 21,134; Three Creeks and Willow Creek, a Humboldt Co., Tracy 5841; Three Forks of Mad River, Trinity Co., Tracy 10,206; Beegun, w. Tehama Co., Jepson 16,631; Sisson, w. Siskiyou Co., Jepson 21,131. Sierra Nevada: Poso Creek, Greenhorn Mts., Hall & Babcock; betw. Watson Spr. and Cedar Creek, North Fork Kaweah River, Jepson 598; Chocoma School, Mariposa Co., Jepson 12,802; Deadman Creek, Middle Fork Stanislaus River, Jepson 6500a; near Alpine Camp, upper Truckee River, El Dorado Co., J. M. Rankin; Bear Valley, near Emigrant Gap, Jepson 21,135; Yuba Pass, Sierra Co., Jepson 16,855; Rock Creek, Meadow Valley, Plumas Co., Jepson 19,337; Rich Gulch, Plumas Co., Follett 99; Shasta Retreat, Siskiyou Co., Condit. East side of Sierra Nevada: Walker River, Mono Co., Mans 7571; Dog Valley, e. Nevada Co., Jepson 21,132; North Fork Bidwell Creek, n. Warner Mts., Jepson 7907.

Var. *penula* Jtn. Plants often dwarfish and 2 to 5 inches high; fruiting calyx 1½ lines long; nutlets smaller.—South Coast Ranges (Los Gatos, foothills w., Heller 7458; Penitencia Creek, near Mt. Hamilton foothills, Ruffin; Mt. Diablo, Bowersman 2245; Strawberry Cañon, Berkeley Hills, Tracy 793); Marin Co. (Mt. Tamalpais).

Var. *scrutata* Jepson nom. n. Stem erect, weak, 7 to 16 inches high, divergently few-branched, the branches long, slender, flexuous; calyx 1½ lines long, densely ascending-hispid with short hairs, the midrib of the lobes with a few much reduced bristles, these bristles very slender and spreading, sometimes long, sometimes very short, but rising above the appressed hairs at an angle; corolla 1 to 1½ lines wide.—Chaparral slopes, open woods and rocky outcrops, 500 to 3000 feet; North Coast Ranges from Lake Co. to Del Norte Co. Apr.-June.

Tax. note.—The nutlets of var. *scrutata* are like those of the species, *Cryptantha torreyana*. For example, in representative collections, the nutlets of var. *scrutata* in a collection from the hills near the mouth of the South Fork Trinity (Tracy 10,141) are identical with the nutlets of a collection of *Cryptantha torreyana* from Chamise Mt., near Shelter Cove, Tracy 6320; the nutlets of these two collections are alike in shape, in beak, in the flattened back, in the slightly raised venation in habit and save that the calyx-bristles are extremely reduced in number and in size in River Valley, Trinity Co., Tracy 4298; New River Bluffs, Trinity Co., Tracy 6388; Smith River, Del Norte Co., Parks 24,011 (det. R. F. Hoover).

Var. *traskae* (Jtn.) Jepson comb. n. Nutlets smaller than in the species, ¾ as long, smooth at most minutely tuberculate towards apex dorsally.—San Nicolas Isl.; San Clemente Isl., Mans 6574. The nutlets in the type of this variety in shape, basal fork of groove and somewhat truncatish base resemble closely the nutlets of the species, *Cryptantha torreyana*. Although the variety is, admittedly, widely sundered geographically from the species, it cannot well be referred to the more nearly contiguous species, *Cryptantha clevelandii*, which differs in fundamental structure on pressed broad nutlets of var. *traskae*.

Refs.—*CRYPTANTHA TORREYANA* Greene, Plt. 1:118 (1857); Jepson, Fl. W. Mid. Cal. 446 (1901), ed. 2, 348 (1911), Man. 860 (1925). *Krynitzkia torreyana* Gray, Proc. Am. Acad. 50:271 (1885), "nearly throughout Cal." (holotype, Yosemite Valley, Torrey in 1865; cf. Johnston, Contrib. Gray Herb. 74:81). *K. torreyana* var. *collosa* Gray, Lc., type loc. Lake Co., Eufonia (no. 42, acc. Gray Herb.), the flowers spatulate-congested at ends of branches, the calyxes 2 lines long. *C. torreyana* subvar. *capitata* Brand; Engler, Pflz. 4:282-58 (1931), type loc. Lake Co., Eufonia 42. *C. torreyana* var. *collatipes* Jtn., Contrib. Gray Herb. 74:80 (1925), type loc. Callistoga, Tracy 2094, a form with longer style. *C. trifurca* Eastw., Bull. Torr. Club 22:293 (1905), type loc. Klamath, Siskiyou Co., Copeland 3550. Var. *PENULA* Jtn., Contrib. Gray Herb. 74:80 (1905). Var. *scrutata* Jepson, C. *microbakeri* Jtn., Jour. Agr. Arb. 21:63 (1940), type loc. betw. Kelseyville and Lower Lake, Lake Co., M. S. Baker 7629 (typ. non vidi). Var. *TRASKAE* (Jtn.) Jepson. *C. traskae* Jtn., Contrib. Gray Herb. 74:77 (1925), type loc. San Nicolas Isl., Trask.

33. *C. watsonii* Greene. Stem erect, branched, 4 to 10 inches high; herbage hirsute; leaf-blades narrowly oblong or linear, ½ to 1½ inches long; spikes 2 to 9 lines long; calyx-lobes lanceolate, thinly strigose and sparsely spreading-bristly; corolla ½ to ¾ line broad; nutlets 4 or 3, smooth, narrow-ovate, flattish on back, convexly 2-planed on the ventral side, the lateral angles sharply acute, the ventral groove closed or nearly so, shortly forked at base.

Desert ranges, 5000 to 10,300 feet: White Mts. East to Colorado, north to Oregon and Montana. May-Aug.

Geog. note.—Distributed widely over the mountains of the Great Basin region, *Cryptantha watsonii* has never hitherto been reported from California. Three collections are available for

record; Big Prospector Mdw., White Mts., J. Griseb in 1917 (det. R. P. Hoover, in 1938); Conway grade, s. of Mono Lake, Hoover 5411; Hot Creek, below Fales Hot Spgs., Hoover 5446.
 Refs.—*CRYPTANTHIA WATSONII* Greene, Pitt. 1:110 (1887); *Krynitzkia watsonii* Gray, Proc. Am. Acad. 20:271 (1885), type loc. Wasatch Mts., Utah, Watson.

34. *C. nemaclada* Greene. Stem slender, erect, simple or branching from the base, 6 to 14 inches high; herbage strigose and thinly spreading-bristly; leaves loosely hispid, the blades linear, $\frac{3}{8}$ to $1\frac{1}{4}$ inches long; spikes geminate or ternate, subuliform, at length elongated and loose, $\frac{3}{8}$ to 3 inches long; calyx-lobes linear-attenuate, the lower half densely spreading-bristly, the upper part densely clothed with short equal bristles bent slightly below the horizontal or ovate-lanceolate with short equal bristles bent slightly below the horizontal or ovate-lanceolate; corolla $\frac{3}{8}$ to 1 line broad; nutlets 1 to 4, ovate-lanceolate or markedly deflexed; whitish, smooth and polished, rounded dorsally, the angles rounded, the ventral face convexly 2-planed, the groove closed; pericarp thin, fragile.

Barren clay banks or shaly outcrops in the hills and valleys, 75 to 3000 feet; Coast Ranges from Colusa Co. to San Luis Obispo Co., mostly in the inner range and sometimes in the bordering valleys; Tehachapi Mts. Apr.-May.

Locs.—North Coast Ranges from Colusa Co. (and its bordering Sacramento plain) to Napa Co.; Colusa jct., T. Brandegee; Suisun Creek, w. Colusa Co., foothills, Hoover 3217; Monticello (w. North Fork Lewis Creek), M. S. Baker. South Coast Ranges: Puerto Calles, w. Stanislaus Co., Hoover 3362; 15,895; Paso Robles, K. Brandegee. Tehachapi Mts.: Keene sta., K. Brandegee.

Refs.—*CRYPTANTHIA NEMACLADA* Greene, Pitt. 1:118 (1887), type loc. "Colusa Co." Curran, most probably near the old-time Mountain House (present day Venado), on the 1884 route of the collector.

35. *C. affinis* Greene. Stem slender, erect, branching, 3 to 20 inches high; herbage ascending- or spreading-hispid; leaf-blades oblong to oblanceolate, $\frac{1}{2}$ to $1\frac{3}{4}$ inches long, those of the main stem often opposite; spikes solitary or geminate or ternate, soon very loose, 1 to 5 inches long, leafy at base; ovate-lanceolate, acute to 1 to $1\frac{1}{2}$ lines long, not elongating in fruit, ascending-hirsute and also spreading-bristly; corolla minute ($\frac{1}{4}$ line broad); nutlets ovate or ovate-lanceolate, acute up to the middle of the gynobase, the lateral angles rounded, the ventral groove strongly eccentric and closed; basal areola or fork none.

Hillslopes, 3000 to 8000 feet: Cuyamaca and San Bernardino mountains; North Coast Ranges from Lake Co. to western Siskiyou Co.; Sierra Nevada from Tulare Co. to eastern Siskiyou Co. East to Wyoming, north to Washington. June-July.

Locs.—S. Cal.: Cuyamaca Mts., T. Brandegee; San Bernardino Mts., Hall. North Coast Ranges: Cobb Mt., w. Lake Co., C. F. Lumsden; Mt. Sanhedria, w. Lake Co., Heller 5882; McKay Camp, South Fork Mt., e. Humboldt Co., Tracy 8941; Grouse Mt., Humboldt Co., Tracy 15,941; Ruth, Mad River Valley, Trinity Co., Tracy 8797; Corral Prairie, Trinity Summit, Tracy 10,398; Shasta Spgs., Heller 7962. Sierra Nevada: Giant Forest, Tulare Co., K. Brandegee; Huntington Lake, A. L. Grant 1154; Arnold Mdw., Madera Co., A. L. Grant 1247; Yosemite, Jepson 4277; Jepson 10,114; Bear Valley, Nevada Co., Jepson 21,135; Prattville, Plumas Co., T. Brandegee; Chico Mdw., Butte Co., Heller 11,480; Butte, s. Siskiyou Co., Jepson 20,097. East side Sierra Nevada: Mammoth, Mono Co., K. Brandegee; Webber Lake (s. of), Sierra Co., S. B. Doten.

Refs.—*CRYPTANTHIA AFFINIS* Greene, Pitt. 1:119 (1887); Jepson, Man. 850 (1925). *Krynitzkia affinis* Gray, Proc. Am. Acad. 20:270 (1885), type loc. "eastern side of the Sierra Nevada" (the phrase first mentioned in the indication of range), with which must be associated the specific locality "Denner Lake, Torrey." *C. geminata* Greene, Lx. type loc. Truckee, Curran.

36. *C. glomeriflora* Greene. Stem diffusely branching from base or simple and erect, 1 to 5 inches high; herbage ascending-hirsute or the leaves ascending-bristly; leaf-blades linear-oblong, $\frac{3}{4}$ to $\frac{1}{2}$ inch long; flowers 2, 3 or 4 in very small glomerules (extremely reduced spikes 1 to $1\frac{1}{2}$ lines long), at the ends of the branches, and also in glomerules (or sometimes solitary) in the axils of the leaves, even the lowest; calyx-lobes linear, $\frac{1}{2}$ to $\frac{3}{4}$ line long, densely strigose and also spreading-bristly, the bristles often as long; corolla very minute ($\frac{1}{4}$ line broad); nutlet solitary, smooth and shining, ovate, shortly attenuate or rostellate, the ventral groove slightly off center, open only at base.

Montane slopes and meadows, 6000 to 10,650 feet, rare: Sierra Nevada, mostly east side or high easterly meadows, from Nevada Co. to Tulare Co.; Sweetwater and White mountains, Mono Co. July.

Locs.—Sierra Nevada: Truckee, Nevada Co., *Sonne*; Eagle Mdw., Eagle Peak, Tuolumne Co., *Hoover* 1850; Rock Creek Lakes basin, Inyo Co., *Peirson* 11,146; Volcano Creek, Tulare Co., *Hall & Babcock* 5322. Mono Co.: Cottonwood Creek, Sweetwater Mts., *Hoover* 5540; near Big Prospector Mdw., White Mts., *Jepson* 7357.

Refs.—*CRYPTANTHIA GLOMERIFLORA* Greene, Pitt. 1:116 (1887), type loc. Truckee (2 mi. below), *Sonne*; *Jepson*, *Man.* 849 (1925).

37. *C. flaccida* Greene. (Fig. 417.) Stem strictly and rigidly erect, with few ascending branches at the top, $\frac{3}{4}$ to 2 feet high; herbage strigulose; leaf-blades linear, $\frac{1}{2}$ to $1\frac{1}{2}$ inches long; spikes 3 or 4 in a terminal umbellate cluster or panicle, dense or soon loose and 2 to 4 inches long; calyx-lobes narrowly linear, thickish at base and closely erect above, armed on lower part with a dense deflexed or spreading tuft of long curved bristles, the upper part set with short scattered curved bristles, or sometimes 1 or 2 inner calyx-lobes (next to the axis) destitute of long bristles, or all the lobes destitute of long bristles; fruiting calyx 1 to $1\frac{1}{2}$ lines long, appressed to rachis; corolla $\frac{1}{2}$ to 1 (or 2) lines broad; nutlet 1, ovate or lanceolate, foveolate-acuminate, rounded at base, smooth and shining, circular in cross-section or a little flattish ventrally, the groove median or sometimes excentric, closed, areolate at base, the areola small or minute, circular or deltoid.

Open hillslopes, rocky ridges or valley floors, 200 to 4500 feet: throughout the mountains of cismontane Cal., but rare in Southern California; absent from the Great Valley floor or present only rarely on the margins near the foothills; absent from the deserts but occurring occasionally in the intramontane foothills on the desert borders. North to Washington. Apr.-June.

Locs.—Cal.: Cuyamaca Mts., *T. Brandegee*; Saugus, *T. Brandegee*. Coast Ranges: Bitterwater Valley, e. San Luis Obispo Co., *Wiggins* 5814; Tulare Hill, Coyote sta., Santa Clara Valley, *Jepson*; Livermore Valley, *Jepson* 21,120; Mt. Diablo, *Bowerman* 269; Tiburon, Marin Co., *Jepson* 19,945; Howell Mt., Napa Range, *Jepson* 2443; Pleasant Valley, sv. Solano Co., *Jepson* 21,137; Blue Lakes, Lake Co., *Jepson* 21,136; Mt. Saabedrin, e. Mendocino Co., *Jepson* 21,119; Packmata, sv. Tehama Co., *Virginia Bailey*; Look Prairie, Bull Creek, Humboldt Co., *Constance* (margins of, near the foothills); Edison, Kern Co., *Jepson* 18,144; Madira, *Buschmeister*; Buckeye Creek, Hershey, Yolo Co., *Jepson* 8957; Marysville Buttes, *Jepson* 21,136; Crane Creek, w. Tehama Co., *Jepson* 21,121; Red Bluff (rubble field 3 mi. ne.), *Jepson* 16,361. Tehachapi Mts.: Caliente, *Jepson* 6754; Keota, *Jepson* 7160. Sierra Nevada: Pine Mt., Greenhorn Mts., Kern Co., *C. N. Smith* 212; betw. Colony Mill and Marble Fork, Tulare Co., *Jepson* 604; Wawona, *A. L. Grant* 1290; Yosemite, *Jepson* 10,468; Mormon Bar, Mariposa Co., *Jepson* 12,749; Chinese Camp, Tuolumne Co., *Jepson* 6322; Parrotta Ferry, Stanislaus River, *A. L. Grant* 74a; Pine Grove, Amador Co., *Hansen* 430; Table Mt., Butte Co., *Heiler* 11,325; Ager, Siskiyou Co., *K. Brandegee*.

Refs.—*CRYPTANTHIA FLACCIDA* Greene, Pitt. 1:115 (1887); *Jepson*, Fl. W. Mid. Cal. 445 (1901), ed. 2, 347 (1911), *Man.* 850 (1925). *Myosotis flaccida* Dougl.; *Lelins*, *Fagill* 2:22 (1830), type collected by Douglas, probably in e. Wash. or Ore. *Eritrichium oryosorum* Gray, *Proc. Am. Acad.* 10:58 (1874), "common in Ore. and Cal." *Krynitzkia oryosorum* Gray, *Lc.* 20:269 (1885). *C. flaccida* var. *minor* Brand; *Engelm*, *Pflur.* 422-61 (1931), type loc. Solodad, Monterey Co., *Cosgdon* 72. *C. flaccida* var. *minor* Brand, *Lc.*, type loc. Whitman Co., Wash., *Elmer* 766.



Fig. 417. *CRYPTANTHIA FLACCIDA* Greene. a, habit, $\times \frac{1}{4}$; b, st., $\times 4$; c, fr. calyx, $\times 4$; d, nutlet, dorsal view, $\times 8$; e, nutlet, ventral view, $\times 8$.

38. *C. rostellata* Greene. Stem slender, branching above, 4 to 9 inches high; herbage strigulose; leaves strictly ascending, the lower ones opposite or relatively approximate, the upper alternate; leaf-blades oblanceolate or linear, 3 to 7 lines long; spikes solitary or geminate, the flowers at length moderately discrete; calyx-lobes narrow-linear, appressed short-hirsute and densely short-bristly, the bristles spreading, subequal, curved at tip, or the bristles on lower part of calyx longer and spreading-tufted or deflexed-tufted; corolla $\frac{1}{4}$ to $\frac{3}{4}$ line broad; fruiting calyx $1\frac{1}{4}$ to $1\frac{3}{4}$ lines long; nutlet 1, ovate-lanceolate, acute, truncate at base, smooth and polished, high-rounded on back, the face flattish or low-rounded, the ventral groove forked at base, with a usually open areola.

Dry hills, 200 to 3000 feet: inner North Coast Range, east slope from Colusa Co. to Tehama Co. and the bordering rolling plain; Sierra Nevada foothills from Mariposa Co. to Siskiyou Co. North to Washington, Apr.-May.

Tex. note.—*Cryptantha rostellata* is closely related to *C. flaccida*. The lower part of the calyx the bristles may be much reduced. With *Cryptantha flaccida*, the deflexed bristle tufts on the lower part of calyx are long and very striking, but in some collections they are so reduced as to be subobsolete. As so often, recourse for differentiation may be had by looking to the nutlets. In *Cryptantha rostellata* the nutlet is quadratis-rostrate, truncate at base, the ventral groove forked with a minute areola at base but not forked. Collections of *Cryptantha rostellata* are few and material is studied.

Locs.—Inner North Coast Range foothills: sw. Colusa Co.; Prskenta, sw. Tehama Co., Jepson 16,214; Crane Creek, w. Tehama Co., Jepson 21,114. Sierra Nevada foothills: Coulterville, Mariposa Co., Hoover 3422; near Chico (probably foothills c.), Parry; Hornbrook, Siskiyou Co., var. *spithamea* (Jtn.) Jepson comb. n., corolla 1 line broad; a precarious variety, since resting mainly on the instability of bristle features. This form belongs in Mariposa Co.

Refs.—*CRYPTANTHA ROSELLATA* Greene, Pitt. 1:116 (1897). *Krynitzkia rostellata* Greene, Lake-Colusa boundary near Leesville, sw. Colusa Co. (Var. *spithamea* Jepson, C. *spithamea* Jtn., Jour. Arn. Arb. 20:288 (1939), type loc. Coulterville (3 mi. sw.), Mariposa Co., Hoover 2169.

39. *C. sparsiflora* Greene. Stem slender, loosely and widely branching, 5 to 10 inches high, the ultimate peduncular branches filiform, $2\frac{1}{4}$ to 5 inches long, each ending in a single spike; herbage thinly strigose; leaf-blades linear, 5 to 9 lines long; spikes few-flowered, at length loose (the discrete flowers mostly 3 to 7 lines apart); calyx short-bristly, the hairs mostly uncinuate; calyx-lobes lanceolate, the 2 or 3 larger ones membranous-margined below; corolla minute ($\frac{1}{4}$ line broad); fruiting calyx 1 line long; nutlet 1, ovate, acute, smooth and polished, the lateral angles acute, the ventral groove closed; pericarp thin and fragile, somewhat bladderly.

Gravelly or rocky slopes, 1000 to 4000 feet: chaparral belt of the ranges surrounding the San Joaquin Valley, that is, in the inner South Coast Range in Stanislaus Co. (east slope of foothills), and in the Sierra Nevada from Mariposa Co. to Kern Co. May.

Locs.—Inner South Coast Range: Puerto Cañon, w. Stanislaus Co., Hoover 2370. Southern Sierra Nevada: Mormon Bar, Mariposa Co. (Contrib. Gray Herb. 74:101); Coburn Mill, Fresno Co., T. Brandegee; Bear Mt. (n. slope), Tulare Co., Hoover 2478; Havilah, Kern Co., T. Brandegee.

Refs.—*CRYPTANTHA SPARSIFLORA* Greene, Pitt. 1:116 (1897). *Krynitzkia sparsiflora* Greene, Bull. Cal. Acad. 1:203 (1885), collected in 1884, Curran, "the locality uncertain." In that year Greene collected on a trip from Arbockle to Mountain House (Venado) in southwestern Colusa Co., thence to Epperson road station (southwestern Colusa Co.) on east slope of Bear Mt., chap. Mts.

14. *EREMOCARYA* Greene

Densely branching annual with almost filiform stems, the leaves mostly in a basal rosette. Root imparting a purple stain. Racemes dense, spike-like, each flower subtended by a leafy bract, the bracts regular and equal. Calyx 5-parted to