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ADDITIONAL NOTES ON THE
CALIFORNIA BUCKWHEATS
(*ERIOGONUM*, POLYGONACEAE)

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Since the treatment of the genus *Eriogonum* (Polygonaceae) was completed for the *Supplement to A California Flora* by Philip A. Munz and myself (Reveal & Munz, 1968), a number of minor notes and corrections in the taxonomic portions of that paper have come to my attention which seem worthy of comment at this time.

ERIOGONUM HERACLEOIDES Nutt. In our treatment (page 41), I proposed that the California material be referred to the var. *angustifolium* (Nutt.) T. & G. following the recent work by Hitchcock (1964). Since that time, type material associated with this species has been reviewed at the Royal Botanic Garden at Kew, the Academy of Natural Sciences in Philadelphia, and photographs of the types at the British Museum (Natural History) taken for me by Conrad V. Morton of the U. S. National Herbarium in Washington, D.C. This has allowed me to investigate more carefully the exact nature of some of the early Nuttallian names, including both *E. heracleoides* and *E. angustifolium*. In general our previous concepts of var. *heracleoides* were based on a far too limited circumscription of the variety. Actually the typical variety should include those forms of the species which have oblanceolate leaves 4–15 mm wide, while the var. *angustifolium* includes those populations with linear leaves only 1–4 mm wide. As a result of this study, the var. *angustifolium* is now outlined as occurring from northern Oregon northward to southern British Columbia, while the typical variety is found throughout much of the western United States, including northern California.

ERIOGONUM UMBELLATUM Torr. var. *GLABERRIMUM* (Gand.) Reveal [*E. g.* Gand.] Leaves glabrous, elliptic, 1–2 cm long; inflorescences compound, bracteate near the middle of the rays; calyx 4–7 mm long, cream-colored; flowers numerous in each involucre, the heads up to 3 cm across.—Dry gravelly places at 4500–6000 ft; Modoc Co. north to Lake and Harney Counties, Ore. July–Aug.

The var. *glaberrimum* was thought to occur in California (page 44), but no specimens were known to me at that time. Since then I have seen several collections from Modoc Co., California.

ERIOGONUM UMBELLATUM Torr. var. *munzii* Reveal, var. nov. A var. *bahii-formi* differt foliis subtus tomentosus, supra floccosis. Plants spreading and forming mats up to 4 dm across; leaves in rather compact rosettes, the leaf-blades elliptic, 1–2 cm long, densely white-tomentose below, floccose above, infrequently becoming glabrous in late anthesis, on slender short petioles; scapes slender, erect, 1–2 dm long, tomentose to floccose; rays of the umbels compoundly branched with foliaceous bracts at the base of each division, 3–10 cm long, the branches commonly tomentose; peduncles slender, 0.5–2 cm long, tomentose; involucre with tubes 2–3 mm long and lobes 1–2 mm long; calyx bright yellow, 3–8 mm long.—Dry ridges in the mountains of southern Calif. from San Bernardino Co. west to Ventura and Los Angeles Counties, 4000–8000 ft. July–Sept.

Type.—Dry slopes near Baldwin Lake at 6700 ft elev., San Bernardino Mts., San Bernardino Co., Calif., 20 July 1926, *Munz 10747*. Holotype, US! Isotype, POM!

A recent investigation of the holotype of var. *stellatum* (Benth.) Jones collected by David Douglas in the Blue Mountains of Oregon has allowed me to name a series of closely related variants in *E. umbellatum* of which the var. *munzii* is an example. In the "Supplement" the key to the varieties (page 43) may be altered as follows:

- E. Lvs. tomentose below, subglabrous to glabrous above; northern Calif. var. *stellatum*
- EE. Lvs. tomentose on both surfaces, or if merely floccose above, then the plants of southern Calif.
- F. Lvs. densely white-tomentose on both surfaces; Coast Ranges from Lake and Glenn Counties south to San Benito Co.....var. *bahii-forme*
- FF. Lvs. densely white-tomentose below, slightly less so to floccose or rarely glabrate above; mts. of southern Calif.....var. *munzii*

ERIOGONUM HIRTELLUM Howell & Bacig. A second location for this rare endemic is Baldy Mt., Siskiyou Co., based on *Howe s.n.* gathered 4 Aug. 1962 (SD).

Eriogonum diclinum Reveal, sp. nov. A *E. marifolio* et *E. incano* differt inflorescentiis semper capitatis et foliis dense lanatis. Plantae humiles caespitosae implicitae herbaceae perennes, tegetes 2–4 dm latae formantes; folia rosulata, laminis ellipticis vel ovatis, (0.5–)1–2 cm longis et 0.5–1.5 cm latis, utrinque dense lanatis, marginibus integris, petiolis 0.7–3 cm longis, lanatis; caules floriferi erecti, parce tomentosi, (0.5–)1–2 dm alti; inflorescentiae capitatae; bractae 4–6, lanceolatae, tomentosae, 3–5 mm longae; involucrea turbinata vel turbinato-campanulata, tomentosa, 2.5–4 mm longa, lobis 4–6, erectis; flores diclines, flavi, 2–8 mm longi, glabri, tepalis similaribus, ellipticis, ovatis, oblanceolatis vel obovatis; stamina 1–2 mm longa, filamentis basi pilosis, antheris rubellis vel flavis, 0.4–0.5 mm longis; achaenia 3–4 mm longa.

Low caespitose spreading matted dioecious herbaceous perennials up to 2 dm high with numerous highly branched, elongated, woody caudices forming loose mats up to 4 dm across, the caudices from stout woody tap-roots, the bark dark reddish-brown, exfoliating in small thin, often scaly, strips, the herbaceous stems arising from the nodes along the spreading

caudices; leaves in loose rosettes, restricted to the base of the flowering stems or at the tips of the caudices, the leaf-blades elliptic to ovate, (0.5-)1-2 cm long, 0.5-1.5 cm wide, densely grayish-lanate on both surfaces, the margins entire, plane, the apices obtuse, the bases obtuse to rounded, the petioles mostly long, 0.7-3 cm long, lanate to tomentose, the petiole-bases triangular, 1.5-4 mm long, 2-3 mm wide, sparsely pubescent to glabrous and brownish on both surfaces, not clasping the stems; flowering stems erect, slender, (0.5-)1-2 dm long, sparsely tomentose, the stems usually greenish; inflorescences capitate, the female inflorescences 2-3 cm across, the male inflorescences 1-1.5 cm across; bracts 4-6, semifoliate to foliate, lanceolate, 3-5 mm long, tomentose at least on the lower surface; peduncles lacking; involucre 1-3, congested, turbinate to turbinate-campanulate, those of the male plants 2.5-3 mm long, 3-4 mm wide, with 5-6 erect lanceolate lobes 1.5-2 mm long, the tubes not distinctly rigid, those of the female plants 3-4 mm long and wide with 4-5 erect broadly lanceolate lobes 2.5-3.5 mm long, the tubes rather rigid, tomentose without, glabrous or nearly so within, the bractlets linear, numerous, 2-4 mm long, densely white-hirsutulous with numerous cells, the pedicels 2.5-5 mm long, glabrous; flowers unisexual, the male flowers yellow with brownish-yellow midribs, 2-3 mm long including the 0.5-0.7 mm long stipe, glabrous within and without except for minute scattered glands within, the tepals essentially similar, elliptic to ovate, the female flowers yellow with brownish-yellow to reddish-yellow midribs, maturing reddish in fruit, (3.5-)5-8 mm long including the 0.5-0.8 mm long stipe, glabrous within and without except for a few minute hairs along the midribs within, the tepals essentially similar, oblanceolate to obovate, the inner whorl of tepals slightly longer than the inner whorl, both flowers united less than $\frac{1}{4}$ of their total length; stamens slightly exerted, 1-2 mm long, the filaments pilose basally, the anthers reddish to yellowish, 0.5-0.7 mm long, oval; ovary with styles up to 0.5 mm long; achenes light brown to brown, 3-4 mm long, the narrow base gradually tapering to a slightly pubescent 3-angled beak.—Dry rocky ridge tops, known only from Jaynes Canyon, Siskiyou Co., California. July-Sept.

Type.—On open rocky ridges above Jaynes Canyon at 6400 ft elev., Siskiyou Mountains, Siskiyou Co., California, 1 Sept. 1934, *Wheeler 3235*. Holotype, US! Isotypes, CAS! LA! NA! NY! UC! WTU!

Eriogonum declinum (based on *declinis*, Latin for unisexual) is related to both *E. marifolium* T. & G. and *E. incanum* T. & G., but differs from them in numerous features, the most obvious being the persistent capitate inflorescences. From *E. marifolium*, the new species differs in its wider and more densely lanate leaves, while from *E. incanum* it differs in the broader leaves, longer involucre and involucre lobes, and the more northern distribution. These three species and *E. polypodium* Small make up a unique section in the subgenus *Oligogonum* Nutt., and may be distinguished as follows:

A. Flowers yellow.

B. Leaves glabrate above, mostly rounded at the base, the upper surface olive-green; male plants with capitate to subcapitate inflorescences, the female plants with umbellate inflorescences having the rays elongating prior to fertilization; Sierra Nevada from Tuolumne Co. north to Siskiyou and Modoc Counties, Cali-

ornia, east to the Pine Forest Range of Humboldt Co., Nevada, and northward to central and east-central Oregon.....*E. marifolium*

BB. Leaves lanate to tomentose on both surfaces.

C. Female inflorescences capitate but becoming elongated after fertilization; leaves oblong to spatulate, 5–15 mm long, 3–7 mm wide, tomentose, on petioles (3–)5–10 mm long; Sierra Nevada from Tulare and Inyo Counties north to Tuolumne and Alpine Counties, and infrequently to Nevada Co., California, with an outlying isolated population on Ashland Peak, Jackson Co., Oregon.*E. incanum*

CC. Female inflorescences persistently capitate; leaves elliptic to ovate, (5–)10–20 mm long, 5–15 mm wide, lanate, on petioles 7–30 mm long; eastern end of the Siskiyou Mountains, Siskiyou Co., California.....*E. diclinum*

AA. Flowers chalky-white; leaves 2–10 mm long, 1–6(–8) mm wide, lanate to tomentose on both surfaces, with the upper side soon glabrous; Sierra Nevada, mainly in Tulare Co., California.....*E. polypodium*

Eriogonum congdonii (S. Stokes) Reveal, stat. nov. [based on *E. ursinum* S. Wats. var. *congdonii* S. Stokes, Gen. Eriog. 114. 1936. *E. ternatum* Howell var. *c.* J. T. Howell.] Low spreading herbaceous perennials forming rather dense mats up to 3 dm across with rather densely branched spreading woody caudices arising from stoutish but somewhat obscured taproots, the bark reddish-brown, exfoliating in thin shaggy strips, the herbaceous stems arising from the nodes of the caudices all along the entire length of the caudex; leaves in compact basal rosettes restricted to the base of the stems or the tips of exposed caudices, the leaf-blades narrowly elliptic or narrowly oblong, 0.5–2 cm long, 3–6(–8) mm wide, densely white-tomentose below, thinly floccose to glabrous and green above, the margins entire, usually thickened or slightly revolute, the apices acute, the bases cuneate, the petioles slender, 2–8 mm long, thinly tomentose to glabrate, the leaf-bases triangular, 1–2 mm long and wide, thinly tomentose without, glabrous within, not clasping the stems; flowering stems erect, slender, 1–2 dm long, floccose to glabrous, bractless; inflorescences simple umbellate, slightly open, up to 1.5(–2) cm long; bracts 3–4 at the base of the inflorescence, lanceolate, up to 5 mm long, thinly pubescent, slightly less so above; peduncles slender, erect, 0.3–3 cm long, tomentose; involucre solitary, turbinate, 5–6 mm long, tomentose without, glabrous within, the 6–8 lobes triangular, up to 2 mm long, erect, the bractlets linear, hirsutulous, the pedicels 6–8 mm long, glabrous; flowers sulphur-yellow with broad greenish-yellow midribs, 4–6 mm long including the 0.4–0.6 mm long stipe, glabrous within and without except for minute glands along the midribs within, the tepals essentially similar, obovate, the apices obtuse, the outer whorl of tepals slightly shorter than the inner whorl, united up to 1/3 the length of the flower in some; stamens slightly exerted, 4–5 mm long, the filaments densely pilose basally, the anthers yellowish, 0.4–0.5 mm long, oblong; ovary with styles 3–3.5 mm long, achenes light brown, 4–5.5 mm long, the large base tapering to a slightly pubescent, faintly 3-angled beak.—Dry serpentine slopes on Mt. Eddy, Siskiyou Co. and near the head of Bear Creek, Trinity Co., California, from 5000–7000 ft elev. July–Sept.

The Congdon Buckwheat, *Eriogonum congdonii* is a rare endemic species known only from a limited number of collections. Stokes (1936) associated

it with *E. ursinum* S. Wats. along with several other unrelated entities in a hodge-podge that took John Thomas Howell some years to finally unravel. At that time, Howell (1952) placed var. *congdonii* under *E. ternatum* Howell. His proposed relationship is correct with regards to its position in the genus as a whole; however, I would like to recommend that the variety be recognized at the specific rank. *Eriogonum congdonii* is quickly distinguished from *E. ternatum* and *E. umbellatum* Torr. by its narrow revolute leaves which somewhat resemble those of *Ledum*. The key in the "Supplement" may be modified on page 34, after BB, CC, DD, EE, as follows:

- F. Flowers ochroleucous; leaves broadly ovate, round to truncate at the base; west slope of the Sierra Nevada from Placer Co. north to Shasta and Lassen Counties, California, and in southwestern Oregon.....*E. ursinum*
- FF. Flowers sulphur-yellow; leaves attenuated at the base.
- G. Leaves plane, not revolute, oblong to obovate, 8-13 mm wide; tomentum of the plants blackish; Del Norte and western Siskiyou Counties, California, northward to southwestern and central Oregon.....*E. ternatum*
- GG. Leaves thickened and slightly to obviously revolute, narrowly elliptic to narrowly oblong, 3-6(-8) mm wide; tomentum of the plants greenish; southern Siskiyou Co. and adjacent Trinity Co., California.....*E. congdonii*

ERIOGONUM INFLATUM Torr. & Frem. var. *contiguum* Reveal, var. nov. A var. *inflato* differt plantis annuis et var. *fusiformi* differt plantis parce glandulosis cum caulis parce fistulosis vel gracilis. Plants annual, 5-30 cm high with usually a single stem arising from the slender woody taproot; leaves basal, the leaf-blades mostly reniform, 1-2 cm long, 1.2-2.8 cm wide; flowering stems erect, 2-7(-10) cm long, slender or only slightly fistulose toward the apex just below the first node, green and glabrous except for stipitate glands along the base of the stems and branches, slightly glaucous in some; inflorescences open and \pm densely branched, 5-20 cm long, the main branches rarely fistulose, glandular at the base, otherwise glabrous; peduncles 0.3-1.2 cm long, erect and curved, glandular at the base in most, glabrous above; involucre 1-1.3 mm long; flowers yellow, 1.3-1.6 mm long.—Dry sandy places on low foothills and flats from southwestern Nye Co., near Ash Meadows, westward into the Death Valley region of eastern Inyo Co., California. Mar.-June.

Type.—Large playas southeast of the junction of Nevada 10 and U. S. Highway 95, east of Ash Meadows, sec. 21, T. 17 S., R. 51 E., at 2250 ft elev., Nye Co., Nevada, 3 June 1969, *Reveal & Matthews 2157*. Holotype, US! Isotypes, to be distributed.

The var. *contiguum* is an interesting and evolutionary important variant within *Eriogonum inflatum*; it is the ultimate extreme within the species and represents a mere step along a seemingly parallel line of divergence prior to *E. trichopes* Torr. The name "*contiguum*" is selected to denote this condition and to point out the close and obvious affinities the var. *contiguum* has with *E. trichopes*. The differences between the two are subtle, but consistent. The two major features are the five lobed involucre and the sparsely branched primary nodes of var. *contiguum*. The involucre in *E. trichopes* are four lobed and the first node has a whorl of several branches. The glandular condition remains to be critically examined, but for now it can be said that

it is common in var. *contiguum*, while in *E. trichopes* it is rare or at least infrequent.

From a taxonomic point of view, this new variety presents some real problems for the specific distinctiveness of *Eriogonum trichopes*. However, as the variety shares several features with the perennial *E. inflatum* which can be emphasized (or weighted if you will allow me to use a bit of numerical taxonomy jargon), it can be referred with some certainty to this species. For the most part, the var. *contiguum* will not be confused with *E. trichopes*, although some plants from Clark Co., Nevada appear to bridge the already weak gap between the two. It should be noted at the same time that no confusion with *E. inflatum* has been encountered.

In *Eriogonum inflatum* as a whole, annual phases are not infrequent. As a matter of fact, the species is commonly a first-year flowering perennial so that some plants of var. *inflatum* are definitely annual when collected. In the southern Coast Ranges of California this condition is frequently noted. However, these scattered plants are not consistently annual, and thus are not biologically similar to the var. *fusiforme* (Small) Reveal, var. nov. [based on *E. fusiforme* Small, Bull. Torrey Bot. Club 33: 56. 1906] of north-eastern Utah and adjacent northwestern Colorado. Here the plants are only annuals.

The perennial to annual evolutionary trend is seen within *Eriogonum inflatum*: Going from var. *deflatum* I. M. Johnst. of Baja California and extreme southern California and adjacent Arizona which is strictly perennial, to the first-year flowering perennial var. *inflatum* to the two strictly annual variants. This same type of trend is observed in the *E. trichopes* complex: Here the trend beginning with the perennial *E. pilosum* S. Stokes of Baja California and blends into the annual *E. trichopes* on the one hand, while on the other hand, *E. pilosum* varies toward a second perennial, *E. scalare* S. Wats., which in turn blends into the annual *E. intricatum* Benth, both of central Baja California. For this reason, I suspect that var. *contiguum* represents some type of parallel development of an annual phase within *E. inflatum* which is similar to *E. trichopes*.

ERIOGONUM RIXFORDII S. Stokes. This species is now known from extreme western Nye Co., Nevada, near Beatty (Beatley, 1969).

ERIOGONUM EREMICOLA Howell & Reveal. This endemic species is now known from New York Butte, Inyo Mountains, Inyo Co., California, based on *Alexander and Kellogg 3091* (UC).

The following three species of the subgenus *Oregonium* may be added to the California flora. They have suffered from the slings of the taxonomist's sword of synonymy and from the ignorance of a younger generation of botanists, into which both cases I too have fallen. I trust that their return to full status will be appreciated.

ERIOGONUM CITHARIFORME S. Wats. [*E. vimineum* var. *c.* S. Stokes. *E. gracile* var. *c.* Munz.] Erect herbaceous annuals 2–3 dm high; leaves basal and cauline, the basal leaf-blades oblong-lanceolate, 1–2 cm long, tomentose below, floccose to glabrate above, the petioles 1–5 cm long, winged, the cauline leaf-blades elliptic, highly reduced and restricted to the lower nodes,

lacking in some; flowering stems slender, 0.5–1 dm long, glabrous; inflorescences spreading and open, 0.5–2.5 dm long, glabrous, the branches often curved; involucre turbinate, 2.5–3 mm long, glabrous, 5-lobed; flowers white to rose, 1.5–2 mm long, glabrous, the tepals oblong-obovate; stamens 1–1.5 mm long; achenes brown, 1 mm long, ovoid, with a prominent 3-angled beak.—Dry slopes and waste places in the southern Coast Ranges from San Luis Obispo and Santa Barbara Counties south to Ventura Co., California. May–Aug.

Var. *agninum* (Greene) Reveal, comb. nov. [based on *E. agninum* Greene, Pitt. 2: 165. 1891. *E. vimineum* var. *a.* S. Stokes. *E. v.* ssp. *polygonoides* S. Stokes. *E. gracile* var. *p.* Munz.] Leaves elliptic to ovate or nearly rounded, the petioles not winged.—Waste places in San Luis Obispo and Santa Barbara Counties, California. Sept.–Nov.

This species can not be referred to any other specific entity, and most certainly not *Eriogonum vimineum* Dougl. ex Benth. nor, although with less conflict, to *E. gracile* Benth. It seems to me that the only rank this entity can stand comfortably at is the specific one. To be sure it is closely related to other species in the subgenus, but then so are the other species as I have already pointed out (Reveal, 1969b). With regards to the variety, the earliest name at this rank is *agninum*, dating from 1936, and must take precedence over the var. *polygonoides* suggested by Munz.

ERIOGONUM LUTEOLUM Greene. [*E. vimineum* var. *l.* S. Stokes, non *E. l.* (Cov.) Jones, 1903, a synonym of *Gilmania luteola* Cov., see Reveal, 1969a.] Tall erect herbaceous annuals (2–)3–5(–6) dm high; leaves basal and cauline, the basal leaf-blades oblong-ovate, rounded to reniform or cordate, 1–3.5 cm long and wide, tomentose below, floccose to glabrous above, the petioles 1–8 cm long, the cauline leaf-blades cordate to reniform, 1–2 cm long, 1–3 cm wide, similar to the basal leaves, the petioles 0.5–5 cm long, the leaves occasionally reduced and 0.3–1 cm long and wide and often deciduous especially in central Oregon; flowering stems erect, 0.5–1 dm long, slender, glabrous or infrequently tomentose; inflorescences open, erect or only slightly spreading, 1–4.5 dm high, glabrous or rarely tomentose; peduncles lacking; involucre cylindric, 3–3.5 mm long, glabrous or tomentose, 5-lobed; flowers white to pale yellow, 1.8–2 mm long, glabrous, the tepals essentially similar, obovate; stamens 1–1.5 mm long; achenes light brown to brown, 1.8–2 mm long, the narrow base tapering to a long 3-angled beak.—Occasional in dry places in the northern Coast Ranges from San Mateo Co. northward to Humboldt and Siskiyou Counties, California, and from Curry Co. northeastwardly to Crook Co., Oregon. June–Sept.

The name *Eriogonum luteolum* has been hidden in synonymy for many years and the exact nature of the species was totally unknown to me until 1968. Over the years, I have been recognizing specimens of this species and occasionally giving them a herbarium name commemorating Joseph P. Tracy whose collections of this entity are numerous. In the "Supplement" I mentioned this species (page 57) as being related to *E. caninum* (Greene) Munz, but up to that time, I felt the need to understand more fully the relationship between the Coastal populations of *E. luteolum* and the Sierra Nevada element now known as *E. pedunculatum*. A review of the Greene

type deposited in his herbarium has shown me that my association of *E. luteolum* with *E. vimineum* Dougl. ex Benth. as suggested by Stokes (1936) is an error.

For the most part, *Eriogonum luteolum* can be easily recognized by the large cauline leaves found on the lower nodes of the inflorescences and the totally sessile involucre which are appressed to the stems and not on short branchlets as in *E. caninum*. The leaf feature is not a consistent one, however, as the leaves are soon deciduous in the Oregon populations and will be lacking in some of the northern California plants if the collections are made late in the year. Its relationship to *E. vimineum* seems clear, but without the cauline leaves, the plants resemble *E. davidsonii* Greene more closely. How close *E. luteolum* is to *E. pedunculatum* remains to be explored in more detail.

ERIOGONUM PEDUNCULATUM S. Stokes. Tall erect herbaceous annuals 3–6 dm high; leaves basal and cauline, the basal leaf-blades oblong to oblong-ovate, 2–5 cm long, 1–2.5 cm wide, tomentose below, floccose to glabrous above, the petioles 1–5 cm long, the cauline leaf-blades mostly orbicular, 1–2 cm long and wide, similar to the basal leaves, the petioles 0.5–3 cm long; flowering stems erect, slender, 0.5–1 dm long, glabrous; inflorescences open, erect or slightly spreading, 1–5 dm high, glabrous; peduncles erect, slender, glabrous, up to 5 mm long, restricted to the lower nodes; involucre cylindrical, 3–3.5 mm long, glabrous, 5-lobed; flowers white, 1–1.5 (–1.8) mm long, glabrous, the tepals essentially similar, obovate; stamens 1–1.5 mm long; achenes light brown, 1–1.4 mm long, the narrow base tapering to a long, 3-angled beak.—Dry places mainly under pines and oaks along the western flank of the Sierra Nevada from Calaveras Co. northward to Placer Co., California. June–Sept.

This species has been a painful thorn for many years. It is an unusual species to begin with in that it has peduncles similar to those found in *Eriogonum eastwoodianum* J. T. Howell and its related taxa of the subgenus *Oregonium*; and yet, it is in no way closely related to them. In my preliminary revision of the genus (Reveal, 1969a), I placed *E. pedunculatum* and *E. luteolum* Greene side by side with *E. vimineum* Dougl. ex Benth. and *E. davidsonii* Greene in the typical section *Oregonium*. Those taxa associated with Howell's species were referred to an altogether different section. As noted above under *E. luteolum*, the relationship of these two entities is not yet clear. There are several well-known northern Coast Ranges–western Sierra Nevada populations in the genus *Eriogonum* which are represented by the same species (such as *E. tripodum* Greene) or different varieties (as is the case in *E. inerme* (S. Wats.) Jeps.), or even closely related species as is the case suggested here. However, until *E. pedunculatum* can be more carefully studied in the field, its taxonomic status must remain in some doubt.

These species can be added to the key in the "Supplement" by modifying the key on page 37 after EE, F, G, as follows:

- H. Leaves oblong-obovate to oblanceolate, but if plants glabrous, then not from the western flank of the central Sierra Nevada; stems tomentose or glabrous; southern Oregon southward in western and southern California into northern Baja California.

- I. Involucres 4–5 mm long, cylindric, with minute teeth; outer whorl of tepals narrowly obovate; achenes 2 mm long; southern Oregon southward in scattered locations in western California to Ventura and Los Angeles Counties, California, and becoming more common in the ranges bordering the Great Valley.....
.....*E. roseum*
- II. Involucres (1.8–)2–3 mm long, turbinate, with prominent teeth; outer whorl of tepals broadly obovate; achenes about 1 mm long; Napa and Yolo Counties, California, southward to northern Baja California.
- J. Stems and inflorescences tomentose to floccose; petioles slender, not winged; inner Coast Ranges from the Sacramento Valley southward into southern California mainly in the mountains on into northern Baja California.....
.....*E. gracile*
- JJ. Stems and inflorescences glabrous; petioles often winged; Coast Ranges from San Luis Obispo Co. southward to Ventura Co., California....*E. cithariforme*
- HH. Leaves rounded or nearly so, or if not, then the stems glabrous and the plants of the western flank of the Sierra Nevada; stems glabrous or floccose; central Washington southward through eastern Oregon and western Idaho into southern Oregon, California and northern Baja California, and eastward across southern California into southern Utah, western and northern Arizona, and extreme southwestern Colorado.
- I. Leaves basal and at the lower nodes; involucres 3–3.5 mm long; stems usually solitary, glabrous or tomentose; plants mostly 3–6 dm high; Coast Ranges of northern California and southern Oregon, and the western flank of the Sierra Nevada.
- J. Leaves rounded to reniform or cordate, or oblong-ovate; stems glabrous or tomentose; northern Coast Ranges from San Mateo Co. northward to Humboldt and Siskiyou Counties, California, into southern Oregon from Curry Co. eastwardly to Crook Co.....*E. luteolum*
- JJ. Leaves oblong to oblong-ovate; stems glabrous; western flank of the Sierra Nevada from Calaveras Co. northward to Placer Co., California.....
.....*E. pedunculatum*
- II. Leaves strictly basal; involucres 2–5 mm long; stems solitary or several from the base, glabrous or floccose; plants 1–5 dm high; central Washington southward to northern Baja California, eastward into western Idaho and Nevada, and across western and northern Arizona into southern Utah and southwestern Colorado.
- J. Stems mostly branched from the base, glabrous or floccose only near the base; outer whorl of tepals less than twice as long as wide; central Washington southward into eastern Oregon, western Idaho, and into northeastern California and western Nevada, southward in the Sierra Nevada and the Coast Ranges to central California.....*E. vimineum*
- JJ. Stems mostly simple below, glabrous; outer whorl of tepals more than twice as long as wide; southern Coast Ranges and mountains of southern California and northern Baja California eastward into western and northern Arizona, southern Utah, and extreme southwestern Colorado.....
.....*E. davidsonii*

ERIOGONUM DENSUM Greene. In the "Supplement" I commented that the type of this species appeared to be a grazed form of *E. polycladon* Benth. in DC. Since then a small number of additional collections have come to my attention which indicate that this is not the case. In my review of the genus (Reveal, 1969a), I suggested that *E. densum* be given taxonomic recognition. However, it in no way alters the concept of *E. palmerianum* Reveal in Munz.

ERIOGONUM BRACHYANTHUM Cov. also occurs in northern Baja California.

ERIOGONUM HEERMANNII Dur. & Hilg. var. *humilius* (S. Stokes) Reveal, stat. nov. [based on *E. h.* ssp. *h.* S. Stokes, Gen. Eriog. 90. 1936.] Low spreading to rounded shrubs 3–7 dm high and 5–12 dm across; leaves oblanceolate to spatulate, 8–15 mm long, floccose to glabrous below, glabrous above, the petioles 3–8 mm long; inflorescences dense, glabrous and smooth, 3–10 cm long, 5–20 cm wide; involucre 1–1.5 mm long, 1.5–3 mm wide; flowers white, 2.5–3 mm long.—Dry slopes from Inyo and Mono Counties, California northward and eastward to Humboldt and Nye Counties, Nevada. June–Oct.

The var. *humilius* and var. *heermannii* have been confused for many years in my mind (as well as others), but Stokes (1936) carefully pointed out the differences which have just recently become obvious to me too. Originally my concept of the typical phase of the species was based on var. *humilius*—those plants of the species I had seen throughout so much of Nevada. Consequently, it came as somewhat of a shock to discover the true phase of the species in southern Nevada and adjacent southern California. A review of the types and herbarium specimens associated with my studies on *Eriogonum apachense* Reveal (1969c) brought the differences home and a new combination is now made. In general, the two varieties may be distinguished on the arrangement of the involucre on the upper branches: Those of var. *humilius* are scattered along the slender branches while the involucre of var. *heermannii* are racemously arranged on the tips of the stouter and more rigid branches.

Eriogonum rupinum Reveal, sp. nov. A *E. panamintensi* affinis sed foliis (2–)2.5–3.5(–4) cm longis et 1.5–2.5 cm latis, plantis 3–5 dm altis, caulibus 3–7 basi; a *E. racemoso* differt involucris per ramis 3–5, non congestis, tubis 3–4 mm longis et latis. Plantae herbaceae perennes 3–5 dm altae; folia basalia, laminis oblongis vel ellipticis, (2–)2.5–3.5(–4) cm longis et 1.5–2.5 cm latis, subtus tomentosis, supra floccosis, petiolis longis, 3–7 cm longis, tomentosis vel floccosis; caules 1.5–3 dm longi, tomentosi vel floccosi; inflorescentiae cymosae, 1.5–2.5 dm longae, tomentosae vel floccosae; bractee ternatae, squamiformes; involucra solitaria, 3–5 racemose disposita secus superiores caules, tubis turbinato-campanulatis, 3–4 mm longis et latis, tomentosis, 5-lobatis, bracteolis lineari-oblancoelatis, 1.5–3.5 mm longis, pedicellis 3–5 mm longis, glabris; flores cremei vel eburnei, 2.5–3(–3.5) mm longi, glabri, tepalis similaribus, oblongo-oblancoelatis; stamina exserta, 2.5–4 mm longa, filamentis sparsis basi pilosis, antheris cremeis vel roseis, 0.5–0.6 mm longis, oblongis; achaenia 2–3 mm longa.

Erect herbaceous perennials 3–5 dm high with 3–7 stems arising from the compact, short-branched, woody caudices, the bark reddish-brown to brown, exfoliating in long loose strips, arising from rather stout taproots; leaves solitary and strictly basal, the leaf-blades oblong to elliptic, (2–)2.5–3.5(–4) cm long, 1.5–2.5 cm wide, thinly tomentose below, thinly tomentose to floccose and greenish above, the margins entire and plane, the petioles long, 3–7 cm long, thinly tomentose to floccose, the petiole-bases deltoid, 4–6 mm long, 4–7 mm wide, densely tomentose with short matted white hairs without, glabrous within, not clasping the stems; flowering stems erect, ± stout, 1.5–2.5 dm long, thinly white-tomentose to floccose; inflorescences

cymosely branched with the virgate branches containing 3-5 racemosely arranged involucre, 1.5-2.5 dm long, trichotomously branched at the first node, dichotomous above, divided 3-5 times, thinly white-tomentose to floccose; bracts ternate, scale-like, linear to narrowly triangular, 2-4 mm long, 0.8-1(-1.3) mm wide, thinly white-tomentose without, tomentose within at the base but becoming glabrous above, connate at the base; peduncles lacking; involucre solitary, closely appressed to the stems and in the nodes, turbinate-campanulate, 3-4 mm long and wide, thinly tomentose without, glabrous within, the 5 shallow lobes up to 0.3 mm long, rounded, the bractlets linear-oblongate, 1.5-3.5 mm long, fringed with short acute cells along the margins, the pedicels 3-5 mm long, glabrous; flowers cream-white or cream with reddish-brown to brownish midribs, 2.5-3(-3.5) mm long, glabrous within and without except for a few glands along the midribs at the base or totally glabrous within, the tepals essentially similar, the outer whorl of tepals slightly wider than the inner whorl, oblong-oblongate, 1.4-1.8 mm wide, united only at the very base; stamens slightly exerted, 2.5-4 mm long, the filaments sparsely pilose basally, the anthers cream to rose, 0.5-0.6 mm long, oblong; achenes light brown, 2-3 mm long, the narrowly subglobose bases tapering to long 3-angled beaks.—Dry gravelly flats and lower slopes in canyon bottoms in various desert ranges from 6000-8500 ft elev., Inyo Co., California east to southern Lander Co. and Nye Co., Nevada. July-Sept.

Type.—Common along wash of canyon below Rose Spring, Cedar Pass area, southern Kawich Range, about 1 mile N of old Nev. Hwy. 25 from Kawich Valley to Cactus Flat, at 7200 ft elev., associated with *Artemisia*, pinyon and juniper, Nye Co., Nevada, 9 Aug. 1969, *Beatley 9458*. Holotype, US! Isotypes, to be distributed.

Representative collections.—CALIFORNIA: Inyo Co.: 10 miles up Wyman Creek, White Mts., 1 Aug. 1945, *Maguire & Holmgren 26031* (NA, NY, UC, US, UTC). NEVADA: Esmeralda Co.: Silver Peak Mts., 18 Oct. 1915, *Goldman 2566* (NA). Lander Co.: 17 miles from Austin, Birch Creek, 7 Sept. 1937, *Henning 29* (NA, RENO); Kingston Creek Canyon, Toiyabe Mts., 16 Sept. 1968, *Howell & True 45421* (CAS); 36 miles SE of Austin, 17 Aug. 1937, *Murphey 493* (NA). Mineral Co.: 4 miles up Cory Creek, Wassuk Range, 2 Sept. 1938, *Archer 6882* (NA, RENO); 15 miles N of Hawthorne, 25 Sept. 1937, *Henning 252* (NA). Nye Co.: Near Rose Spring, Kawich Range, 14 Sept. 1969, *Beatley 9630* (BRY, CAS, NY, RENO, US, UTC); 10 miles S of Millet, 14 Sept. 1937, *Henning 119* (NA, RENO, UC); Pine Creek Canyon, Toquima Range, 6 Aug. 1964, *Holmgren & Reveal 1556* (ARIZ, BRY, CAS, DS, GH, MO, NY, OKL, RM, RSA, UC, US, UT, UTC); Pine Creek Canyon, Toquima Range, 20 July 1945, *Maguire & Holmgren 25886* (NA, NY, UC, US, UTC); Quinn Canyon Range, 1898, *Purpus 6391* (US); North Fork of Twin River, Toiyabe Mts., 28 Aug. 1939, *Train 3411* (NA); Pine Creek Canyon, Toquima Range, 7 Aug. 1940, *Train 4525* (NA, UC).

Eriogonum rupinum is related to both *E. panamintense* Morton and *E. racemosum* Nutt. From the first it may be distinguished by the non-matted habit and the 3-7 erect herbaceous stems. These stems arise from a short compact caudex. The leaves are strictly basal and about the same size on long petioles. However, the tomentum is less dense and the plants tend to have a greenish hue rather than a whitish or brownish-gray hue so typical of *E. panamintense*. From *E. racemosum* the new species is far more difficult to characterize, but the aspect of the two is so different in the field

(and even in the herbarium) that once known, the two are consistently distinguished. The features of *E. rupinum* all overlap—to some degree—characteristics typically seen in the various populations of *E. racemosum*. However, no single group of specimens referable to *E. racemosum* have the same combination of features found in *E. rupinum*. Thus, one population of *E. racemosum* may be similar only in leaf size, or in the involucre size, or in flower size, but in no other feature. Technically, the new species can be separated from all known forms of *E. racemosum* by the highly branched inflorescences with only 3–5 racemosely disposed involucre on the upper branches. Also, preliminary data indicate that *E. rupinum* has a different chromosome number, and in this way also differs from *E. racemosum*.

As indicated in the "Supplement," the California plants previously called *Eriogonum racemosum* are now referred to *E. rupinum*. Also, the plants referred to *E. racemosum* from the Cottonwood Mountains are *E. panamintense*.

ERIOGONUM ROSENSE Nels. & Kenn. After a fresh review of the holotype of *E. anemophilum* Greene, I feel less confident that this name should be applied to the California species. Consequently, I am suggesting that the name *E. rosenense* be given to the plants I called *E. anemophilum* in the "Supplement," my discussion notwithstanding (page 66). Until the West Humboldt Range can be re-explored and Greene's species studied in detail, some doubt must remain as to the proper name for the California plants.

ERIOGONUM NUDUM Dougl. ex Benth. var. **murinum** Reveal, var. nov. A var. *pubifloro* differt foliis non solum basalibus, et a var. *auriculato* differt foliis tomentosis in superficiebus ambabus.

Tall erect herbaceous perennials 3–6 dm high; leaves sheathing up the stems, the leaf-blades 1.5–2.5 cm long, densely white-lanate below, grayish-tomentose above, the margins slightly crisped; flowering stems slender, not fistulose, 2–3 dm long, glabrous; inflorescences cymose, 1.5–3 dm long, glabrous; involucre congested, 5–10 per head, 5–6 mm long, glabrous; flowers white, 3–4 mm long, pubescent without.—Dry slopes in pine forests in the foothills of the Sierra Nevada, Tulare Co., California. May–July.

Type.—Along California Hwy. 198, 0.5 mile E of the south entrance of Sequoia National Park near Hammond, Tulare Co., California, 27 July 1966, *Holmgren & Reveal 2942*. Holotype, UTC! Isotypes, BRY, NY!

ERIOGONUM NUDUM Dougl. ex Benth. var. **DECURRENS** (S. Stokes) Bowerman. [*E. latifolium* ssp. *d.* S. Stokes.] Plants tall, 5–15(–20) dm high; leaves sheathing, the leaf-blades 1–3 cm long, tomentose below, thinly floccose to glabrous above, the margins crisped in some; flowering stems rather stout, slightly fistulose in some, 3–6 dm long, tomentose; inflorescences cymose, 5–10 dm long, tomentose; involucre solitary or in pairs, 4–6 mm long, tomentose; flowers white, 3–4 mm long, glabrous.—Dry slopes in the Coast Ranges from Contra Costa Co. south to Santa Cruz Co., California. July–Oct.

These two varieties are now added to the definition of *Eriogonum nudum*. The var. *murinum* is likely more widespread in Tulare Co. than known to me at this time, and certainly additional records will come to light in the future. The var. *decurrens*, on the other hand, is well-known, and is recog-

nized again although I previously placed it in synonymy under var. *auriculatum* (Benth.) Tracy ex Jeps., an error in judgment on my part.

In the key on page 69 of the "Supplement" these varieties may be added after AA, B as follows:

- C. Stems glabrous.
 D. Leaves densely tomentose on both surfaces or lanate below and tomentose above; involucre 5–10 per head; Sierra Nevada in Tulare Co.....var. *murinum*
 DD. Leaves densely tomentose below, glabrous or nearly so above; involucre 3–5 per head; inner Coast Ranges of California.
 E. Stems not strongly inflated; Sonoma Co. S to Monterey Co.....
var. *auriculatum*
 EE. Stems strongly inflated; Merced and Kern Counties.....var. *indictum*
 CC. Stems tomentose; Contra Costa Co. S to Santa Cruz Co.....var. *decurrens*

ERIOGONUM GRANDE Greene var. *timorum* Reveal, var. nov. A var. *grandi* affinis sed foliis et staturis minoribus, involucri campanulatis, 4–5 mm longis et 3–6 mm latis; a var. *rubescens* differt floribus albis.

Plants 1–2 dm high; leaves sheathing up the stems at least 1 dm, the leaf-blades 2–3.5 cm long, tomentose below, floccose above; flowering stems 0.8–1.2 dm long, glabrous, not fistulose; inflorescences subcapitate, 4–8 cm long, glabrous; involucre campanulate, 4–5 mm long, 3–6 mm wide; flowers white.—Dry rocky cliffs above the sea on San Nicolas Island, Ventura Co., California. Endemic. July–Sept.

Type.—San Nicolas Island, Ventura Co., California, Feb. 11, 1949, Moran 3168. Holotype, UC! A second collection was made by Trask and is deposited at US.

The var. *timorum* (meaning helping or aiding, alluding to San Nicholas of Bari, or in modern times, Santa Claus) is a narrowly endemic variant found only on San Nicolas Island. It differs from var. *grande* primarily in its smaller stature and size of all its parts and the tomentose to floccose leaves. The var. *timorum* differs from var. *rubescens* (Greene) Munz mainly in the same features plus the flower coloration.

The following notes and corrections can be added to the text of the "Supplement."

Page 35. Read "*carneum*" for "*glandulosum*."

Page 43. In the discussion under var. *covillei*, read "var. *aureum* (Gand.) Reveal" for "var. *intectum* A. Nels."

Page 46. Read "*pyrolifolium*" for "*pyroliifolium*."

Page 49. J. T. Howell published his work on *E. angulosum* in 1946, not 1944.

Page 55. In the description of *E. mohavense*, line 6, replace the semi-colon after "infl." with a comma.

Page 60. In the last line of the geographical range description for *E. saxatile*, place a semi-colon after "Santa Lucia Mts."

Page 61. In the discussion under var. *laxiflorum*, read "*rosmarinoides*" for "*rosamarinoides*."

Page 63. The length of the involucre of *E. Wrightii* var. *subscaposum* is 1.5–4 mm long, not 1.5–3 mm.

Page 64. In the first line, read "1.5–3 dm high," not "1.5–3 cm high."

Page 69. The flowers of *E. nudum* var. *pauciflorum* are pubescent, not glabrous.

Page 70. On the authorship of *E. fasciculatum* var. *foliolosum*, read (Nutt.) Stokes ex Abrams instead of Stokes ex Jones.

Page 71. In the description of *E. giganteum*, on line 7, remove the semicolon after "campanulate" and replace it with a comma.

Page 72. The chromosome number of *E. intrafractum* is $n=20$, based on Reveal & Holmgren 1862 from Titus Canyon, Inyo Co., California, collected on 19 Aug. 1968. Voucher at UTC.

The publication dates for chromosome counts given in the following species (cited by their number in the "Supplement") should be changed from 1968 to 1967: 9a; 10; 25; 53; 59; 82; 94; 95; 100, 101, and 103.

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