

CONTRIBUTIONS FROM THE ROCKY MOUNTAIN HERBARIUM. V.

AVEN NELSON.

TO THOSE who have known them in the field and who have studied them carefully in the herbarium, desert plants are of peculiar interest. No other plants show so many adaptations to their environment and, as a consequence, so many variant characters that have become fixed. During the spring of 1902 Mr. Leslie N. Goodding, a student in the University of Wyoming, was sent into the field in the interest of the Rocky Mountain Herbarium. He made collections in southern Nevada, southern Utah, the Wasatch Mountains, and in the Uintah Mountains, especially on their southern desert slopes. He secured many rare species of great interest, as well as some novelties. This paper is based, in a large measure, upon his field work.

NEW GENERA AMONG THE APLOPAPPUS SEGREGATES.

Notwithstanding the attention that the genus *Aplopappus* Cass. has had in recent years, it seems that further division would tend to simplicity. The genus *Stenotus* as now constituted is nearly homogeneous. Before the recent separation of two of the species and their erection into the genus *Stenotopsis* by Rydberg (Bull. Torr. Bot. Club **27**: 617), a concise generic description was unthinkable. My attention was called to this fact recently when some material of *Stenotus interior* (Coville) Greene came into my hands for determination. To one perfectly familiar with the normal species, the possibility that this plant also was listed as a *Stenotus* did not for some time occur to me. Several other genera come to mind more readily than this, among them *Macronema*, when one has in hand only the leafy floriferous twigs that constitute the usual herbarium specimens.

The difficulties encountered in generically placing the original species of the group (*Aplopappus linearifolius* DC.) has been recognized from DeCandolle down. Greene has stated the

whole matter very fully in the fifth of that series of papers entitled "Observations on the Compositae" (*Erythea* 2: 71). In his discussion of the asteroid genera (*Erythea* 2: 53) it seems to me that he was at his best, and gave us a bit of botanical philosophy that must stand for all time. But the criterion there laid down, and now generally accepted, as marking the limits of genera, confirms *Stenotopsis* as a valid genus. Into this genus another species must therefore find its way as follows:

Stenotopsis McLeanii, n. n.—*Aplopappus McLeanii* T. S. Brandegee, *BOT. GAZ.* 27: 448. 1899; *Stenotus McLeanii* Heller, *Muhlenbergia* 1: 7. 1900.

There are three other plants that seem to me to form an equally good and homogeneous group. One of these, starting as *Stenotus pygmaeus* (T. & G. Fl.), passed into *Aplopappus* (Gray Syn. Fl.) and was there associated with a near relative, *Aplopappus Lyallii* Gray. Greene in his discussion of the segregates of *Aplopappus* (*Erythea* 2:) considers the status of the former of these two and decides that it has enough *Macronema* characters to justify its transfer to that genus. Recently, however, it has been distributed on Greene's determination as *Stenotus* (Pl. Baker, 1899), though this may have been a clerical error. The second of these species Greene either overlooked or ignored entirely. But now Rydberg (*Mem. N. Y. Bot. Gard.* 1: 382. 1900) after due consideration very reluctantly makes the second *Pyrrocoma Lyalli*. Henderson, apparently not accepting the segregates of *Aplopappus*, describes (*Bull. Torr. Bot. Club* 27: 347. 1900) a third species which he pronounces "close to *A. Lyallii* as well as to *A. pygmaeus*." With these doubts and these differences of opinion staring us in the face, why not again accept the criterion laid down by Greene (that is, if I interpret him aright, a genus may be founded on characters of habit, along with characters of the vegetative organs and morphological characters of the flower, but not upon morphological characters of the flowers alone in the face of differences in habit and of the vegetative organs) for the limitation of genera, and thus bring together under one name these species which are allied by habit and morphological characters to each other and are aberrant in any recognized genus or genera in which they can be placed.

Tonestus, n. gen.—Low herbaceous perennials from woody roots, having a short more or less branched subligneous caudex. Stems simple, a few to several centimeters high, leafy throughout, monocephalous. Leaves herbaceous, obscurely 3-nerved, spatulately tapering to a short margined petiole. Heads relatively large (15–25^{mm} broad); the involucre bracts herbaceous, in about two loosely imbricated rows, usually with one to several outer foliaceous ones. Rays conspicuous, ten or more; the disk flowers more numerous. Pappus soft and white, equaling the corolla. Style tips slender, subulate-elongated. Akenes glabrous or pubescent. Anagram of *Stenotus*.

1. **Tonestus Lyallii**, n. n.—*Aplopappus Lyallii* Gray, Proc. Acad. Philad. 1863: 64; Syn. Fl. 1: 131; *Pyrrocoma Lyallii* Rydb. Mem. N. Y. Bot. Gard. 1: 382. 1900.

2. **Tonestus laceratus**, n. n.—*Aplopappus laceratus* Henderson, Bull. Torr. Bot. Club 27: 347. 1900; *Stenotus laceratus* Heller, Muhlenbergia 1: 7. 1900.

3. **Tonestus pygmaeus**, n. n.—*Stenotus pygmaeus* T. & G. Fl. 2: 237. 1842; *Aplopappus pygmaeus* Gray, Am. Jour. Sci. II. 33: 239. 1862; *Macronema pygmaeum* Greene, Erythea 2: 73. 1894.

STUDIES IN THE COMPOSITAE.

Coleosanthus venulosus, n. sp.—A low shrub 3^{dm} or less high, freely branched, the stems whitened with irregularly furrowed bark: leaves glabrous, sprinkled with microscopic (waxy?) particles, subsessile, triangular-deltoid, rather thin, with narrow prominent reticulate veins, the base truncate or subcordate, sharply acute or even acuminate at apex, cuspidately few-toothed on the margins, often subcrenate, generally less than 2^{cm} long, mostly on the herbaceous branchlets which terminate in slender monocephalous peduncles: heads about 14^{mm} high and fully as broad: involucre bracts minutely granular-puberulent as are also the peduncles, sub-equal, acuminate; the inner linear-lanceolate, few-nerved; the outer ovate-lanceolate, 6–10-nerved, usually with a subtending bract: flowers numerous: akenes linear, with 10 minutely hispidulous nerves: pappus strictly capillary, scarcely scabrous.

I know of no near ally of this species. It is based on Mr. Goodding's no. 678, from southern Nevada, "The Pockets," April 30, 1902; "in the crevices of the rock."

Hofmeisteria viscosa, n. sp.—Allied to *H. pleuriseta*: stems decumbent at base; lignescent below, grayish-white with glabrous bark; the upper herbaceous part granular-viscid: leaves slightly viscid, greatly reduced as to the blade; the lamina often reduced to a broadly linear-subulate point, frequently with 1 or 2 teeth near the base, from one-third to one-sixth as long as the slender petiole which is often 3^{cm} or more long: heads about 25-flowered, at the ends of the slender naked peduncles in 2-7 capitate clusters, the pedicels very short: involucre bracts oblong-linear, abruptly short-acuminate, scarious with three parallel green nerves: pappus of a few slender bristles (8-12); the squamellae wanting or if present represented by a few (1-6) variable bristles; corolla shorter than the pappus, its tube with minute scattered stipitate glands: the club-shaped styles included or at least not noticeably exerted: akene very short, ovate-oblong.

This species is somewhat at variance with the genus in the congested heads. It differs from all the species in its leaves and from its nearest ally as well as the others in floral characters.

Secured in southern Nevada, at "The Pockets," April 30, 1902, on dry stony bottom lands; no. 671.

Chrysopsis imbricata, n. sp.—Stems few to many from the crown of the root, quite simple, decumbent-ascending, 3-4^{dm} long, subcinerosus, the pubescence short and close with some longer hirsute hairs: leaves very numerous, broadly oblong or narrowly elliptic, sessile, often broadly obtuse, abruptly apiculate, sometimes lanceolately narrowed, grayish-hirsute; usually crowded till they appear imbricated, with smaller fascicled ones in the axils, the lower wanting at anthesis; the floral leaves reduced and often ciliate: heads several, closely glomerate at the summit of the stems, 10-14^{mm} high: involucre cinereous-hirsute: rays several, conspicuous, distinctly nerved: pappus fuscous: akenes silky.

The writer's no. 8618, from Pike's Peak, September 1, 1901, is taken as the type. Dr. Clements's no. 39, from the same region, is this species, but

not typical in habit, having been browsed off (my set). It was distributed as *C. hispida* (Hook.) Nutt.

Chrysopsis scabrifolia, n. sp.—Stems several from a woody root, ascending or erect, dark green and subpruinose, simple, or branched above, 12–20^{cm} high: leaves small (1–2^{cm}), nearly linear, at anthesis wanting below but crowded above, greenish in aspect, but distinctly scabrous with short upturned hairs from a pustulate base: heads few, solitary at the ends of the resinous-glandular branches, about 1^{cm} high: involucre bracts in 4–5 rows, merely puberulent: rays 20 or fewer: pappus somewhat sordid, equaling the disk corollas.

The specimen upon which this species is based was secured by Mr. Paul J. White, in Woods co., Okla., June 29, 1900. It was distributed as *C. hispida*, to which it bears little resemblance and less yet to any other species known to the writer.

The Natural History Survey of Oklahoma, so energetically conducted by Dr. Van Vleet, of the State University, has suffered the loss, by fire, of many very valuable collections, among them the plants of which these specimens were a part. Dr. Van Vleet is again in the field, and it is to be hoped that he may once more secure some of the rare species found on his first expedition.

Guttiérrezia myriocephala, n. sp.—Branching freely from the shrubby base, becoming 3–5^{dm} high, the grayish branches dissolving into myriads of filiform, green, subresinous branchlets: leafless below, trichophyllous above: cymes small, supernumerous: heads many, small, nearly cylindrical, somewhat glutinous: bracts of the involucre linear, acute, in about 3 rows: rays minute, 3–4; the disk flowers as many or fewer: pappus paleae 6–8, broadly linear and subacute.

The type is no. 8645, secured near Badger, Laramie co., Wyo., in the sandy draws of the Platte Cañon, September 3, 1901.

Solidago scopulorum, n. comb.—*S. multiradiata scopulorum* Gray, Proc. Am. Acad. 17: 187; Syn. Fl. 1²: 148.

There seems to be no reason for supposing that true *S. multiradiata* Ait. comes within the limits of the United States. The original high northern form is said to occur from Labrador and Hudson's Bay to Behring Strait and Unalaska. It is characterized by villous-pubescent stems, few and closely glomerate heads with very narrow rays. To carry the Rocky Mountain form along as a variety of this arctic species can serve no useful purpose.

Pyrrcoma brachycephala, n. sp.—*Aplopappus lanceolatus brachycephalus* Piper, n. var. in herb.—Stems several from the crown of a thickened root, slender, erect, 4–6^{dm} high, glabrous, rather leafy, clothed at the base with the shreds of former petioles: leaves glabrous or nearly so; the basal few, linear-ob lanceolate, entire or minutely denticulate, acute at apex, 1–2^{dm} long, tapering to a margined petiole nearly as long; the cauline sessile, noticeably denticulate: inflorescence a long crowded or glomerate spike-like raceme, with foliar bracts: heads about 1^{cm} high: the bracts unequal, in about 4 rows, oblong, abruptly acute.

The above description is taken from Mr. William C. Cusick's no. 2778 (in the Rocky Mountain Herbarium), the label of which bears the legend already given. The plant is so different from *Pyrrcoma lanceolata* in its habit, in the spicate, foliar-bracted inflorescence, and in the character of its leaves that it seems best in transferring it to *Pyrrcoma* to give it specific rank at the same time.

Pyrrcoma Kennedyi, n. sp.—Stems several from the root, ascending, 2–4^{dm} high, light-green, somewhat villous-pubescent, paniculately branched upward and bearing numerous heads: leaves permanently and rather softly and densely lanate-pubescent, mostly basal, oblong or oblanceolate, acute at apex and conspicuously dentate with narrow spinulose teeth, 5–10^{cm} long, tapering into a petiole usually much shorter; cauline leaves smaller and narrowed to a sessile base: heads medium sized (1^{cm} or more broad and high), several to many (often 30 or more on each of the several stems) on the slender linear-bracted branches of the panicle: involucre bracts in 3 or 4 rows, unequal, herbaceous-tipped, but not noticeably broadened or squamose: rays mostly fewer than 20.

The nearest ally of this species is *P. lanceolata*. In fact, it bears much the same relation to this that *P. inuloides* bears to *P. uniflora*. The distinctly paniculate arrangement of the numerous heads, together with the permanent woolliness of the plant as a whole, seems to justify its separation from *P. lanceolata*.

The type is no. 630 secured by Professor P. B. Kennedy on Maggie Creek, Elko county, Nev., August 13, 1902. Similar but smaller is his no. 615, Tuscarora flats, same county. Mr. William C. Cusick's no. 2744, Oregon, 1901, distributed as *Aplopappus hirtus* Gray, var., is the same, as is also probably no. 1137 by Merrill and Wilcox, from Buffalo River, northwestern Wyoming.

Stenotus latifolius, n. sp.—Caudex woody, with numerous slender naked branches rising some centimeters above the ground; herbaceous stems numerous, slender, leafy, monocephalous, 10–15^{cm} high, striate, glabrous but obscurely glutinous: leaves glabrous, slightly glutinous, acute or apiculate, 3-nerved and more obscurely reticulate-veined; the crown leaves not persistent, small, spatulate and cuneately tapered to a petioled or sessile base, usually not more than 7–12^{mm} long; stem leaves longer, several (5–7), the lowest broadly spatulate-cuneate, the upper from broadly oblong to lanceolate, usually with tapering base, 2–3^{cm} long; the upper one-third of the stem naked-pedunculate, often with a linear bract: heads 10–12^{mm} high: the bracts in 3–4 series, oblong, abruptly acute, light green with narrow scarious margin: rays several, rather short: pappus bristles slender, white, about as long as the somewhat angled canescent akene.

This species has no near relative, but is most nearly approached by *S. falcatus* Rydb. From this and all the other species it is at once separated by the open naked slender branches of the caudex which wholly lack the enlarged indurated and petiole-sheathed crowns of the other species. This also is the only species with decidedly foliose stems, the leaves of which are relatively much broader and more herbaceous than in the other species.

Type no. 1111, by Mr. Goodding, "rock crevices," mountain slopes, near Provo, Utah, June 16, 1902.

Sideranthus Gooddingi, n. sp.—Caudex woody, branched, several centimeters high: herbaceous stems slender, 2–3^{dm} high, numerous, fascicled, nearly simple, monocephalous or with 2–3 monocephalous branches, minutely glandular-puberulent throughout: leaves linear, spinulose-tipped, 1–3^{cm} long, 1–2^{mm} broad, with a few slender flagellate-spinulose teeth upon the margins, rarely with a few short linear lateral lobes: heads about 1^{cm} high, the disk hemispherical: involucre bracts in 5–6 series, very narrowly linear, somewhat greenish and minutely glandular, flagellate-spinulose tipped: rays orange-yellow, many, linear: disk flowers numerous: pappus bristles scabrous, of several lengths, the longest not equaling the disk corollas: akenes softly pubescent, broadly linear, not more than half as long as the disk corollas.

Allied to both *S. gracilis* (Gray) and *S. australe* (Greene) Rydb. It is

distinguished from both by the nearly simple branches, the glandulosity of the whole plant, and the narrowly linear leaves. From the former also by the greener stems which lack the canescent harsh pubescence of that species; from the latter also by a very different involucre.

I dedicate this species to Mr. L. N. Goodding, who secured a most valuable collection of plants in southern Nevada and Utah, in fact, as will be noticed, most of the species of this paper. No. 667, from "rock crevices," "The Pockets," southern Nevada, April 30, 1902.

Townsendia dejecta, n. sp.—Depressed-acauliscent, the caudex bearing a few heads in a small rosulate semisubterranean tuft: leaves linear-spatulate or oblanceolate, somewhat petioled, 1–2^{cm} long (including the petiole), surpassing the heads, somewhat fleshy, green and apparently glabrous but under a lens appressed strigose on both faces: heads sessile at the base of the leaves, about 1^{cm} high; involucral bracts in 2–3 series, oblong ovate, mostly subacute, purple or some with green centers, ciliate margined, otherwise nearly glabrous: rays white or possibly purple: disk flowers numerous, the corolla lobes purple: pappus white, similar in disk and ray flowers as are also the akenes: akenes brown, flattened, spatulate-cuneate, about 4^{mm} long, wholly glabrous except for some obscure puberulence at the very base, as long as the pappus and disk corolla.

Most nearly allied to *T. alpigena* Piper, from which it may be distinguished by its absolute stemlessness, the strigose pubescence, the purple of the involucre, of the disk, and probably of the ray, and by the glabrous akenes wholly devoid of bidentate hairs. Townsendsias with glabrous akenes are rather rare.

Collected by Mr. Goodding in the Uintah Mountains, near Dyer's Mine, at an altitude of about 3,000^m. Type no. 1238, July 3, 1902.

Machaeranthera verna, n. sp.—Perennial from thickened woody roots: stems several from the ligneous crown, erect, branched above, 4–6^{dm} high, striate, nearly or quite glabrous except above: leaves from linear to lanceolate, glabrous or sparsely crisped or ciliate-pubescent especially on the margins, spinously few-toothed on the margins; the uppermost reduced and bract-like, lanately-puberulent as are also the branchlets: heads corymbose-paniculate: involucre 12–14^{mm} high and broad; its bracts imbricated in 5–6 rows, scarcely viscidulous, lightly sublanate, linear acuminate, the slender tip green and at length reflexed: rays purple,

rather numerous: pappus slightly dingy, equaling the slender corollas: akenes linear, pale, sparsely and minutely soft pubescent.

This tall handsome species differs from the species known to the writer in its early development. It comes into blossom in April, whereas most of the species are autumnal or at least of late summer. But apart from that its morphological characters readily distinguish it.

Collected by Mr. Leslie N. Goodding, Big Bend, Virgin River, Arizona, May 10, 1902, no. 757.

Machaeranthera coronopifolia, n. n.—*Dieteria coronopifolia* Nutt. Trans. Am. Phil. Soc. 7: 300. Annual, or probably often biennial, divaricate-branched from the base upward (rarely two or more stems from the base), 1–2^{dm} high, green but puberulent and minutely glandular: leaves from moderately to very deeply pinnatifid, oblanceolate in outline, from 1–4^{cm} long; the segments very variable, from linear to oblong or merely with broad teeth upon the margins of the blade, setulose-mucronate: heads large: the involucre in about 5 series, the slender green reflexed portion of the bract about as long as the scarious imbricated base: rays often nearly 2^{cm} long, bluish-purple: akenes sparingly appressed pubescent.

This is in part the *Aster tanacetifolius* of Gray, Syn. Fl. 206; not *Machaeranthera tanacetifolia* Nees, nor the *M. tanacetifolia* of Greene in Pitt. 3:59.

This northern species may at once be distinguished from that southern and earlier named one by its greener aspect, lower stouter and more spreading habit, simply pinnate leaves, broader and more numerous involucre bracts, and by the sparse appressed pubescence of the akenes. Of the southern species I have seen only a few plants, but Wootton's no. 22, Mesilla, N. M., seems to be quite typical. The northern species is frequently collected in Wyoming, northern Colorado, and western Nebraska.

My numbers are 443, Platte River, July 13, 1894; 2581, Chug Creek, August 1, 1896; and 8205, Colorado-Wyoming line, August 28, 1900.

Aster meritus, n. sp.—Stems one to several from each of the many crowns of the woody roots and rootstocks that make up the dense perennial base, the tufted stems suberect or more usually widely spreading and forming a mat 5–10^{dm} across, 2–4^{dm} long, green but under a lens sparsely pubescent, simple or branched, leafy throughout: leaves oblong or sometimes elliptic, 3–7^{cm} long, subacute, entire or obscurely crenulate-serrate, glab-

rous above, often sparingly and minutely ciliolate-scabrous below and on the margins: heads several to numerous, usually in a crowded corymbose leafy cyme, turbinate-campanulate: involucrel bracts broadly linear, in 3-4 rows, subacute or obtuse, erect, purple-tipped and margined, delicately ciliate, sometimes puberulent (as are the peduncles and pedicels): rays mostly fewer than 15, purple or violet, pappus brownish: akene linear, half as long as the pappus, minutely ciliate and obscurely few-nerved (about 5).

The literature of the subject seems to indicate the distinctness of the *Aster* occurring in the middle Rocky Mountains, which has been called *A. Sibiricus* or *A. Richardsonii*. There can be no doubt that the true *A. Sibiricus* L. is foreign to North America and that it belongs where its name would indicate.

It is equally clear that *A. Richardsonii* is the name given to the *A. montanus* of Nuttall. Hooker (Fl. Bor. Am. 2:7) seems to have satisfied himself that *A. salsuginosus* (?) Less. equals *A. Espenbergensis* Nees, and that the latter is undoubtedly the *A. montanus* of Rich. It follows, therefore, that the more southern form, if distinct from *A. Richardsonii* Spreng. (re-characterized by Hooker, *l. c.*), has so far remained unnamed. The original *A. Richardsonii* is a plant of the "barren country from lat. 64° to the Arctic Seas." The Torrey and Gray *Flora*, which took into consideration these arctic forms only, emphasizes the characters which separate them from the species now proposed, viz., the tomentum, the serrate leaves, the squarrose involucre, many-ribbed achenia, etc. In the *Syn. Fl.* Dr. Gray modifies this description so as to include all the European as well as the North American forms.

Typical of the species now proposed are the writer's collections as follows: Yellowstone Park, 1899, nos. 6754 and 6610 (distr. as *A. Sibiricus*); Big Horn Mountains, nos. 2334 and 7924, secured in 1896 and 1901 respectively.

Aster incertus, n. sp.—Low, more or less caespitose-tufted, from small woody root-crowns and slender rhizomes: stems leafy, usually decumbent at base, rarely more than 1^{dm} high (occasionally nearly 2^{dm}), sparingly cinereous-pubescent: leaves oblong to oblanceolate, 2-5^{cm} long, most of them tapering to a short petiole, glabrous or nearly so; the uppermost sessile by a clasping base: heads solitary at the ends of the stems which are usually simple, rather large and showy (2-3^{cm} broad): involucrel bracts spatulate, subacute, minutely soft-pubescent on the margin, otherwise glabrous and green or sometimes purple margined: rays purple, rather numerous (25-50): pappus brownish, twice as long as the brownish nearly glabrous akene.

The species here proposed seems to belong in the *A. adscendens* group. In habitat and aspect, however, it reminds one more of *Erigeron glacialis*. After trying for some time to find in the recognized Rocky Mountain species a near ally, I now offer it, with some hesitancy as a new species. The type is no. 7924, from alpine summits in the Medicine Bow Mountains, Albany co., Wyo., August 2, 1900.

Xylorrhiza scopulorum, n. sp.—A low shrub 3–4^{dm} high, the woody base branched and naked: branches with a glistening white bark, glabrous except for a tuft of wool at the old leaf-scars: young branches herbaceous, greenish, leafy throughout, sparsely lanate and above viscid-glandular, monocephalous: leaves oblong-lanceolate, green and herbaceous, lightly lanate-pubescent and glandular-dotted, spinulose-dentate, the lower short-petioled, the uppermost reduced to lanceolate bracts: heads with the expanded rays about 4^{cm} broad: involucre bracts many, linear-acuminate, about 1^{cm} long, minutely viscid-pubescent: rays numerous, white or light-blue, 3-toothed: disk flowers very numerous, slender-tubular, about 5^{mm} long, and four times as long as the short-cylindrical merely canescent akenes; pappus as long as the disk corollas.

This species is to be distinguished from *X. tortifolia* (T. & G.) Greene, its nearest ally, by its less rigid, wholly herbaceous, not at all contorted leaves, which are not in the least incised (only bordered with small spinulose teeth); by the presence of some viscid-glandulosity upon leaves, young stems, and involucre; by the leafiness of the peduncles; and by the color of the rays. Type specimens from rocky cliffs at "The Pockets," southern Nevada, April 30, 1902, by Mr. Goodding, no. 669.

Erigeron glacialis, n. comb.—*Aster glacialis* Nutt. Trans. Am. Phil. Soc. 7: 291; T. & G. Fl. 2: 155; *Erigeron salsuginosus glacialis* Gray, Syn. Fl. 1^r: 209.

I think we shall do well to allow Nuttall's conception of the rank of this plant to stand.

Erigeron nauseosus, n. comb.—*E. caespitosus nauseosus* Jones, Proc. Cal. Acad. Sci. II. 5: 696.

The specimens distributed by Mr. Jones (no. 5586) bear out nicely the fairly complete description cited.

Hymenoclea fasciculata, n. sp.—Stems shrubby, several to many, spreading, simple, leafless, striate, with light yellowish-

green resiniferous bark, 2–4^{dm} high; branches fasciculate or brush-like at the top of the stems, 5–15^{cm} long, glabrous or sub-resinous, sometimes leafless and having a spinescent appearance: leaves narrowly linear, 1–4^{cm} long, entire or with a few widely divaricate linear lobes, slightly involute, leaving exposed a median line of canescent pubescence: sterile heads small, 3–4^{mm} in diameter, about 20-flowered, mostly spicate on the ends of the branches, or more scattered and intra-axillary: their involucre green, glabrate, its lobes 7, ovate, obtuse or subacute, often ciliate-laciniate; the corollas tubular-funneliform, 2–2.5^{mm} long, distinctly surpassed by the stamens and protruded penicillate stigma, its five tooth-like lobes with a long delicate pubescence partly concealing the numerous minute glands: anthers linear, shorter than the slender filament; chaff spatulate with a long narrow claw: fertile involucre oval, 5–6^{mm} long, its scales consisting of 3 or 4 cordate-deltoid green ciliate-margined bracts and about 12 spirally arranged scales which are broadly reniform, delicately nerved, thin, and petaloid in appearance, closely enwrapping the gland-dotted coriaceous body of the involucre: akene (immature) light yellow or greenish, closely dotted with brown.

The nearest ally is *H. salsola* T. & G. Pl. Fendl. 79; Pl. Frem. 14, *pl.* 8; but the fertile involucre is only the size of the involucre in *H. monogyra* Gray Pl. Fend. *l. c.*, and its scales, like the scales of that species, are reniform and not contracted at base. Besides the many other minor differences, the two species differ markedly in habitat and time of flowering. *H. salsola* is a plant of the saline basins of desert regions of California and comes into blossom in August, while *H. fasciculata* occurs on rocky ledges and comes into blossom in April.

The type is no. 662, by Leslie N. Goodding, Kernan, southern Nevada, April 29, 1902.

Gymnolomia nevadensis, n. sp.—Perennial from slender sub-vertical rootstocks, from the crown or crowns of which spring few to several slender stems: stems 3–5^{dm} high, somewhat striate, sparsely pubescent with minute appressed or sometimes spreading hairs, simple or more rarely branched; the branches very slender, alternate or opposite: leaves mostly opposite, narrowly linear, tapering at both ends, 3–7^{cm} long, 1–3^{mm} wide (rarely nearly 5), appressed minutely hispid-pubescent, the margins

revolute; often a fascicle of small leaves in the axils representing the suppressed branches: heads mostly solitary at the ends of the peduncle-like branches, the main axis usually with 3; the peduncles naked or bracteate: involucre canescent, about 1^{cm} broad, its bracts in two series: rays 8–12, oblong to elliptic: disk corollas tubular, noticeably dilated just above the very short glandular pubescent tube: pappus wholly wanting.

Notwithstanding the morphological similarity of the floral characters of this and *G. multiflora* Benth. & Hook., the distinctness of the two can scarcely be questioned. In the excellent revision of the genus by Robinson and Greenman (Proc. Bost. Soc. Nat. Hist. 29: 87–104. 1899) mention is made of narrow-leaved forms of *G. multiflora* which occur to the southwest of the range of the species, but judging from the specimens cited nothing like the plant now described was at hand. In any case, the species now proposed is strongly marked by its slender, rhizome-like roots, its very narrow revolute leaves, and its slender fascicled stems; in contrast with the woody taproot, the relatively stout branched stems, the lanceolate leaves, and the somewhat larger heads and broader rays of *G. multiflora*.

The type is no. 968, Leslie N. Goodding, Meadow Valley Wash, southern Nevada, May 17, 1902; in blossom and with mature akenes; growing among the rocks on dry steep mountain slopes.

***Encelia virginensis*, n. sp.**—Perennial, the base shrubby and freely branched, 3–5^{dm} high including the herbaceous part of the plant: the ligneous stems white, rather slender; the herbaceous branches leafy below, terminating in a long slender monocephalous peduncle, light green, roughish-puberulent as are also the ligneous stems for a time: leaves opposite below but alternate upward, short-petioled, broadly rhomboid- or deltoid-ovate, rarely sub-cordate, generally 3-nerved from the base, 12–20^{mm} long, some nearly as broad: the pubescence of two kinds, some short white strigose-hispid hairs, and a fine close puberulence: peduncles 1–2^{dm} long, naked or 1- or 2-bracted near the head: involucre strigose-canescens; its bracts acute, in about 2 series, linear-lanceolate, rather coriaceous, some of them abruptly narrowed to a slender somewhat recurved tip: rays 12–20, minutely pubescent below, cuneate-oblong, deeply 3- or 4-toothed at the truncate apex, neutral, 15–20^{mm} long: disk-flowers numerous; the tube proper narrow, half as long as the cylindrical throat: style branches acute, linear: akene flattened, broadly linear-spatu-

late, slightly depressed at summit, glabrous on the sides, densely long ciliate-villous on margins and summit, about 4^{mm} long, as long as the corolla; pappus wholly wanting: receptacle flat; the chaffy bracts broadly linear, membranous with herbaceous tips and midrib which are finely pubescent and viscid-glandular, as are also the involucrel bracts and to some extent the peduncles.

Related to *Encelia frutescens* Gray, but wholly distinct from that as originally defined in Bot. Mex. Bound. 89 (*Simsia* [*Geraea*] *frutescens*). We must consider Colonel Emory's plants from the Gila country as the type of that species. The species now defined may be represented in some herbaria under the name *E. frutescens* by specimens from southwestern United States. The type is Mr. Goodding's no. 666, secured at "The Pockets," on the Virgin River, in southern Nevada, April 30, 1902.

Helianthella Covillei, n. n.—*H. argophylla* Coville, Contrib. U. S. Nat. Herb. 4: 132; *Encelia grandiflora* Jones, Proc. Cal. Acad. Sci. II. 5: 702.

While working out the preceding species I naturally looked up all of the species of *Encelia*. As a result of this study I gained, with much difficulty, a conception of some of the species as understood by M. E. Jones. I feel satisfied that he is right in asserting the distinctness of the plant described by Dr. Coville (*l. c.*) from the *Tithonia argophylla* of Eaton, Bot. King. Exp. 423. On the other hand, he does not seem to be right in taking Coville's plant out of *Helianthella*, and in either genus Jones' specific name is untenable. I refer it back to *Helianthella*, therefore, naming it for Dr. Coville, who has furnished us with a clear and full diagnosis of it.

Bebbia aspera (Greene), n. sp.—Stems slender, the woody basal portion with gray fibrous bark, the herbaceous stems sub-cinerous with scattering abruptly upturned white scabrous often deciduous hairs from a papillate base: leaves nearly linear; the lower opposite, 2–4^{cm} long; the upper alternate, small and finally reduced to subulate bracts; pubescence similar to that of the stems: heads in an open corymbose panicle, 10–15^{mm} high, canescently pubescent: corollas yellow: style-tips slender-subulate, exserted, recurved: receptacle flat, chaffy throughout; the bracts linear-lanceolate, scarious, with base inflexed and partly enclosing the akene: akene broadly linear-clavate, with an evident epigynous disk: pappus of 20–30 plumose bristles as long as the corolla.

Never has a plant come into my hands that was so difficult to place. Superficially it has one or two eupatoriaceous characters, but the real characters unite it to the Helianthoideae. Inadvertently overlooking Greene's genus *Bebbia*, I applied to Dr. B. L. Robinson for assistance, writing him as follows: "This plant may get into the Helianthoideae. Here by a little amplification of characters it might be included in the Verbesineae or in the Madiaceae. If in the former, near *Varilla*; if in the latter, near *Layia*." I mention this to show that to one to whom the plant was wholly unknown it appeared in such a way as to confirm exactly the views expressed by Greene in the diagnosis of the genus (Bull. Calif. Acad. 1:179).

In regard to the elevation of *Bebbia juncea aspera* Greene (*l. c.*) to specific rank, I believe that no one who will take the trouble to compare the description of the *B. juncea* from Cedros Island, which furnished the type, with the full description of the inland forms will question their distinctness.

The foregoing description was drawn from plants collected by Mr. Gooding at Rioville, Nevada, May 6, 1902, no. 720. It is a low shrub 3-7^{dm} high, occurring on dry sandy hillsides.

Hymenopappus eriopoda, n. sp.—Perennial; the caudex decidedly woody, multicapitous, forming a large dense tuft; stems single from each crown, simple, 0.5-1^m high, leafy for more than one-half the height, more or less lanate-pubescent, glabrate upward: leaves numerous, glabrate, some lanate pubescence on the petiole and rachis, bipinnately divided into filiform lobes rarely more than 0.5^{mm} broad; petiole and rachis flattened-semiterete; the primary divisions 2-5^{cm} long; the secondary 1-2^{cm}; root-leaves numerous, crowded on the crowns, their bases involved with the stem in a dense white pannose tomentum, including the petiole 15-20^{cm} long; stem leaves 5-7, the uppermost merely pinnate: peduncles axillary, from the two or three uppermost leaves and from as many minute bracts, very slender, monocephalous, or developing 1 or 2 accessory heads on filiform pedicels, 1-3^{dm} long, the lowest usually much elongated: heads about 12^{mm} high: involucre rusty-tomentose, shorter than the disk; its scales in 2 series, mostly oblong, or oblong-elliptic, obtuse, with scarious margin and tips, rarely purplish: corolla tube obscurely glandular-pubescent, very slender, about 3^{mm} long, expanding into an equally long broadly tubular throat, which is three times as long as its lobes; akene 5^{mm} long, somewhat enlarged upward, pubescent especially on the angles; pap-

pus of numerous linear-oblong obtuse scales half as long as the corolla-tube.

The two related species are *H. lugens* Greene and *H. macroglottis* Rydb., the species now described making the third in the series of long-throated forms (see Rydberg, Bull. Torr. Club 27:636).

Type no. 880, by Mr. Goodding, who reports it as abundant in "rocky volcanic draws" near Diamond Valley, Utah; May 19, 1902.

Tetraneuris epunctata, n. sp.—Caudex simple or with 2-several crowns: leaves crowded on the crowns, glabrate and bright green, with a few long whitish scattered hairs, wholly free from the punctate glands so usual in the genus, some microscopic resin particles present, narrowly spatulate or oblanceolate, 2–4^{cm} long, the margined petiolar bases imbricated on the crowns but not involved in the usual wool of the other species: scapes simple, ebracteate, 1^{dm} or less high, sparsely silky-canescens and obscurely granulate: heads large, 25–30^{mm} broad when fully expanded: involucre silky-lanate; the green tips of its oblong acute bracts mostly free from the wool: the bright-yellow rays about 12^{mm} long: disk corollas penicillate glandular-pubescent on the lobes: pappus scales nearly as long as the disk corollas, obovate, abruptly long-acuminate.

The type of this excellent species is no. 1236, collected by Mr. L. N. Goodding near the Dyer Mine in the Uintah Mountains, Utah, July 3, 1902. Most of the species in this genus are xerophilous plants and strictly vernal, occurring on broken ridges of the plains or on denudated foothills. In the species before us we have an inhabitant of moist subalpine slopes, occupying a belt from 9,000–12,000 feet in altitude. No. 1374 by the same collector was obtained above timber line.

Tetraneuris eradiata, n. sp.—Densely silky throughout: caudex short, of one or more crowns, slightly lanate and covered with the expanded bases of the petioles: leaves crowded on the crowns, linear or narrowly oblanceolate, 5–8^{cm} long, the short petiole margined and expanding at its scarious base: scapes slender, 12–25^{cm} high: heads wholly eradiate, 1^{cm} or more high, the disk almost orange or tinged with brown: pappus-scales obovate, glistening-white, tipped with a slender awn, including the awn almost as long as the silvery akene and scarcely shorter than the corolla.

Collected on steep mountain side at the head of the Middle Fork of Powder River, Big Horn Mountains, by Leslie N. Goodding, July 18, 1901, no. 276.

Gaillardia gracilis, n. sp.—Perennial from a woody root: stems usually several, simple or sparingly branched, slender and somewhat virgate, 5–7^{dm} high, the upper half naked-pedunculate, straw-colored, striate and nearly glabrous: leaves softly and sparsely short-pubescent, oblanceolate in outline, 4–8^{cm} long including the margined petiole, from entire to deeply pinnatifid with linear or broader lobes: the bracts of the involucre moderately canescent, narrowly lanceolate-acuminate, green and the tips somewhat reflexed: rays yellow, cuneate, deeply cleft (nearly divided) into broadly linear obtuse lobes: disk purplish-brown: the corolla-teeth short-triangular, without tip of any kind, the penicillate pubescence short: akenes short-turbinate, densely long-villous, about equaling the numerous aristiform fimbriae of the receptacle: pappus of 10 narrowly lanceolate paleae, as long as the rather broadly tubular corolla.

This will have to be looked upon as segregated from *G. pinnatifida* Torr. I take as typical of *G. pinnatifida* the plant of southern Colorado, southward and eastward. This is known by its almost scapose stems (the leaves being crowded on the crowns or at least well towards the base), by its canescent pubescence, and the fine purple of the disk which extends at least to the veins and the lower half of the ray. *G. gracilis* is twice as tall, with indurated base, leafy to the middle or above, rays wholly yellow and cleft almost to the disk.

The type is no. 894. Mr. Leslie N. Goodding, Diamond Valley, Utah, in deep hot cañons.

Arnica arcana, n. sp.—Tufted or cespitose in rock crevices, about 3^{dm} high: stems slender, minutely granular-glandular especially upward: leaves dark-green, denticulate, somewhat granular-glutinous; root-leaves oblong-oblanceolate, 2–4^{cm} long, on very slender petioles longer than the blade; lower stem leaves small, broadly oblong, sub-acute at apex, abruptly narrowed at base to short margined connate-sheathing petioles; middle stem leaves lanceolate, sessile or nearly so, 3–5^{cm} long; the foliar bracts similar but smaller: heads usually three, on subequal peduncles 5–10^{cm} long; more rarely 1 or 2 smaller additional heads on short slender peduncles proliferous from the base of the central

head: involucre turbinate-campanulate, about 1^{cm} high, shorter than the disk; its bracts in two series, the outer broadly linear, short-acuminate, minutely glandular, the inner narrower, subscarious: rays orange-yellow, obscurely 3-toothed: disk corollas with narrow minutely pubescent tube as long as the gradually dilated throat: akenes linear, dark, sparsely hispidulous.

After deliberating on this for a long time and failing to decide upon even its nearest ally, I submitted it to Dr. Greene, who replied as follows: "This I can refer to no known species; yet it is a feeble thing as to any character." Nevertheless, it seems well to place it on record and to distribute to the herbaria specimens which will enable our students to judge for themselves whether it is a species with "feeble" characters or not.

The type is no. 377, from Doyle Creek, Big Horn Mountains, Wyo., July 26, 1902; collected by Mr. Goodding.

Tetradymia axillaris, n. sp.—A shrub mostly less than 1^m high: stems several from the base, these freely and somewhat fastigiately branched at summit, all very white with a close fine permanent pannose tomentum: spines widely divaricate but not reflexed, very straight, slender, rigid and pungently acute, 2–4^{cm} long, tomentum somewhat floccose and rather early deciduous: leaves fascicled in axils of the spines, green and glabrous, somewhat fleshy, linear subulate, very unequal, 5–12^{mm} long: heads solitary, axillary, 5-flowered, on glabrous peduncles as long as the oblong-cylindrical head: bracts of the involucre 5, about 1^{cm} long, somewhat carinate and rigid, glabrous: pappus bristles much surpassing the copious hairs of the akene.

This relative of *T. spinosa* Hook. & Arn. I was at first inclined to refer to Jones's var. *longispina* of that species. With that variety it has some points in common, but because of the relatively long internodes of the stems, the straight rigid spines which are 3–5 times as long as the fascicled leaves, the glabrous heads, and peduncles which are solitary in the axils, it seems as impossible to unite it with that variety as with the species.

The type no. 917 is from Meadow Valley, Wash., southern Nevada, collected by Mr. Goodding, May 22, 1902.

MISCELLANEOUS SPECIES.

Cuscuta Anthemi, n. sp.—Stems delicately slender-filamentous, only 2 or 3^{dm} long: flowers sessile in capitate few-flowered clusters about 5^{mm} in diameter: calyx-lobes broadly ovate, acute,

united below the middle, somewhat imbricate, equaling or at first surpassing the corolla: corolla less than 2^{mm} long; its lobes ovate, acute, equaling or longer than the broadly campanulate tube: scales oval, fringed around the summit with short processes: filaments about as long as the anthers: capsule globose, about 1^{mm} in diameter: stigmas linear, purple, as long as the distinct equal styles; stigma and style together 1^{mm} long: ovules 4, usually but 1 maturing.—On *Artemisia gnaphalodes*. Wyoming.

When Dr. Rydberg published his *Cuscuta gracilis* (Bull. Torr. Bot. Club 28: 501), founding it in part upon material that had passed for *C. epilinum*, I was at first inclined to doubt the presence of indigenous species in this country possessing the characters that Gray and Engelmann had considered as possessed only by old world species. I am satisfied now, however, that both types occur here. Species undoubtedly indigenous and having characters clearly separating them from the European forms, with which we have been wont to ally them, leave no room for doubt.

The species now proposed was collected in the Seminole Mountains, Wyo., by Mr. Elias Nelson in 1898, no. 4936. It was found on *Artemisia gnaphalodes*, but I have no doubt it will be secured on other species of the Anthemideae.

Pectocarya miser, n. sp.—Minutely appressed-strigose, branched from the base, the several stems filiform, spreading, 5–20^{cm} long: leaves linear, imperfectly opposite, mostly less than 1^{cm} long, the floral one of the pair reduced or wanting: flowers singly at the nodes: nutlets geminate, very flat, irregularly and narrowly winged on the sides, sides and apex bordered with hooked bristles, the dorsal disk slightly keeled and glandular-hairy.

Known only from the type locality, Point of Rocks, Wyo., where it was collected by the writer, June 15, 1898, and distributed under no. 4741 as *P. penicillata* H. & A.

Orobanche xanthochroa Nels. & Ckl.,[†] n. sp.—Glabrous, 20–25^{cm} high: stem bracteate: the bracts large (20^{mm} long and 7^{mm} broad at the base), the upper of these covering rudimentary flowers: spike 10–12^{cm} long, about 38^{mm} broad, densely flowered: floral bracts single, acuminate-lanceolate, 17^{mm} long: flowers entirely pale yellow: upper lip large (9^{mm} broad, surpassing the calyx by 7^{mm}), rounded, entire or with two slight notches:

[†]The characters of this plant were worked out by Professor Cockerell from the living plant. It has had further study in the herbarium.—A. N.

anthers with a fringe of long hairs on each side, but not otherwise hairy; anther cells caudate basally: calyx with five short triangular lobes about 2^{mm} long: discoid stigma about 3^{mm} broad: capsule oval, somewhat pointed apically, 10–11^{mm} long, about 7^{mm} in diameter; style persistent, nearly 9^{mm} long, strongly curved: seeds very numerous, irregularly angular, light-brown, obscurely pitted.

The affinity of this species is with *Orobanche Ludoviciana* Nutt. It turns ferruginous on fading or after bruising. First collected, June 7, 1903, by Dr. M. Grabham, at Pecos, N. M., where it occurs as a parasite on the roots of *Quercus*.

THE ROCKY MOUNTAIN HERBARIUM,
Laramie, Wyoming.