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## ROCKY MOUNTAIN HERBARIUM STUDIES. II.

AVEN NELSON

(Received for publication May 1, 1933)

This paper is a continuation of the studies begun in the June number of the American Journal of Botany, volume 18, 1931. Critical examination of the available herbarium material in certain genera brings to light unnamed and misnamed sheets that cannot be incorporated in the known species. Other proposed species are based upon recent collections, by the writer and others, in various localities in the Southwest. It is hoped that a further paper, no. III, may follow within a few months.

### ***Ephedra fasciculata*** Aven Nelson, new species

Stems rather slender, prostrate, only a few dm. long, the internodes 3–5 cm. long, 5 mm. or less in diameter, the older ones ash-gray; branches yellowish-green, numerous, closely fascicled, erect at right angles to the prostrate stems, short, having 3–5 nodes, the internodes 3–5 cm. long and 2 mm. or less in diameter, apparently smooth but under a lens obscurely striate and minutely roughened; nodes scarcely swollen, with two scarious scales apparently completely united into a close-fitting white truncate cup 2 mm. or less high, sometimes each scale showing a short rounded free tip; as the cup breaks down the base of the scales appears as a narrow brown band 0.5 mm. wide or less.

Flowers and fruit are not yet available, but the vegetative characters place it in the section with *E. viridis* Coville, and *E. antispyhillitica* Meyer, to neither one of which it seems possible to refer it.

It was secured in the hot dry banks of a sandy wash, in low hills near Phoenix, Arizona, May 1, 1925, by the writer. Collection number 10268; type in Rocky Mt. Herb.

### ***Allium funiculosum*** Aven Nelson, new species

Bulb elongated, the bases of the two or more stems united by the common sheath which forms a tubular wrapping 5–10 cm. in length, the fibers coarse and abundant but not intricately interwoven; stems and leaves subequal, distinct as they emerge from the summit of the sheath, moderately stout, 3–4 dm. high, leaves flat, 2–5 mm. broad; involucre bracts 2, membranous, roseate; umbel erect, flowers 10–15, on short (6–12 mm.) slender pedicels; perianth deep-rose color, its segments oblong, acute 5–6 mm. long; stamens about equalling the flower segments; capsule globular, the crests small, or wanting.

The above description scarcely distinguishes this species from *A. Geyeri* Wats., Proc. Am. Acad. 14: 227. 1879. In fact, it probably should be considered as a subspecies of that, but its narrow elongated deep-set bulb with

the long coarse-fibred sheath (*funiculosum*—"full of cordage or coarse threads") makes it stand out from *A. Geyeri* in which the bulb is short and "onion" shaped with a closer network of smaller fibres. Geographically also they are well separated—*A. Geyeri* extending from Colorado into the Northwest. The specimens representing the proposed species are all from the Southwest. Castetter, 272 (type, in Rocky Mt. Herb.) and 964, co-type, Sandia Rim, 10500 ft., July 24, 1929; Goodding, 2426, Huachuca Mts., Arizona, Aug. 22, 1907; 179, Miller's Peak, Huachuca Mts., July 12, 1909; O. B. Metcalf, 716, Bear Mt. near Silver City, New Mex., Sept. 15, 1903; E. P. Walker, 357, Geyser Canyon, San Juan Co., Colo., July 30, 1902.

#### **Eriogonum umbellatum intectum** Aven Nelson, new variety

Smaller than the species in every way, perhaps more surculose matted; only a little of the tomentum persisting even in early anthesis; later practically glabrous.

Doubtless many specimens of this species are extant, but the writer's no. 10695 may be cited as type, Rocky Mt. Herb. Secured in the low sandy hills of the northern part of the Red Desert, Sweetwater Co., Wyo., July 6, 1926.

#### **Purpusia Osterhoutii** Aven Nelson, new species

Obscurely glandular-pubescent throughout: stems and leaves few—several, from the crown of the small tap-root, protected by remnants of former leaf-bases and stems; the pinnate leaves with 2–4 pairs of leaflets unequally spaced (the largest above); leaflets 5–10 mm. long, ovate, obovate or orbicular, more or less deeply cleft into obtuse teeth; petals yellow, minute, shorter than the ovate sepals. Receptacle contracted into a raised columnar base for the few achenes, only 1 or 2 of which mature.

This is an interesting find. The genus *Purpusia* described by Brandegee, Bot. Gaz. 27: 446. 1899, has stood until now as a monotypic one (*P. saxosa* Brand, l. c.). The species now added tallies closely with the original one but differs in the absence of viscosity and hirsuteness in the cymose inflorescence (in contrast to corymbose-racemose), the yellow petals (in contrast to white), the small crown with its few stems and leaves (in contrast to "caespitose"), and in the absence of hairs on the receptacle. Evidently the hypanthium also differs slightly in that the rim of the cup has a slight annular thickening from which the sepals, petals, and short filaments arise. (Cf. also N. A. Fl. 22<sup>3</sup>: 291. 1908.)

The type of this novelty is Mr. George E. Osterhout's no. 7103, Bright Angel Trail, Grand Canyon, Arizona, June 22, 1928. Again Mr. Osterhout has demonstrated his discriminating field work which so splendidly supports his occasional papers in the botanical journals.

#### **Astragalus jemensis** Aven Nelson, new species

Caespitose on a branching woody crown, glabrate in appearance but, under a lens, showing a short white appressed pubescence throughout, the leaves

basal, on the crowns or very short stems, 1–2 dm. long; leaflets varying from 17–31, paired but usually not directly opposite, oblong to broadly oval or obovate, rounded at tip or somewhat retuse, 7–15 or even 20 mm. long; scapes 1 or more from each crown, surpassing the leaves, 2–3 dm. long, floriferous for one-half their length; flowers purple, several to many, in an open raceme, large, about 20 mm. long, the banner somewhat exceeding the other petals; calyx purplish, its tube about 10 mm. long, the subulate linear teeth 5–7 mm.; pod 1-celled, at first circular in cross-section, without intrusions, the walls somewhat thickened-fleshy, not at all inflated, becoming somewhat woody-coriaceous with the sutures conspicuous externally and with evident reticulations between; at maturity the pod is narrowly oblong, pointed, curved, and up to 3 cm. long.

Somewhat doubtfully this is being referred to the section *XYLOPHACOS*. In the Wooton-Standly Flora of New Mexico, its nearest ally is *Astragalus remulcus* Jones, Contr. 7: 658. This has much the same habit and technical pod characters, but there are no elements of confusion between them. Two sheets of Professor E. F. Castetter's no. 322, collected between Golden and Madrid (Jemez Mts.), N. M., May 23, 1930, are taken as the type (Rocky Mt. Herb.).

#### **Galpinsia glandulifera** Aven Nelson, new species

A short-lived perennial, only 1 dm. (more or less) high, blooming the first year and then with the aspect of a slender simple-stemmed annual with almost filiform root, the second year branching from the enlarging crown, the bases of these stems persisting, obscurely glandular on stems and leaves, less so on the calyx; leaves crowded especially upward, acute or obtuse at apex, usually tapering into a short petiole; calyx greenish-yellow, the tube 16–18 mm. long, expanding gradually into the obconical throat, the broad lobes, including the free tips 6–7 mm. long, petals saffron yellow, from broadly obovate to almost reniform, 1 cm. or more broad; young ovary fusiform, nearly half as long as the calyx-tube; mature capsule subcylindric, 8 mm. long, 2–3 mm. in diameter.

Type collection by Mrs. Gladys Convis, no. 37, on hills in vicinity of Carlsbad Caverns, New Mex., May, 1930. (Type: Rocky Mt. Herb.)

#### **Chylisma arenaria** Aven Nelson, new name

A large showy branching winter annual, or possibly more enduring. Grayish in appearance due to short white dense spreading pubescence especially on the earlier leaves and the main stems and branches, the later leaves and branchlets greener and less pubescent; leafy throughout, decreasing in size upward and passing into the bracts of the long fruiting raceme topped by the crowded flowers; leaves simple, dentate with numerous variable small sharp teeth, all broadly cordate and petioled, the larger with petioles 2 to 3 times as long as the blade, which is 2–3 cm. wide; calyx tube 1.5–2.5 cm. long, expanding gradually to the broad throat (5–7 mm.), its ovate-lanceolate lobes half as long; petals yellow (?) ageing pink-red, suborbicular, about 1 cm. broad; anthers large, pollen super-abundant; stigma large, a hemispheric disk; capsule linear-oblong, about 4 cm. long, usually sessile but sometimes tapering to a pedicel a few mm. long.

This proposed species is a segregate from *Chylisma cardiophylla* (Torr.) Small, Bull. Torr. Club 23: 193. 1896. It is Jepson's var. *longituba* of *Oenothera cardiophylla* (see Jepson's, Man. Pl. Calif. 686. 1925). It is also the *O. cardiophylla splendens* of Munz and Johnston. (See Bull. Torr. Club 49: 354. 1922.)

These specimens were secured by the writer, Feb. 26, 1930, in sandy washes in the Fortuna Range, some 20 mi. east of Yuma, Arizona, no. 11140 (type in Rocky Mt. Herb.). Since the locality is probably never visited by frosts, the time and length of the growing season are determined by the rainfall. The herbaceous vegetation may start in the autumn and continue for several months, the length of time varying from year to year. The plants described were bushy-branched, some of them 6-8 dm. high.

**Euphorbia flagelliformis** (Engelm.) Aven Nelson, new combination

*E. Petaloidea flagelliformis* Engelm., in Torr. U. S. & Mex. Bound. Bot. 185. 1859; *Chamaesyce flagelliformis* Rydb. Col. Agr. Exp. Sta. Bull. 100: 223. 1906.

**Dodonaea arizonica** Aven Nelson, new species

A somewhat willowy branching shrub, 1 m. or more high, obscurely resinous-granular on the season's growth only: leaves glabrous, occasionally one or more having a varnished aspect but none adhesively viscous, narrowly oblanceolate or linear-oblong, mostly 4-6 cm. long but on vigorous vegetative shoots much longer, all acute, tapering at base to a short petiole: racemes short, subumbelliform, axillary or terminal on new shoots; flowers small, apetalous, calyx greenish, the 3 united styles thick, 6-8 mm. long, carpels 6-8 mm. broad.

It will certainly result in clarity and understanding, and thus in service, if the *Dodonaea* of Arizona and adjacent Mexico be separated from that variable aggregate known as *Dodonaea viscosa* and first described by Jacquin in his Enumeration of the Plants of the Caribbean, in 1760. Since that time its known distribution has been extended to and through Mexico to Lower California. Its economic-medicinal and ornamental uses have caused it to be extensively grown in tropical regions.

The original species evidently occurred in the moist tropics, but in its wide dispersal other forms have arisen, most of which have not been ranked as species. As one would expect, where its range has extended into arid districts, with very different soil characters, the variations have been the most fundamental.

One such area occurs in south-central Arizona, and here we find a strongly marked *Dodonaea* that has from its earliest discovery borne the name of *D. viscosa*, var. *angustifolia*. In the judgment of the writer, this name is not tenable in case the name is raised to specific rank, as it most certainly should be. There can be only confusion resulting from retaining this plant under a trinomial name, especially when the trinomial originally must have desig-

nated something quite different. As remarked by Dr. Bailey, in his *Manual of Cultivated Plants*, 470. 1924, speaking of *D. viscosa*, "There seems to be confusion as to the limitation of this species, or it is exceedingly variable." For a fuller discussion and description, see, U. S. Nat. Herb. 23: 705. 1923 (Standley, "Trees and Shrubs of Mexico").

The original use of the name *angustifolia* was by Linnaeus, and certainly he did not refer to this willow shrub of Arizona. The same must be true of Blanco, in his *Flora of the Philippines*, Ed. I: 312, as well as Thunberg, *Prod. Pl. Cap.* 77.

Furthermore, *D. arizonica* may well stand on its own merits in any case, for it has an aspect all its own, and the shreddy-fibrous gray bark contrasts sharply with the smooth dark-brown of the typical *D. viscosa*. The thinner narrow leaves are themselves diagnostic.

Representative collections of *D. viscosa* are Heller, 4507, Mayagues, Porto Rico, Feb. 3, 1900; Barkeley, 188, on Exped. to Revillagigedo Islands, Mexico, summer of 1903; Schaffner, 306, San Louis Potosi, Mexico, 1879.

Representative collections of *D. Arizonica* are Aven Nelson, 11276 (type in Rocky Mt. Herb.), dry stony hills, Salt River Valley, between Canyon Lake and Roosevelt Dam, Mar. 20, 1930; Jones, Mescal Mts., Ariz., May 24, 1890; Catalina Mts., Sabino Canyon, Aug. 18, 1903.

#### **Macrosiphonia dulcis** Aven Nelson, new species

Low shrub, many-stemmed and more or less branched, from a woody branching caudex, 3–6 dm. high, the foliose branches slender and nearly herbaceous; leaves almost sessile, from narrowly to broadly ovate, entire and subacute or rarely obtuse and then broadly elliptic, somewhat puberulent especially beneath, 10–20 mm. long; flowers few, large, solitary, fragrant, singly in one or more of the uppermost pairs of leaves, sessile; calyx cleft to the pedicel-like tube which tapers slightly downward, tube and lobes subequal, each about 6 mm. long, the usual glands of the genus wholly wanting; corolla tube about 4 cm. long, the expanded portion of the throat somewhat longer than the distinctly puberulent slender basal part, limb of five obovate rounded spreading lobes, about 15 mm. long, white with (usually) roseate margins; anthers linear (not lance-subulate as in most other species), about 10 mm. long, subsessile at the base of the throat, subsagittate and tipped with a small triangular appendage, the basal part apparently not dehiscent; style slender, its large 5-costate stigma enclosed by the large approximated anthers but scarcely adnate; follicles not known; other characters resembling those of *M. brachysiphon* Gray, *Syn. Fl.* 2: 84.

Type in Rocky Mt. Herb.; L. N. Goodding's No. 2413, from the lower slopes of Miller Peak, Huachuca Mts., Mexico, Aug. 22, 1907.

#### **Gilia flavocincta** Aven Nelson, new species

A small winter annual, 1–2 dm. high, related to *G. leptalea* (Gray) Greene, the slender stems simple at base but branching above into the open paniculate inflorescence, blooming when only a few cm. high but becoming as much as 20 cm., or possibly more, the herbage green but at first with scattering obscure

lanate puberulence, in the inflorescence an equally obscure glandulosity; leaves few, those near the base crowded but not rosulate, linear, or pinnate with short linear pinnae, those on the upper stem sparser, smaller and usually entire; flowers large and showy for the size of the plant, blue but the expanded throat simulating a yellow girdle; calyx only 3-4 mm. long, green-ribbed with white puberulent membranes, the linear-cuspidate teeth shorter than the sub-campanulate tube; corolla tube slender, 6-8 mm. long, the throat about half as long and the rounded obovate lobes about 5 mm.; stamens inserted in the sinuses of the limb on filaments half as long as the anthers; seeds several, becoming mucilaginous in water and emitting spiracles.

Type: Rocky Mt. Herb., Aven Nelson, No. 11228, sandy soils, Apache Trail, near Canyon Lake, Arizona, March 20, 1930.

**Oreocarya Williamsii** Aven Nelson, new species

Biennial or (?) perennial, densely setose-bristly throughout, the rosulate crowns borne singly or in small caespitose clumps; stems slender, simple, one only from each crown, suberect, 1-2 (or more) dm. high; crown-leaves numerous, linear-oblancheolate, 1-3 cm. long, canescent and sparingly setose-hispid, the earlier ones short, their bases persisting; stem-leaves narrowly oblancheolate and, above, linear; flowers crowded above with one or more small glomerules in the axils of the uppermost leaves: calyx-lobes subulate-linear, about 5 mm. long, equalling or longer than the corolla-tube; corolla pale-yellow but truly yellow throughout, not merely with a yellow eye; the tube proper very short (1 mm.), abruptly expanded into a semiglobular throat 2 mm. or more long; nearly closed by the conspicuous fornicies, the limb 7-8 mm. in diameter, its lobes broadly obovate and entire; the included anthers on very short filaments standing at right angles to the wall of the expanded throat, thus holding the anthers free from the wall; style short, its stigma just below the anthers; nutlets (immature) apparently all maturing, ovate, at least one of them wing-margined and roughened on the back, the sides smooth.

The only species with which pubescence and the nutlets (in so far as these can be understood from the present material) permit this to be compared is *Oreocarya setosissima* (Gray) Greene. That, however, is a large coarse plant wholly different in aspect.

The points relied upon to distinguish this proposed species are its relatively weak suberect stems with greenish aspect, the absence of a canescent indument except on the older crown leaves, the numerous widely spreading setae, the yellow flowers, the narrow basal part of the tube of the corolla which is constricted above the ovary and then abruptly expanded into a nearly globular portion, within which the anthers stand on short transverse filaments.

Collected by Louis Williams in the Flaming Gorge, of Green River, Daggett Co., Utah; elevation about 6000 feet; June 2, 1932 (type No. 489 in Rocky Mt. Herb.).

**Penstemon regalis** Aven Nelson, new species

Wholly glabrous and glandless throughout, subglaucous, the wand-like leafy simple stems (4-8 dm. high), terminating in a gorgeous narrow thyr-

soid raceme of regal crimson-purple flowers; leaves entire, thick, the basal oblanceolate to obovate, the lowest ones on petioles as long as the blade, becoming longer, broader and sessile as they pass into the cauline, mid-stem leaves broadly ovate, up to 6 cm. in length, with the aspect of cordate-perfoliate but completely distinct as are the greatly reduced bracts of the inflorescence; calyx short, the sepals ovate-lanceolate, distinct nearly to the base, 4–5 mm. long; corolla 20 mm. or more long, tubular, expanding upward past the middle and then tapering slightly into the narrow throat, both lips very short, the oval-ovate lobes only 3–4 mm. long, inordinately bearded on the lower lip with long yellow hairs; sterile filament slightly flattened and bearing a few to several hairs below the tip; anthers in the throat, the filaments free except for the lower one-third which is superficially attached to the very base of the tube; anthers somewhat explanate, opening the full length but not through the junction; style extending into the beard of the lip.

This beautiful *Penstemon* was secured near the Carlsbad Caverns of New Mexico, by Mrs. Gladys Convis, in May, 1930. Her number 75 is the type, in Rocky Mt. Herb.

#### ***Amphipappus spinosa* Aven Nelson, new species**

A low intricately branched shrub, 2–3 dm. or more high; the old stems with gray shreddy bark; branches nearly white, with thin glabrous cracked bark, the twigs slender, pale green with an obscure puberulence, many of them naked and distinctly spine-like: leaves numerous, chiefly on the younger branchlets, the puberulence similar to that of the branchlets, green, oblong or oblanceolate, obtuse or acutish, short-petioled or subsessile: heads few, solitary or in small clusters, about 5 mm. high; involucre pale, glabrous, the few thin outer bracts broadly oblong, obtuse, the inner longer and narrower and somewhat scarious and fimbriate at tip: ray flowers 1 only, its ligule oblong, with 3 minute teeth at its truncate tip; the achene finely pubescent and the few pappus scales fimbriately cut; disk flowers 3–5, normal in appearance but probably sterile, the 8 or 10 bristles as long as the corolla, variously kinked or tortuous.

Collected by L. N. Goodding, no. 707, on the Virgin River, in southern Nevada, May 5, 1902. Type in Rocky Mt. Herb.

This species is as remarkable as the type of the genus, *Amphipappus Fremontii* T. & G., and follows the original in generic characters very closely. The intricate branching and the spinescent character of so many branchlets serve for ready separation. The puberulence will also distinguish it from the original.

To follow recent precedent, one should call this *Amphiachyris spinosus*, but I doubt the advisability of merging *Amphipappus* T. & G. and *Amphiachyris* Nutt. The latter, while antedating the former, was based upon an annual herb, *A. dracunculoides*, differing in many respects from the desert shrub of Torrey and Gray. The wholesale segregation of genera is to be deplored. A genus should be recognizable in the field. If a scalpel and lens are required to detect the diagnostic characters, the splitting has gone too far. On the other hand, if two species in a given genus must be dissected before



relationship can be established, the segregation has not gone far enough. No field-worker, I am sure, finding *Amphiachyris dracunculoides* and *Amphipappus Fremontii*, would even suspect their relationship, close as it is. For this reason it seems logical to retain *Amphipappus* as originally characterized. It is a striking genus.

#### ***Machaeranthera hiemalis* Aven Nelson, new species**

A pale ashy-green winter annual, 3–4 dm. high, the single axis branching more or less corymbosely from near the base upward, the entire plant with a thin pale puberulence: leaves firm, undulately toothed to entire; the lower petioled, becoming smaller, sessile, somewhat clasping, and finally bract-like, varying from oblanceolate through oval-oblong to narrower, mostly obtuse: heads small to medium, the involucre 6–8 mm. high and 10 mm. broad (more or less); bracts linear-oblong, the outer obtuse, the inner acute, pale with green tip, some finally reflexed, minutely glandular in the puberulence, as are also the peduncles and branchlets; rays short, pale-pink; pappus fuscous, the achenes short, obscurely pubescent.

In duration and habit it suggests *M. tanacetifolia* (H. B. K.) Nees., but in its long slender vertical tap-root it is unique. One wonders just what was included in *M. montana* Greene (Pitt. 3: 60), "High Plains of Wyoming to the Eastern slope of the high Californian Sierra." In Pitt. 4: 22–24, Dr. Greene removes from the original aggregate *M. pulverulenta*, *divaricata*, and *viscosa*. "The name may now stand for the plant of the Californian Sierra," and then he re-defines the species but names no type. Were it not for the mountain habitat, the pinnate leaves, and the duration ("Perennial") of his *M. montana*, one might suspect that *M. hiemalis* should be referred to it.

Collected by the writer (no. 11190, type in Rocky Mt. Herb.) in Devil's Canyon, near Jacumba, Calif., Mar. 14, 1930. This locality is on the western border of the Imperial Valley where the canyon temperature is high even in the winter, especially in the volcanic sands. The tap-root and foliage indicate that the life-history of the plant is completed in one growing period, which in this case consists of the calendar winter months.

#### ***Erigeron lobatus* Aven Nelson, new species**

A large handsome winter annual 5–8 dm. high, mostly branched throughout, sometimes with one or more accessory stems from the base: pubescence hirsute throughout, spreading, sparse: leaves abundant, crowded on the crown, gradually more open and smaller upward, becoming bract-like on the slender peduncles; the lower leaves 8–15 cm. long including the narrowly margined petioles, spatulate-oblanceolate in outline, deeply pinnately lobed, the broad lobes mostly obtuse, upward tending to become entire and finally linear-oblanceolate: peduncles 5–10 cm. long, naked or sparsely foliar-bracteate: heads medium-large, the involucre hirsute, especially at base, the bracts green, linear, 3–4 mm. long; rays numerous, 2–3 times as long as the bracts, violet-blue; disk flowers very numerous, the achenes glabrate.

The species proposed is clearly of the *Erigeron divergens* series. Taking

the extremes of this series, one could not desire more clearly defined species. Because of the intergrades one hesitates to add another name, but a form so characteristically developed as *E. lobatus* is interesting enough to carry its own cognomen.

From the writer's collection in the Salt River Canyon, Arizona, on the Apache Trail, near Canyon Lake, no. 11209, Mar. 19, 1930. Type, Rocky Mt. Herb.

***Arnica Maguirei*** Aven Nelson, new species

Plant strictly erect, 1 meter, more or less, high; the unbranched stem slender for its height, glabrate below but becoming minutely granuliferous and sparsely lanately-pubescent upward: leaves entire, large, 7-10 pairs equally distributed, the basal narrow, with long margined petioles connate into ocreae 2-4 cm. long, these withering early but persisting for a time; stem-leaves elliptic-oblong, rounding into the broad margined petiole which with the sheath shortens and disappears entirely in the uppermost sessile pairs; leaf-blades 12-20 cm. long, 4-7 cm. broad, conspicuously veined; the uppermost smaller, becoming acute and the floral pair acuminate, glabrate in appearance but with a sparse soft pubescence: heads 3 or more (the central one and a pair out of the uppermost foliar-bracts or, if more, an additional pair from the next lower bracts) on erect naked peduncles 8-15 cm. long; involucre bracts linear-oblong, obtusish, less than 1 cm. long, lightly pubescent: rays medium size but conspicuous, well surpassing the darker disk; disk corollas softly pubescent, equalled by the sparse tawny minutely barbellate pappus; achenes brown, lightly striate and nearly glabrous.

This extraordinarily tall *Arnica* with its simple wand-like stem carrying its numerous large thin leaves has an aspect all its own. Perhaps typical *A. subplumosa* Greene might come to mind but the smaller plant and much larger heads of that as well as its notable pubescence and glandulosity exclude it from consideration.

This species was secured by Prof. Bassett Maguire of the Agricultural College of Utah, at Logan. At my request he has supplied the information which follows: "I remember distinctly the exact station, for at the time I was particularly impressed with the great size of all the plants. A few specimens only were taken from a considerable colony but those collected are wholly representative. The station lies in a low, grassy open woodland of willow and cottonwood, north of the outlet of Lower St. Mary Lake, Alt. 4460, Glacier National Park, Aug. 4, 1932." Number 1098, in the Rocky Mt. Herb.

Since Mrs. Maguire (Ruth R.) is also a botanist and joins her husband in his field and herbarium studies, I am giving myself the pleasure of dedicating to both of them this fine species, *Arnica Maguirei*. Their collection number is 1098. The type is deposited in the Rocky Mt. Herb.; co-types at Utah State Herbarium, Logan, and in the Cornell Herbarium.

***Arnica trina*** Aven Nelson, new species

Plant 4-5 dm. high, glabrate in appearance though with scattering crisped hairs throughout and some glandulosity on the peduncles and especially at the

base of the involucre: stem stoutish, with large equably distributed leaves; the basal pair (or pairs) small, sessile, spatulate-oblong, 2-3 cm.; the lower cauline pair broadly obovate, narrowed to a very short winged petiole, conspicuously serrate-toothed, 6 cm. or more long, 4 cm. or more broad; venation characteristic—consisting of a strong mid-vein, a pair curving from the base and uniting at the apex and a second lighter pair paralleling the first; the second and third cauline pairs similar but larger, elliptic-oblong and tending to become acute at apex; the floral pair scarcely smaller, sessile by broad rounded base, narrowly triangular-lanceolate; inflorescence bi-ternate and normally consisting of 9 conspicuous heads corymbosely arranged, the three primary rays about equal, 6-8 cm. long, and again ternate from a pair of foliar bracts on each, the three sets of secondary rays subequal, 3-4 cm. long; involucre small for the large golden-yellow rays, dark sordid-green, mostly less than 1 cm. broad and about as high, the fully expanded head 3-4 cm. broad; the disk dark by reason of the well exerted stamens and the still longer style; the short pappus tawny and subplumose; achenes dark-brown and with scattering stiffish hairs.

This beautiful *Arnica* was also secured by Prof. and Mrs. Maguire in Glacier Park. It was found in the margin of woods overlooking Lake Josephine at an altitude of about 4880 ft., Aug. 2, 1932. In the field it was mistaken for *A. diversifolia* Greene, to which indeed it is most closely allied. Examination of Greene's type number from Oregon shows that species to be much smaller, the leaves definitely petioled and fewer, less coarsely and saliently toothed, the inflorescence consisting of 1-3 heads from the floral pair of leaves, the involucre much larger and broader while the rays are fewer and shorter. The involucre in *A. trina* is definitely campanulate and not turbinate salverform as in *A. diversifolia* and in many other species. The leaves differ markedly—those of *A. trina* being a deep green with a definite sheen.

The type bears the number 1095 and is deposited in the Rocky Mt. Herb. Co-types in Utah State Herb., Cornell Herb., U. S. Nat. Herb., and Gray Herb. A second collection of it by the Maguires, no. 1094, shows all of the essential characters, though the inflorescence is not so fully and definitely bi-ternate. This number was secured in a similar situation at Elrod Lake and is named with the type number.

UNIVERSITY OF WYOMING,  
LARAMIE, WYOMING