

NEW AND NOTEWORTHY PLANTS FROM SOUTHWESTERN COLORADO

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During the summer of 1913 and the spring and summer of 1914 it was the writer's privilege to make a collection of the plants of western Montrose County, from the Uncompahgre Plateau on the east to the La Sal Mountains of eastern Utah on the west. Of all parts of the state, the southwestern portion is the least known botanically and may therefore be expected to furnish novelties to the systematist for many years to come. This is especially true of the spring flora of the arid or so-called "Upper Sonoran" life-zone. The reason for this is obvious when one considers that most of the collections have been made upon the summer flora, and that by the middle of June most of the vegetation of the arid district has withered and even the seeds have scattered. Though the collections of 1913 and 1914 were made upon the montane as well as the desert flora, most of the interesting forms were discovered at the lower altitudes. The undescribed species, those that had not previously been reported from the state or had been omitted from recent manuals of the district, as well as some perplexing forms, are treated in this paper. A complete set of these plants, containing the types of the species and varieties characterized, is deposited in the Rocky Mountain Herbarium.

CALOCHORTUS FLEXUOSUS Wats.—This lovely and interesting mariposa lily, which has heretofore been known only from farther south and west and has not generally been credited to Colorado, was collected in bloom near Naturita on May 12 and May 26, on a red clay hillside over which it was growing in great profusion. The stems were stiff and flexuous and showed no inclination to become prostrate or twining. The flowers have been described as "purple" or "purplish," but as a matter of fact they are at first white and later become a very delicate pink; it is only in withering that they become "purplish." Nos. 289 and 357.

SALIX.—Nos. 288 and 289, collected in flower near Naturita on May 9, 1915. The staminal filaments are united nearly to the summit in these specimens. If it were not for this character, I would refer this willow to *S. cordata* Muhl., but because of knowledge of material from one plant only and the lack of mature leaves, I prefer to leave it undetermined for the present.

ERIOGONUM MICROTHECUM Nutt.—Collected near Naturita, September 26, 1914, on a dry rocky hillside; no. 613.

POLYGONUM AMPHIBIUM L.—A form of this species with long fringed sheaths is common in ponds on the Uncompahgre Divide in Tabeguache Basin; no. 173.

Aquilegia pallens, n. sp.—Perennial: stems slender, erect, glandular, pubescent, and sparsely villous throughout; radical and lower cauline leaves biternate; petioles slender, only somewhat glandular, moderately villous, much exceeding the rest of the leaf; leaflets rather thick, broadly cuneate to suborbicular, base often quite truncate, margins inclined to be revolute, under surface slightly glaucous, more viscid and hairy than upper one; upper cauline leaves once or twice ternate, only the few small floral bracts entire: flowers about 3 cm. in diameter and 5 cm. long, mostly erect; sepals 15 mm. long, white or pale blue, lanceolate with narrow claw; petals white, blades about 8 mm. long and 6 mm. broad, truncate, spurs straight, about 3 cm. long; stamens exceeding the petals and exceeded by the mature styles; ovaries pubescent: mature fruit unknown.

Collected only in the canyon of La Sal Creek, Utah, within a few miles of the Colorado boundary, at an elevation between 6500 and 7000 ft. The plants were growing in a moist area at the foot of the sandstone walls of the canyon. The slender stems, the thick leaves, the viscid and villous herbage to which grains of sand were clinging, and the small white or pale blue flowers gave this plant of the Upper Sonoran life zone quite a different aspect from *A. coerulea* of alpine and subalpine stations to which it is evidently related. No. 443, June 16, 1914.

Cleomella montrosae, n. sp.—Glabrous annual, 8–15 cm. high, from a slender taproot: stem diffusely branched from base: leaves trifoliate; petiole 2–3 mm. long; leaflets linear-oblong, 10–14 mm. long, thickish, distinctly petiolulate, more or less folded and with

prominent midrib; stipules present, of two or three filiform setae; flowers small, yellow, crowded in corymbiform racemes terminating the branchlets; pedicels 2–3 mm. long, subtended by simple, linear, foliar bracts; calyx segments greenish yellow, 1 mm. long, lanceolate, weakly bristle-tipped; petals elliptical, thickish, three times as long as sepals; stamens exserted; ovary slightly obovate, with two ovules in each cell: capsule ovate, 3 mm. long, 2–3 times as long as the slender stipe and 4–5 times as long as the persistent style; seeds 1 or 2, dark brown, broadly obovate, 2 mm. long.

Probably most nearly related to *C. oocarpha* Gray, from which it is easily distinguished by the possession of a very short stipe. Collected on dry, loose, gypsiferous hillsides near Montrose, alt. 5800 ft., in fruit, October 1912. Flowers produced in May and June. No. 222.

Lupinus crassus, n. sp.—Perennial, caudex branched, forming a dense mat from which arise many stems: stems rather stout, erect, unbranched, sparsely sericeous, 3–4 dm. high: leaves five or six on a stem, green; petioles silky-pubescent, those of lower leaves 8–10 cm. long, of upper ones generally longer than the leaflets; leaflets 5–10 (usually 7 or 8), thickish, somewhat folded, cuneately obovate to oblanceolate, obtuse, silky-pubescent below, upper surface glabrate, 3–4 cm. long, 10–12 mm. wide: inflorescence erect, many-flowered; pedicels 4–5 mm. long, pubescent with short, spreading, white hairs; bracts purplish, lanceolate, 10–12 mm. long, exceeding the buds at the apex of the inflorescence and falling by the time the flowers are fully expanded: calyx not spurred, densely pubescent, lower lip entire, 7–8 mm. long, slightly exceeding the bifid upper lip; corolla white, fading brownish, 12 mm. long, distance from apices of banner and wings about 6 mm., keel included, triangular, acute, scarcely falcate, ciliate except at apex; ovary pubescent, ovules 7 or 8.

This splendid lupine was collected near Naturita, April 21, 1914. At this time it was not in full bloom. Its habit of growth is peculiar in that it forms a dense mat rather than a clump. It seems to prefer soils that are somewhat gypsiferous in character and is often found growing on a loose hillside. No. 239.

Lupinus fulvomaculatus, n. sp.—Perennial: stems nearly glabrous, several to many from a single root, branching upward and

forming a rounded clump 5–7 dm. high: leaves numerous, petioles of stem leaves about equaling the longest leaflets; leaflets 6–8, rather unequal, oblanceolate, not folded, green and glabrate above, sparsely pubescent and somewhat glaucous beneath, 4–6 cm. long, 8–10 mm. broad, obtuse: racemes numerous, terminating the branchlets, 2–3 dm. long; bracts deciduous; pedicels about 2 mm. long, softly pubescent as is also the calyx: flowers very small (7–8 mm. long and about 6 mm. deep), crowded and rarely somewhat verticillate, light blue with a conspicuous rich brown spot on banner; calyx neither spurred nor gibbous, strongly bilabiate, with two linear-lanceolate bractlets attached near sinus; upper lip 3 mm. long, 2-cleft, lower lip 4 mm. long, entire; banner nearly orbicular when spread out, 7 mm. in diameter, shorter than wings, distance between apices of banner and wings about 3 mm.; wings broadly oblong, exceeding the keel by 2 or 3 mm.; keel strongly curved, margins ciliate from middle to near the comparatively blunt, blue-purple apex: pods densely villous, 2–3 cm. long and 8–9 mm. wide; seeds 4 or 5.

A species with distinctive characteristics and peculiar aspect due to the numerous long racemes of very small, "compact," light blue flowers with the conspicuous brown areas on the banners. Collected only at Tabeguache Basin on the Uncompahgre Divide, alt. 8000 ft., where it is rather plentiful in open aspen groves or on brushy hillsides. Type no. 547, July 29, 1914.

ONOBRYCHIS SATIVA L.—Escaped from cultivation on upper La Sal Creek, Utah; no. 437, June 16, 1914.

ASTRAGULUS COLTONI Jones.—Common in Long Park, near Naturata among the junipers and piñons; no. 336, May 22, 1914.

Astragalus naturitensis, n. sp.—Perennial: gray with appressed pubescence throughout: stipules large, scarious, ovate to broadly lanceolate, free; leaves 5–7 cm. long; petioles 2–3 cm. long; leaflets 9–11, narrowly elliptical, more densely pubescent on lower side, 6–7 mm. long: inflorescence racemose-capitate in flower, elongating somewhat in fruit; peduncles equaling or exceeding the leaves, spreading: flowers few (6–10); calyx tubular, about 7 mm. long, appressed pubescent and sparsely nigrescent, teeth short (1–2 mm.), triangular-subulate; corolla 12–15 mm. long, conspicuously bicolored, standard white, 2 mm. longer than keel,

apical portion of lateral petals and blunt keel red: pods sessile, mottled with red or purplish blotches, horizontal or ascending, 2 cm. long, 6 mm. wide, acute, straight, linear-elliptic, flattened dorsally and on account of the intrusion of the dorsal suture very broadly cordate in cross-section.

This species is in general aspect so remarkably close to *A. desperatus* Jones that at first glance one would suppose them to be identical. Closer examination of the floral and fruit characters, however, show them to be quite distinct. In *A. desperatus* the standard, as well as the wings and keel, is red, while in the new species the flowers are conspicuously bicolored. JONES has described the pod of *A. desperatus* as being "long hairy"; the pods of the new species are short pubescent. No mention is made of any markings on the pod of *A. desperatus*; the pods of the new species are very conspicuously mottled.

Collected on dry, rocky mesas near Naturita; alt. 5400 ft.; May 27, 1914; no. 360.

***Astragalus amplexus*, n. sp.**—Biennial or short-lived perennial: stems 3–4 dm. high, several from vertical root, sparsely pubescent, erect or spreading, more or less flexuous and often serpentine: leaves comparatively few, 8–12 cm. long; leaflets 17–21, oblanceolate, truncate or retuse at apex, those of lower leaves opposite, of upper often alternate, 9–12 mm. long, 4–6 mm. broad, green; glabrate above, sparsely pubescent below; stipules 3–4 mm. long, united only at base: racemes axillary to and not surpassing the leaves, 7–10 cm. long: flowers 12–15, horizontal, pale violet when fresh; calyx tube cylindric-campanulate, 6 mm. long, nigrescent; lobes linear, 2–3 mm. long; banner scarcely reflexed and inclosing the keel and wings; wings about 14 mm. long with slender claw half as long as the narrow blade; keel about 2 mm. shorter than wings, blade about 2 mm. wide, very blunt: pods sessile, sparsely pubescent, completely 2-celled, coriaceous, 2–2.5 cm. long and 6 mm. in diameter, neither suture intruded and hence pod nearly circular in cross-section, arcuate dorsally, mottled on dorsal surface with irregular purplish splotches.

This species evidently belongs to the MICRANTHI section of WATSON's revision of the genus in KING's *Report*, and to the genus *Astragalus* as restricted by RYDBERG in his segregation of the genus in Bull. Torr. Bot. Club 32:657. 1905. Collected on dry hillsides in Long Park near Naturita, May 22, 1914; alt. about 6000 ft. (apparently infrequent); no. 335.

Psoralea aromatica n. sp.—Perennial herb, 1.5–2 dm. high: stems decumbent and sparingly branched, 2–3 dm. long, sparsely pubescent with short, rigid, appressed hairs: leaves green, rather numerous, on petioles 3–5 cm. long; leaflets usually five, petiolulate, cuneate-obovate, obtuse, mucronate, 2 cm. long, 1 cm. broad, lepidote, sparingly appressed pubescent; stipules lanceolate and scarious, persistent, 6–8 mm. long: flowers borne in axillary racemes 1.5–2 cm. long, light blue, in part at least; bracts linear-lanceolate, scarious, much shorter than the calyx; calyx somewhat accrescent in fruit, bilabiate, sparingly pubescent except on the margins where it is densely pubescent with short rigid hairs, lower lip lanceolate, nearly equaling the corolla, upper lip 2-cleft, almost one-half as long as the lower division, lateral lobes 2 mm. long; corolla 1 cm. long, blade of standard broadly elliptical; lateral petals narrow, scarcely equaling the standard; keel much shorter (7 mm. long): pods 1.5 cm. long, bearing a broad, slightly curved acute beak 8 mm. long; seed smooth, compressed, elliptical, 4–5 mm. long.

This plant is perhaps most closely related to *P. californica* Wats., from which it is easily distinguished by the glabrate calyx with its very unequal lobes. The name is given because of the delicate but pleasant odor of the dried plants. Collected on a dry, clay hillside near Bedrock, Paradox Valley, Colorado; alt. about 5000 ft.; no. 451, June 17, 1914.

EUPHORBIA FENDLERI dissimilis, n. var.—A well marked variety, differing from typical *E. Fendleri* T. & G. principally in the larger ovate to lanceolate leaves (7–10 mm. long) which are often acute, and in the usually entire appendages which are 1–3 times as broad as the gland.

Common on dry rocky hillsides, throughout the western half of Montrose County; no. 119, June 27, 1913, and no. 493, July 13, 1914, at Naturita, Colorado.

RHUS UTAHENSIS L. N. Gooding.—Collected on a rocky hillside near Bedrock, Paradox Valley; alt. about 5200 ft.; June 17, 1914; no. 457.

OROGENIA LINEARIFOLIA lata, n. var.—Leaves elliptic and quite entire or irregularly lobed and cleft at apex and then truncate, 4–6 cm. long, 1–3 cm. broad.

Growing with the species on dry flats in Tabeguache Basin; alt. 8000 ft. Intermediate forms were not seen. No. 369, June 1, 1914.

AULOSPERMUM BETHELI Osterhout.—Collected at Naturita on dry hillsides, April 27, 1914, where it is rather common. Previously known only from type locality near De Beque, Mesa County, Colorado. No. 225.

NAVARRETTIA BREWERI (Gray) Greene.—Typical plants of this species were collected in Tabeguache Basin, June 23, 1914; no. 459.

OREOCARYA TENUIS Eastwood.—Collected in flower in Long Park, near Naturita, on May 22, 1914; alt. about 6500 ft.; no. 337.

Oreocarya gypsophila, n. sp.—Densely caespitose perennial: caudex much branched, woody, and clothed with the petioles of former leaves: radical leaves crowded, narrowly spatulate, usually folded, 2–3 cm. long, obtuse, canescent with short, stiff, appressed hairs which on the dorsal surface are often pustulate at base; blade 3–4 mm. broad; petioles ciliate with coarse white bristles; stem leaves reduced upward, uppermost broadly linear, passing into inconspicuous, lanceolate bracts: stems slender, 6–10 cm. high, moderately hirsute: inflorescence short-hirsute, not becoming fulvous, thryoid, the relatively few flowers somewhat capitate; pedicels short (1–2 mm. long): calyx consisting of five narrowly lanceolate, bristly divisions, 6 mm. long; corolla white, salverform, tube twice as long as the calyx lobes, limb 12 mm. in diameter, consisting of five subelliptical lobes, the divisions of which do not reach to the throat; crests present but not conspicuous; anthers less than 2 mm. long, filaments very short, attached about midway on the corolla tube: nutlets broadly ovoid, white, sharply rugose transversely, all of the nutlets developing.

This species is probably most closely related to *O. cristata* Eastwood. Collected on a dry gypsum hill in Paradox Valley, Colorado; alt. slightly over 5000 ft.; no. 458, June 18, 1914.

Pentstemon cyanocaulis, n. sp.—Glabrous and more or less glaucous perennial: stems usually one, 3–6 dm. high, erect and branched, often becoming blue or purple in the inflorescence: basal leaves spatulate, 4–7 cm. long; cauline leaves oblong-spatulate, sessile, passing gradually into the much reduced lanceolate

bracts: flowers in a somewhat secund, interrupted thyrus, 1-2 dm. long; sepals lanceolate, acute or acuminate, 4-5 cm. long, with a rather broad membranous margin; corolla usually horizontal, blue, scarcely ventricose-gibbous, obscurely bilabiate, 17-20 mm. long, lobes subequal; sterile filament sparsely hirsute for over half its length, slightly dilated; anthers bearing short, stiff hairs, cells not confluent, dehiscent from base to apex.

The closest relative of this species is apparently *P. strictus* Benth., from which it is easily distinguished by the shorter, broader leaves and the unusually small flowers for this group. Collected on high, dry mesas near Naturita, May 25, 1914, where it is rather infrequent; alt. about 5800 ft.; no. 348.

PEDICULARIS CENTRANTHERA A. Gray.—Rather common among junipers and piñons in western Montrose County at altitudes from 5800 to 7000 ft. Collected near Naturita, May 25, 1914; no. 345.

CHRYSOETHAMNUS FORMOSUS Greene.—This almost unknown species has apparently been collected but once before, by GREENE near Grand Junction, Colorado, in August 1899, and has been omitted from recent works on the flora of this region. When GREENE described it he did not know the floral characters and therefore I append a brief description of the species.

Low, branched from a woody base, forming dense mats 3-4 dm. high, branches permanently white tomentose: leaves narrowly filiform, somewhat revolute, tomentose but becoming greenish with age, 3-4.5 cm. long: inflorescence cymose, heads rather large and showy; involucre nearly or quite glabrous, their bracts imbricated in distinct vertical rows, 4-5 bracts in each row, ovate to oblong-linear, subacute: corollas usually five in a head, 1 cm. long, the pubescent tube gradually enlarging to form the somewhat inflated throat; tube and throat subequal, lobes short, less than 1 mm. long, scarcely acute; anthers equaling the corolla; style branches exserted, appendages subulate-filiform, three times as long as the stigmatic portion: pappus somewhat deciduous, dull white; achenes pubescent.

Collected near Naturita, alt. 5400 ft., on red clay hillsides that were more or less alkaline in character; September 8, 1914; no. 605.

Helianthella scabra, n. sp.—Stems several, 6–8 dm. high, from a woody, perennial root, somewhat cymosely branched above and bearing many rather small heads: leaves dark green, coriaceous, prominently nerved, linear-lanceolate at base to nearly linear in the inflorescence, hispidulous-scabrous (occasionally glabrate above), acute or obtuse; radical leaves 15–25 cm. long, attenuate into a petiole two-fifths the length of the blade; cauline 5–10 cm. long, short-petioled to sessile, first pair opposite: peduncles whitened with minute pubescence; involucre bracts more or less pubescent, in about three series, mostly lanceolate and shortly acute; ray flowers 8–10, neutral ray flowers bearing orange-yellow ligules over 1 cm. long, oblong, entire or cleft at apex, somewhat recurved; disk flowers purple with pubescent teeth; chaffy bracts of involucre nearly equaling disk, truncate and ciliate pubescent at apex: pappus of several short, lacerate squamellae and two awnlike elongated ones; achenes flattened but scarcely winged, from densely long pubescent in the marginal flowers to sparsely pubescent in central ones.

This species seems to be most closely related to the little known *H. microcephala* Gray; from it, however, it is apparently easily distinguished by the very much larger size, the relatively longer ligules, and the different character of the pappus of the new species. Collected at Naturita, August 11, 1914, where it grows in gulches and ravines; no. 591.

CHAENACTIS SCAPOSA Eastwood (*Chamaechaenactis scaposa* [Eastw.] Rydb.).—Nos. 267 and 305 of my collection may best be referred to this species, at least until more is known of the variability of *C. scaposa*. My plants differ principally from the type as described by Miss EASTWOOD in having leaves that are pubescent but not at all hirsute on the upper surface; pappus that is *quite as long* as the achene; and an achene that is appressed long-pubescent rather than villous. The original description does not mention the existence of rows of many small, superficial dark dots on the achene such as the Naturita specimens possess. Collected on gypsiferous hillsides, April 30 and May 15, 1914. It is interesting to note that the flowers of this plant have a peculiar, “heavy” fragrance that reminds one somewhat of *Abronia fragrans*.



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