

BOTANY.—*Arizona plants: New species, varieties, and combinations.*<sup>1</sup>

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The writers have in preparation an account of the flowering plants and ferns of the State of Arizona, to which specialists in some of the more difficult families and genera are contributing treatments of the groups with which they are familiar. The object of the present paper is to publish in advance such new species, varieties, and combinations as it has seemed advisable to recognize. Several of our collaborators have contributed descriptions of new forms, or new names and combinations, but unless it is otherwise stated, the present writers are responsible for the novelties enumerated in this paper.

**Agave parryi** Engelm. var. **couesii** (Engelm.), comb. nov.

*Agave couesii* Engelm. in Trelease, Ann. Rep. Missouri Bot. Garden 22: 94. 1911.

Similar to *A. parryi* except for the less closely imbricate rosette, the narrower, more gradually pointed leaves, and usually smaller flowers.

**Agave schottii** Engelm. var. **treleasei** (Toumey), comb. nov.

*Agave treleasei* Toumey, Ann. Rep. Missouri Bot. Gard. 12: 75. 1901.

A rare form, distinguished from *A. schottii* by the dark-green, exceptionally wide, and nearly flat leaves.

**Sisyrinchium demissum** Greene var. **amethystinum** (Bicknell), comb. nov.

*Sisyrinchium amethystinum* Bicknell, Bull. Torrey Club 28: 581. 1901.

Apparently differs from typical *S. demissum* only in size of plant, width of leaves, and size of flowers; and the intergradation seems to be complete, in Arizona.

**Sisyrinchium longipes** (Bicknell), comb. nov.

*Hydastylus longipes* Bicknell, Bull. Torrey Club 27: 382. 1900.

In the writers' opinion, Salisbury's genus *Hydastylus* is entitled to only subgeneric rank.

**Phoradendron bolleanum** (Seem.) Eichler var. **capitellatum** (Torr.), comb. nov.

*Phoradendron capitellatum* Torrey, in Trelease Monogr. Phoradendron 25, pl. 17. 1916.

The more copious pubescence and the greater reduction of the first (or only) internode of the fruiting spike seem to be the only characters by which this form can be distinguished from typical *P. bolleanum*.

**Eriogonum mearnsii** Parry var. **pulchrum** (Eastwood), comb. nov.

*Eriogonum pulchrum* Eastwood, Proc. California Acad. Sci., ser. 4, 20: 139. 1931.

The variety differs from typical *E. mearnsii* only in the persistence of loosely lanate pubescence on the upper leaf-surface.

<sup>1</sup> Received June 10, 1939.

**Eurotia lanata** (Pursh) Moq. var. **subspinosa** (Rydb.), comb. nov.

*Eurotia subspinosa* Rydb., Bull. Torrey Club 39: 312. 1912.

This form differs from typical *E. lanata* in having more pronouncedly woody stems, more spreading branches, and hairs with few or no greatly elongate rays, but these characters are not closely correlated and many of the Arizona specimens are intermediate.

**Mirabilis longiflora** L. var. **wrightiana** (A. Gray), comb. nov.

*Mirabilis wrightiana* A. Gray, in Britton & Kearney, Trans. New York Acad. 14: 28. 1894.

Typically, this form is distinguished by the merely puberulent, scarcely viscid herbage and in having all of the leaf-blades distinctly petioled, but these characters are not always associated and there is complete intergradation in Arizona material.

**Oxybaphus linearis** (Pursh) Robinson var. **decipiens** (Standley), comb. nov.

*Allionia decipiens* Standley, North Amer. Flora 21: 223. 1918.

Var. *decipiens* intergrades freely with typical *A. linearis* but is more or less distinguishable by the more distinctly petioled leaves, broader leaf-blades, and less glaucous stems.

**Boerhaavia erecta** L. var. **intermedia** (Jones), comb. nov.

*Boerhaavia intermedia* Jones, Contr. West. Bot. 10: 41. 1902.

The variety has somewhat smaller fruits and usually more compact and more umbelliform inflorescences than typical *B. erecta*, but there is too much intergradation to justify maintenance of *B. intermedia* as a species.

**Abronia angustifolia** Greene var. **arizonica** (Standley), comb. nov.

*Abronia arizonica* Standley, Contr. U. S. Nat. Herb. 12: 319. 1909.

Differs from typical *A. angustifolia* of New Mexico in the broader leaf-blades and usually more copious pubescence. Specimens without fruit are sometimes difficult to distinguish from *A. villosa* S. Wats.

**Cerastium nutans** Raf. var. **obtectum**, nom. nov.

*Cerastium sericeum* S. Wats., Proc. Amer. Acad. 20: 354. 1885. (Non Pourr., 1788.)

In its extremely sericeous aspect, this form appears distinct from *C. nutans*, but the intergradation in pubescence is complete in Arizona specimens. The two forms are not constantly distinguishable by the seed-characters mentioned by Robinson (in Gray, Syn. Flora N. Amer. 1: Pt. 1, 230. 1897).

**Arenaria saxosa** A. Gray var. **mearnsii** (Woot. and Standl.), comb. nov.

*Arenaria mearnsii* Woot. and Standl., Contr. U. S. Nat. Herb. 16: 121. 1913.

Var. *mearnsii* is characterized normally by a longer-stemmed and more open plant with longer, narrower leaf-blades than in typical *A. saxosa*, but specimens of intermediate character are of frequent occurrence.

**Arenaria eastwoodiae** Rydb. var. **adenophora**, var. nov.

A forma typica *A. eastwoodiae* caulibus et sepalis plus minusve glanduloso-puberulentibus distinguitur.

Type: *Pebbles & Fulton* 11856, Tuba, Coconino County, Ariz., altitude 5,000 feet (U. S. National Herbarium No. 1634508). This form grows in

sandy soil in northeastern Arizona, where it is more common than typical *A. eastwoodiae*.

The presence of glandular puberulence on the stems, especially in the inflorescence, and on the sepals, at least toward base, seems to be the only character differentiating this variety from the typical form of the species.

***Delphinium andesicola* Ewan, sp. nov.<sup>2</sup>**

Herba perennis caulis strictis robustis, 1–2 m altis, e radice elongati lignosa, simplicibus vel ad basim paucis, caesiis, puberulentis; foliis imprimis caulibus, tri- vel quinquepartibus segmentis amplis, 15–20 cm latis, cuneato-rhomboidis vel -obovatis dentatis longioribus deinde subglabris, mediis petiolis 6–9 cm longis; racemis elongatis atque remotifloribus, 25–35 cm longis; floribus numerosis, pedicellis puberulentis ascendentibus vel divaricatis 2–3 cm longis, sepalis atro-caeruleis atque ovalibus subacutis, 9–12 mm longis, extus cinereo-puberulentis, petalis superioribus azureis vel fere pallidis, inferioribus oblongo-ovatis, emarginatis, subniger, albo-villosis; folliculis oblongibus, 10–14 mm longis, cuspidate setoidiis, seminibus 2.5–3 mm longis angulatis angustis alatis.

Type: *J. C. Blumer* 136, Sept. 13, 1906, Barfoot Park, Chiricahua Mountains, Cochise County, Ariz. (Herb. Univ. Ariz.). One sheet in flower, another in ripe fruit, both bearing same data.

A medium to tall stout erect perennial, 1–2 m high, from a stout woody-fibrous deep-seated rootstock; stems simple or few from the rootstock, leafy to the racemes, purplish, with a uniform fine puberulence; leaves predominantly cauline, the basal similar, withering at flowering time, appearing glabrous but thinly microscopically puberulent, the principal cauline leaves of 3 or 5 cuneate-rhomboid or -obovate divisions, these again pinnatifid distally into narrowly oblong few-toothed long pinnae, the teeth acute, the proximal half of the division-blade entire and gradually narrowed below, the segments 10–15 mm wide at base of the lobes, the midcauline petioles 6–9 cm long; racemes elongate, open, 25–35 cm long; flowers numerous, on ascending or spreading puberulent pedicels 2–3 cm long, their sepals dull ashy or dark-blue, ovate, barely acute, 9–12 mm long, cinereous-puberulent thinly so at anthesis, the upper petals pale blue, the lower petals oblong-ovate, notched (sinus 1 mm deep), blue-purple, moderately white-villous; follicles oblong, obscurely venulose, 10–14 mm long, with short thin prickly cusp; seeds 2.5–3 mm long, the angles narrowly winged.

Grows in swales on slopes covered with open forest of *Pinus ponderosa*, in the Chiricahua, Huachuca, and Santa Rita Mountains, at elevations of 5,000 to 8,500 feet. Other collections examined: Topotype, *Blumer* 1373; Huachuca Mountains: Garden Canyon, *Harrison and Kearney* 5770; Ramsey Canyon, *Jones* 24847 (sheets vary widely among herbaria). Santa Rita Mountains: *Wootton*, Sept. 30, 1913; Madera Canyon, *Peebles and Harrison* 2958; Stone Cabin Canyon, *Thornber*, July 15, 1903.

***Delphinium sierra-blancae* Wootton subsp. *amplum* Ewan, subsp. nov.<sup>3</sup>**

A *D. sierra-blancae* f. *typico* caulibus subglabris stramineis, foliis tripartibus segmentis ampliore atque latiore cuneato-obovatis dentatis brevioribus ad basim integris differt.

Type: *Kearney and Peebles* 12274, White Mountains, 6 miles south of Han-

<sup>2</sup> Contributed by Joseph Ewan, University of Colorado.

<sup>3</sup> Contributed by Joseph Ewan.

nigan Meadow, 9,500 feet, Greenlee County, Ariz., August 11, 1935 (U. S. National Herbarium No. 1651077).

Stems subglabrous at least below, usually light colored; leaves darker green, more ample, 3-parted into broader segments, these cuneate-obovate, again pinnatifid distally into short few-toothed or entire pinnae, the teeth abruptly or barely acute, the proximal portion nearly oblong, entire and less abruptly narrowed, the segments 18–27 mm wide at base of the lobes.

Wet creek bottoms of mountains about the headwaters of the Salt River and along the upper Gila River, from Mount Graham north to White Mountains, at elevations of 6,500 to 9,500 feet. Other collections examined: Mount Graham, 8,000 ft., *Kearney and Peebles* 9810; same loc., 9,000 ft., *Kearney and Peebles* 9868; Thompson Ranch, Black River, White Mountains, *Gooding* 564.

*Delphinium andesicola*, most often identified as "*D. scopulorum*" or "*D. scopulorum stachydeum*," is apparently more closely related to the poorly known *D. tenuisectum* Greene of the Sierra Madre Occidental of Mexico than to *D. scopulorum* Gray. *Delphinium andesicola* has a natural floristic range in southeastern Arizona. *Delphinium scopulorum* is in reality a fairly local species though currently misinterpreted as a widespread paludose larkspur of virtually the whole of western North America. So far as known it is confined to New Mexico in its typical form.

*Delphinium sierra-blancae* Wootton is based on E. O. Wootton's collection from Gilmore Ranch, White Mountains, Lincoln County, N. Mex., at 7,500 feet, July 27, 1901; the type (New Mexico Coll. Agr. and Mech. Arts, State College, N. Mex.) has been studied. The subspecies *amplum* occupies the White Mountains of Arizona where it replaces the species. From *D. andesicola* of more southerly distribution, *D. sierra-blancae* may be recognized by its acute unhooded sepals.

***Aconitum columbianum* Nutt. var. *glaberrimum* (Rydb.), comb. nov.**

*Aconitum glaberrimum* Rydb., Bull. Torrey Club 29: 151. 1902.

The glabrous stems and glabrous or nearly glabrous leaves are apparently the only distinguishing characters of this form.

***Berberis harrisoniana*, sp. nov.**

Frutex 0.5–0.7 m altus; folia palmate-trifoliolata, foliolis sessilibus rhomboideo-vel triangulari-cuneatis coriaceis laete-viridibus non glaucis subtus vix pallidioribus dentibus spinosis magnis triangularibus 1 vel 2 utroque latere, foliolo terminali 3–5 cm longo 2.5–3.5 cm lato petiolum aequante vel subaequante; inflorescentia brevis corymbiformi-racemosa; sepala interiora petalis majora plus minusve 6 mm longa; filamenta apicem versus bidentata dentibus divergentibus calcaribus similibus; baccae globosae vel subovoideae nigro-coeruleae subglaucae 5–6 mm diametro.

Type: *Peebles and Loomis* 6768, in a canyon of the Kofa Mountains, Yuma County, Ariz., March 31, 1930, in fruit (U. S. National Herbarium No. 1468221). Known only from the type locality, where it was collected in flower on February 26, 1932, by R. E. Beckett (No. 9079).

The outer bark is pale brown on the branchlets, gray on the older stems the inner bark bright yellow. The veins are inconspicuous in fresh leaves. This plant resembles *B. trifoliolata* Moric. in the palmately trifoliolate leaves with petiole not articulated below the junction of the leaflets, but differs in the toothed filaments and the blue-black color of the berries.

The writers take pleasure in dedicating this species to their colleague,

George J. Harrison, whose activity in collecting plants during his residence in Arizona contributed materially to our knowledge of the flora.

***Streptanthus arizonicus* S. Wats. var. *luteus*, var. nov.**

A forma typica *S. arizonici* calyce luteo, stylo longiore, siliquis ad apicem magis attenuatis et rostratis distinguitur.

Type: *Kearney* 10813, Canyon Diablo, Ajo Mountains, Pima County, Ariz. (U. S. National Herbarium No. 1634074). Known only from the type collection.

The bright yellow color of the calyx soon fades, in dried specimens, to the normal ochroleucous hue of *S. arizonicus*. The style is 1 to 2 mm. long, whereas in most specimens of *S. arizonicus* it is less than 1 mm long.

***Descurainia obtusa* (Greene) Schulz var. *adenophora* (Woot. and Standl.), comb. nov.**

*Sophia adenophora* Woot. and Standl., Contr. U. S. Nat. Herb. 16: 127. 1913.  
*Descurainia obtusa* Schulz, Pflanzenr. IV, 105: 321. 1924.

This form apparently differs from typical *D. obtusa* only in the presence of glandular hairs in the inflorescence, and in having the pods often glabrescent.

***Arabis tricornuta* Rollins, sp. nov.<sup>4</sup>**

Herba perennis; caulibus erectis singulis superne ramosis, 3-6 dm altis, inferne sparse pubescentibus superne glabris; foliis radicalibus ignotis; foliis caulinis infimis petiolatis oblanceolatis pubescentibus 3-5 cm longis, ca. 1 cm latis, pilis ramosis, supremis linearibus vel lanceolatis glabris; inflorescentiis racemosis laxis gracilibus; sepalis glabris oblongis 3-4 mm longis, 2-3 mm latis; petalis albis lingulatis vel spatulatis 4-5 mm longis, ca. 1.5 mm latis; pedicellis gracilibus recurvatis glabris 1-1.5 cm longis; siliquis angustis plano-compressis patentibus vel pendulis glabris inferne 1-nervatis, 3-7 cm longis, ca. 2 mm latis; seminibus uniseriatis orbicularibus alatis ca. 1.5 mm latis.

Perennial; stems single, branched above, pubescent below with simple or branched trichomes, glabrous above, 3-6 dm high; basal leaves caducous, unknown; lower cauline leaves petiolate, oblanceolate, pubescent with harsh 2- or usually 3-pronged trichomes, 3-5 cm long, ca. 1 cm wide; upper cauline leaves linear to narrowly lanceolate, glabrous; inflorescence racemose, lax, slender, greatly elongated; sepals glabrous, oblong, 3-4 mm long, 2-3 mm wide, unequal, not saccate, inner pair tapering at base; petals white, lingulate to nearly spatulate, thickened toward base with edges rolled outward, arose to entire along petal margin, not differentiated into blade and claw, 4-5 mm long, ca. 1.5 mm wide; stamens slightly shorter than petals, filament of short stamen curved, filament of long stamen straight; nectar glands surrounding short stamens, only subtending long stamens; pedicels slender, gently curved downward, glabrous, 1-1.5 cm long; siliques linear, flattened parallel to septum, glabrous, 1-nerved to middle or above, spreading at right angles to widely pendulous, 3-7 cm long, ca. 2 mm wide; style ca. 1 mm long; stigma entire; seeds flat, orbicular, conspicuously winged all around, ca. 1.5 mm broad, uniseriate; cotyledons obliquely accumbent.

*Arabis tricornuta* is particularly interesting because at anthesis it is very difficult to distinguish from *Thelypodium micranthum*. In habit, inflorescence, flower, and type of pubescence they are almost identical. One minor feature

<sup>4</sup> Contributed by Reed C. Rollins, Gray Herbarium, Harvard University.

of flower similarity is particularly striking. In both species the short stamen arises at right angles to the ovary and then curves upward. This particular characteristic has not been observed in other species of *Arabis*, but it is not of major importance as a diagnostic character, since there is considerable variation in stamen insertion throughout the genus. The definitely winged seeds, accumbent cotyledons, and markedly flattened siliques of *A. tricornuta* leave little doubt about its being properly placed in *Arabis*, in spite of the striking similarity it shows at the flowering stage to another species of a different genus.

*Arabis tricornuta* is not closely related to any North American species of *Arabis*, but the flower, inflorescence, and upper parts of the plant are similar to *A. laevigata*. The new species is somewhat like *A. repanda*, particularly as regards the petiolate cauline leaves, but the similarity is only superficial. *A. tricornuta* is apparently restricted to the mountains of southern Arizona, where it has been collected at elevations between 7,000 and 9,000 feet.

ARIZONA: Eastview, Rincon Mountains, Oct. 13, 1909, *J. C. Blumer* 3478 (Gray Herb., type); Rincon Mountains, 1891, *G. C. Neally* 120 in part (U. S. Nat. Herb.); Santa Rita Mountains, Aug. 23, 1936, *Robert Darrow* and *J. Arnold* (Gray Herb.). There is a Blumer collection in the U. S. National Herbarium labeled *Castilleja minor*, which is partly *Arabis tricornuta* and partly *Thelypodium micranthum*. This specimen supposedly came from the Chiricahua Mountains, but the label is obviously a transposed one; hence the data cannot be trusted.

***Sedum wootoni* Britton var. *griffithsii* (Rose), comb. nov.**

*Sedum griffithsii* Rose, North Amer. Flora 22: 71. 1905.

There seems to be no character that distinguishes var. *griffithsii* from typical *S. wootoni* except the more distinctly papillate basal leaves.

***Echeveria bartramii* (Rose), comb. nov.**

*Graptopetalum bartramii* Rose, Addisonia 11: 1, pl. 353. 1926.

The characters on which were based the genera *Graptopetalum* Rose and *Dudleya* Britton and Rose are, in the opinion of the writers, of subgeneric rather than generic value.

***Echeveria arizonica* (Rose), comb. nov.**

*Dudleya arizonica* Rose, Addisonia 8: 35, pl. 274. 1923.

This species evidently is related to *E. pulverulenta* Nutt. of southern California but is perhaps sufficiently distinguished by the smaller size of the plant, less pulverulent herbage and smaller flowers.

***Echeveria collomae* (Rose), comb. nov.**

*Dudleya collomae* Rose, in Morton, Desert [Plant Life] 6: 68. 1934.

Closely related to several forms of southern California that have been described as species, *E. collomae* is presumably the Arizona plant referred to *Dudleya parishii* Rose in North American Flora (22: 41. 1905). Specimens of this species collected in Arizona by M. E. Jones were identified by him as *Cotyledon saxosum* M. E. Jones (*Dudleya saxosa* Britton and Rose, *Echeveria saxosa* Nels. and Macbr.), the type of which, a smaller plant, was collected in the Panamint Mountains, Calif.

***Saxifraga rhomboidea* Greene var. *franciscana* (Small), comb. nov.**

*Micranthes franciscana* Small, North Amer. Flora 22: 144. 1905.

*Saxifraga franciscana* Fedde, in Just, Bot. Jahresb. 33: pt. 1, 613. 1906.

*S. rhomboidea* var. *typica* f. *franciscana* Engler and Irmscher, Pflanzenr. IV. 117. 28. 1916.

The filaments of var. *franciscana* are described as clavate by Small but do not appear to be so in specimens from the type locality.

***Heuchera versicolor* Greene var. *leptomeria* (Greene), comb. nov.**

*Heuchera leptomeria* Greene, Leaflets 1: 112. 1905.

Apparently this form differs from typical *H. versicolor* only in the narrower hypanthium and lower part of the ovary and there is too much intergradation to warrant maintenance of *H. leptomeria* as a species.

***Philadelphus microphyllus* A. Gray var. *argenteus* (Rydb.), comb. nov.**

*Philadelphus argenteus* Rydb., North Amer. Flora 22: 171. 1905.

The variety differs from typical *P. microphyllus* only in the copious to dense pubescence of the hypanthium and upper surface of the leaves, these being glabrous or sparsely pubescent in the typical form.

***Fendlerella utahensis* (S. Wats.) Heller var. *cymosa* (Greene), comb. nov.**

*Fendlerella cymosa* Greene, in Woot. and Standl., Contr. U. S. Nat. Herb. 16: 129. 1913.

The leaves are normally narrower and more acute in var. *cymosa* than in typical *F. utahensis* and the two forms are widely separated geographically, typical *utahensis* occurring in southern Utah, southern Nevada and northern Arizona, whereas var. *cymosa* is found in the mountains of southern New Mexico, southern Arizona, and northern Mexico.

***Fendlera rupicola* A. Gray var. *tomentella* (Thornber), comb. nov.**

*Fendlera tomentella* Thornber, in Woot. and Standl., Contr. U. S. Nat. Herb. 16: 129. 1913.

In this variety the leaf-blades are rather densely white-pubescent beneath and are usually narrower and more strongly revolute than in typical *F. rupicola*.

***Crossosoma bigelovii* S. Wats. var. *glaucum* (Small), comb. nov.**

*Crossosoma glaucum* Small, North Amer. Flora 22: 232. 1908.

Although intergradation with the typical form is complete, var. *glaucum* normally has the foliicles broader (ovoid or obovoid) and more glaucous than in typical *C. bigelovii*.

***Rubus strigosus* Michx. var. *arizonicus* (Greene), comb. nov.**

*Batidaea arizonica* Greene, Leaflets 1: 243. 1906.

*Rubus arizonicus* Rydb., North Amer. Flora 22: 446. 1913.

The Arizona form apparently differs from eastern specimens of *R. strigosus* merely in having the leaves of the shoots 5- to 9-foliolate (instead of 3- to 5-foliolate) and those of the flowering branches mostly 5-foliolate but occasionally 3-foliolate.

***Potentilla crinita* A. Gray var. *lemmoni* (S. Wats.) comb. nov.**

*Ivesia lemmoni* S. Wats., Proc. Amer. Acad. 20: 365. 1885.

*Potentilla lemmoni* Greene, Pittonia 1: 104. 1885.

The variety differs from typical *P. crinita* in its stiffer, more erect stems, leaflets toothed only at or very near the apex, and petals usually not surpassing the sepals.

**Potentilla subviscosa** Greene var. **ramulosa** (Rydb.), comb. nov.

*Potentilla ramulosa* Rydb., Bull. Torrey Club 23: 430. 1896.

There is little to distinguish this variety from typical *P. subviscosa* except that the leaflets are usually only coarsely toothed, whereas in the typical form of the species they are cleft more than halfway to the midvein. The basal leaves in var. *ramulosa* are occasionally subpinnate rather than strictly digitate.

**Potentilla multifoliolata** (Torr.), comb. nov.

*Horkelia? multifoliolata* Torr., Sitgreaves Rep. Zuni & Colo. 159. 1853.

*Comarella multifoliolata* Rydb., Mem. Bot. Columbia Univ. 2: 156. 1898.

*Ivesia multifoliolata* Keck, Lloydia 1: 125. 1938.

**Potentilla thurberi** A. Gray var. **atrorubens** (Rydb.), comb. nov.

*Potentilla atrorubens* Rydb., Bull. Torrey Club 24: 11. 1897.

The variety seems to be distinguishable only in having the lower surface of the leaflets rather densely silvery-sericeous whereas in typical *P. thurberi* it is only sparsely sericeous, not silvery.

**Potentilla thurberi** A. Gray var. **sanguinea** (Rydb.), comb. nov.

*Potentilla sanguinea* Rydb., North Amer. Flora 22: 324. 1908.

This form differs from typical *P. thurberi* in having the leaves subpinnate with a very short rachis between the pairs of leaflets, instead of strictly digitate or very nearly so.

**Geum ciliatum** Pursh var. **griseum** (Greene), comb. nov.

*Erythrocoma grisea* Greene, Leaflets 1: 178. 1906.

*Sieversia grisea* Rydb., North Amer. Flora 22: 409. 1913.

From typical *G. ciliatum* the variety differs in having the bracts less conspicuously surpassing the sepals and the leaflets less deeply dissected.

**Geum strictum** Ait. var. **decurrens** (Rydb.), comb. nov.

*Geum decurrens* Rydb., North Amer. Flora 22: 404. 1913.

This is the common form of the species in the southern Rocky Mountain region, with the upper divisions of the leaves decurrent on the rachis and more or less confluent.

**Cercocarpus montanus** Raf. var. **flabellifolius** (Rydb.), comb. nov.

*Cercocarpus flabellifolius* Rydb., North Amer. Flora 22: 422. 1913.

Differs from typical *C. montanus* in the more appressed pubescence of the leaves and hypanthium-tube.

**Rosa arizonica** Rydb. var. **granulifera** (Rydb.), comb. nov.

*Rosa granulifera* Rydb., North Amer. Flora 22: 517. 1918.

As compared with typical *R. arizonica*, var. *granulifera* has the leaflets more or less double-serrate (the smaller teeth often reduced to glands), the lower surface of the leaflets more copiously granuliferous, and stipitate glands more constantly present on the backs of the sepals.

**Prunus emarginata** (Dougl.) Walp. var. **crenulata** (Greene), comb. nov.

*Cerasus crenulata* Greene, Proc. Biol. Soc. Washington 18: 56. 1905.

*Prunus crenulata* Tidestrom, Proc. Biol. Soc. Washington 40: 119. 1927.

Characterized, in comparison with the typical form of the species, by the narrower, elliptic or oblanceolate, more acute leaf-blades.



**Acacia hirta** Nutt. var. **suffrutescens** (Rose), comb. nov.*Acacia suffrutescens* Rose, Contr. U. S. Nat. Herb. 12: 409. 1909.*Acaciella suffrutescens* Britton and Rose, North Amer. Flora 23: 103. 1928.

The variety is scarcely distinguishable from typical *A. hirta* except that the plant is commonly distinctly suffrutescens. Lateral veins are scarcely perceptible in the leaflets of the type specimen of *A. suffrutescens*.

**Acacia hirta** Nutt. var. **shrevei** (Britton and Rose), comb. nov.*Acaciella shrevei* Britton and Rose, North Amer. Flora 23: 105. 1928.

As compared with typical *A. hirta* and var. *suffrutescens*, this form has leaflets with distinct lateral veins, some of these often branching from the midrib far above the base of the leaflet. There is complete intergradation among these three forms of *A. hirta*.

**Mimosa dysocarpa** Benth. var. **wrightii** (A. Gray), comb. nov.*Mimosa wrightii* A. Gray, Pl. Wright 2: 52. 1853.

Typically this variety is characterized by somewhat narrower, unarmed pods usually with a few marginal prickles in *M. wrightii*, glabrous or glabrate upper leaf-surface, and longer inflorescences than in the typical form, but there is much variation in both forms, and the intergradation seems complete.

**Mimosa grahami** A. Gray var. **lemmonii** (A. Gray), comb. nov.*Mimosa lemmonii* A. Gray, Proc. Amer. Acad. 19: 76. 1883.*Mimosopsis lemmonii* Britton and Rose, North Amer. Flora 23: 176. 1928.

The variety has copiously pubescent young twigs, leaves, flowers, and pods, whereas in typical *M. grahami* these parts are normally glabrous or sparsely pubescent. There appear to be no other distinguishing characters.

**Sophora formosa**, sp. nov.

Frutex 1–2 m altus; folia sempervirentia pinnata, foliolis 7–13 ellipticis obtusis 15–30 mm longis 10–12 mm latis coriaceis, primo utrinque argenteo-sericeis deinde supra strigosis; inflorescentia dense racemosa plus minusve 4 cm longa; calyx 8–9 mm longus sericeus brevidentatus; corolla purpurea vel violacea plus minusve 16 mm longa, vexilli lamina late-ovala 14–18 mm longa fere tam lata quam longa, alarum lamina paulo breviora, carinae petalorum lamina 10–13 mm longa quam unguibus vix duplo longiora; legumen usque ad 14 cm. longum 11–13 mm latum planum plus minusve torulosum; semina 2–5 rubro-fusca 6–11 mm longa 6–7.5 mm lata.

Type: *Bassett Maguire* 10993, below Frye Mesa, northern foothills of the Pinaleno Mountains, Graham County, Ariz., April 1935 (U. S. National Herbarium No. 1731764).

The bark of the twigs is gray-green, that of the old stems dark gray, rough and furrowed. The mature leaflets are dark green and slightly glossy above, with only the midvein prominent beneath. The pods are acuminate at apex and are sparsely strigose (more densely so at the constrictions). The seeds average 9.2 mm long and 6.5 mm wide. *S. formosa* closely resembles *S. arizonica* S. Wats., but the latter has a larger corolla (about 22 mm long), an oblong-obovate (instead of broadly oval) banner-petal 18 to 20 mm long and only two-thirds as wide as long (four-fifths as wide as long in *S. formosa*), keel-petals with blades 2.5 times as long as their claws (1.5 to 2 times as long in *formosa*); and slightly larger seeds, averaging 9.9 mm long, 7.4 mm wide (averaging 9.2 and 6.5 mm in *formosa*). All the petals are relatively broader,

in *S. formosa*, the leaflets of that species are usually longer, broader, and more obtuse, and the pubescence is denser and more persistent on the upper leaf-surface and on the pods.

At a second station for *S. formosa*, also in the northern foothills of the Pinaleno Mountains, about 13 miles southwest of the town of Pima, at about 3,000 feet altitude, C. J. Humphrey collected mature seeds on June 11, 1937. The writers visited the type locality, about 4½ miles south of Thatcher, on April 25, 1939, and found the plant locally abundant on eroded slopes with northern exposure, extending from the lower edge of Frye Mesa, at about 3,700 feet altitude, where it is associated with *Quercus turbinella*, *Yucca*, *Dasylirion*, and *Fouquieria*, down to the base of the escarpment at about 3,400 feet, where *Covillea*, *Prosopis*, and *Fouquieria* are the principal woody species. These, the only known stations of *S. formosa*, are 250 to 300 miles southeast of the only known stations of *S. arizonica*, in Mohave County, along the eastern foothills of the Hualpai Mountains and on Big Sandy Wash, 60 miles south of Kingman. Both species give the impression of being relict forms, suggesting that they may have had a common ancestor of much wider distribution.

*Lotus greenei* Ottley, nom. nov.<sup>5</sup>

*Hosackia mollis* Greene, Bull. California Acad. 1: 185. 1885.

*Lotus mollis* Greene, Pittonia 2: 143. 1890. (Non Balf. f. 1882.)

*Lotus oroboides* (HBK.) Ottley, nom. nov.<sup>5</sup>

*Tephrosia oroboides* HBK., Nov. Gen. et Sp. 6: 462. 1823.

*Hosackia puberula* Benth., Pl. Hartweg. 305. 1849.

*Lotus puberulus* Greene, Pittonia 2: 142. 1890.

*Psoralea mephitica* Wats. var. *retrorsa* (Rydb.), comb. nov.

*Pediomelum retrorsum* Rydb., North Amer. Flora 24: 22. 1919.

The variety differs from typical *P. mephitica* in its larger leaflets, longer central peduncle and inflorescence, and larger corolla.

*Amorpha fruticosa* L. var. *occidentalis* (Abrams), comb. nov.

*Amorpha occidentalis* Abrams, Bull. New York Bot. Garden 6: 394. 1910.

This form apparently differs from the variable and widely distributed *A. fruticosa* only in its usually more elongate spikes, these, more frequently than in the typical form, only 1 or 2 on the branchlet.

*Dalea leporina* (Ait.), comb. nov.

*Psoralea leporina* Ait., Hort. Kew. 3: 81. 1789.

*Parosela leporina* Rydb., North Amer. Flora 24: 78. 1920.

*Dalea nana* Torrey var. *carnescens* (Rydb.), comb. nov.

*Parosela carnescens* Rydb., Fl. Rocky Mts. 483. 1917.

Differs from typical *D. nana* in having the upper surface of the leaflets green and glabrescent rather than sericeous, and in having usually stouter stems.

*Dalea polygonoides* A. Gray var. *laevituba*, var. nov.

A *D. polygonoides* f. *typica* calycis tubo externe glabro distinguitur.

In typical *D. polygonoides* the whole of the calyx is silky-villous externally.

<sup>5</sup> Contributed by Alice M. Ottley, Department of Botany, Wellesley College.

Type: *Harrison, Kearney, & Fulton* 8089, Santa Catalina Mountains, Pima County, Ariz., August 23, 1931, growing on rocks at an altitude of 7,500 feet (U. S. National Herbarium No. 1530853). The variety was collected previously in the same locality (*Shreve* 5408) and occurs also in the Chiricahua Mountains, Cochise County, Ariz., at an altitude of 8,200 feet (*Blumer* 1652, 1653) and in southern New Mexico.

*Dalea whitingi*, sp. nov.

Frutex intricate ramosus interdum 0.8 m altus; rami spinescentes pilis retrorsis canescentes glandulis aurantiacis pustulati denique straminei glabrique; stipulae cartilagosae subulatae glanduliferae 1 mm longae; folia oblonga imparipinnata 12–24 mm longa antrorse strigosa, stipellis glandulosis, foliolis 11–19 crassis involutis 2–4 mm longis oblongis vel oblanceolatis obtusis vel truncatis subtus pustulatis in petiolulis brevibus contractis; inflorescentia racemosa spinescens 1–3 cm longa, pedunculo 7–20 mm longo, floribus 1–8, bracteis parvis cartilaginosi, pedicellis adscendentibus 1 mm longis; calyx externe villosus, tubo turbinato 2.5–3 mm longo 10-costato inter nervos glandulis 1–5 aurantiacis obsito, lobis rotundis vel obtusissimis fere tam latis quam longis glandulam apicalem munitis, lobo maximo 2 mm longo; petala hypanthio ad basin tubi staminum inserta, laminis longitudine subaequalibus fere 5 mm longis glandulam unicam apicem versus interdum munitis, vexilli lamina suborbiculari emarginata, laminis ceteris oblique-oblongis basi lobatis, vexilli et alarum unguibus 2 mm longis, carinae petalorum unguibus 3 mm longis; stamina monadelphia supra medium connata; ovarium 2-ovulatum villosum lateribus pustulatum 3.5 mm longum stylo villosa 3.5 mm longo attenuatum; fructus ignotus.

Type: *Whiting & Jones* 916/3277, Wupatki National Monument on Little Colorado River, Coconino County, Ariz., August 9, 1938 (U. S. National Herbarium No. 1732120).

Related to *Dalea thompsonae* (Vail) L. O. Williams, from which it is distinguished mainly by the greater number of leaflets (these only 5 to 9 in *thompsonae*), narrower leaflets (these elliptic or slightly obovate in *thompsonae*), and in having the calyx-tube villous externally and with less prominent ribs. Both species have the petals inserted on the hypanthium, appearing in this and other respects to be closely related to the species Rydberg placed in his genus *Psorothamnus*.

*Dalea wislizeni* A. Gray var. *sanctae-crucis* (Rydb.), comb. nov.

*Parosela sanctae-crucis* Rydb., North Amer. Flora 24: 103. 1920.

Herbage glabrous or nearly so, not villous or villous-canescens as in typical *D. wislizeni*.

*Robinia neomexicana* A. Gray var. *subvelutina* (Rydb.), comb. nov.

*Robinia subvelutina* Rydb., North Amer. Flora 24: 227, 1924.

This variety is distinguished from the typical form of *R. neomexicana* by the glandular-hispid pubescence of the pods and from var. *luxurians* Dieck by the rather loose, somewhat spreading pubescence of the herbage and by the usually more copiously glandular-pubescent young stems and petioles.

*Astragalus egglestonii* (Rydb.), comb. nov.

*Tium egglestonii* Rydb., North Amer. Flora 24: 396. 1929.

This species evidently is closely related to *A. rusbyi* Greene, although Rydberg (*ibid.*, p. 380) placed the latter in a different segregate genus, *Atelo-*

*phragma*. *Astragalus egglestonii* differs chiefly in its glabrous, shorter-stipitate pods.

*Astragalus sonorae* A. Gray var. **tenerrimus** (M. E. Jones), comb. nov.  
*Astragalus humistratus* var. *tenerrimus* M. E. Jones, Proc. California Acad. II, 5: 649. 1894.

*Batidophaca tenerrima* Rydb., North Amer. Flora 24: 316. 1929.

This seems to be only a form of *A. sonorae* with smaller leaflets and shorter fewer-flowered racemes.

*Hedysarum mackenzii* Richards. var. **pabulare** (A. Nelson), comb. nov.  
*H. pabulare* A. Nelson, Proc. Biol. Soc. Washington 15: 185. 1902.

This form has relatively narrow leaflets and relatively small flowers as compared with specimens of *H. mackenzii* from farther north.

*Desmodium metcalfei* (Rose and Painter), comb. nov.  
*Meibomia metcalfei* Rose and Painter, Bot. Gaz. 40: 144. 1905.

*Galactia wrightii* A. Gray var. **mollissima**, var. nov.  
 A forma typica *G. wrightii* caulibus et foliis velutino-tomentosis pilis fere omnibus patentibus distinguitur.

In typical *G. wrightii* the pubescence is sericeous and most of the hairs are appressed.

Type: *Pebbles, Harrison & Kearney* 4657, near Patagonia, Santa Cruz County, Ariz., August 7, 1927, in flower (U. S. National Herbarium No. 1368950). Also has been collected at Paradise, Cochise County, 5,500 feet (*Blumer* 1799, in fruit); in the Pinaleno Mountains, Graham County, 5,100 feet (*Kearney & Pebbles* 14103); and "in Arizona" (*Rothrock* 387).

*Phaseolus wrightii* A. Gray var. **grayanus** (Woot. and Standl.), comb. nov.  
*Phaseolus grayanus* Woot. & Standl., Contr. U. S. Nat. Herb. 16: 139. 1913.

The variety intergrades with typical *P. wrightii* but usually has larger leaflets, longer peduncles, and more persistently pubescent pods.

*Geranium atropurpureum* Heller var. **furcatum** (Hanks), comb. nov.  
*Geranium furcatum* Hanks, North Amer. Flora 25: 16. 1907.

This differs from the typical form apparently only in the presence of glandular hairs, at least on the pedicels.

*Linum aristatum* Engelm. var. **australe** (Heller), comb. nov.  
*Linum australe* Heller, Bull. Torrey Club 25: 627. 1898.

The variety is characterized by usually shorter sepals and petals and by having the inner sepals dentate rather than merely denticulate; also by the commonly more branched stems and serrulate leaves, these being mostly entire in the typical form. There is, however, much intergradation.

*Kallstroemia californica* (S. Wats.) Vail var. **brachystylis** (Vail), comb. nov.  
*Kallstroemia brachystylis* Vail, Bull. Torrey Club 24: 206. 1897.

As compared with typical *K. californica*, this form has usually fewer leaflets and shorter, blunter tubercles on the carpels, but there is too much intergradation to warrant specific distinction.

*Ptelea angustifolia* Benth. var. **cognata** (Greene), comb. nov.  
*Ptelea cognata* Greene, Contr. U. S. Nat. Herb. 10: 62. 1906.

This form is distinguished by the glabrescent, instead of permanently pubescent, lower leaf-surface.

***Acer glabrum* Torrey var. *neomexicanum* (Greene), comb. nov.**

*Acer neomexicanum* Greene, *Pittonia* 5: 3. 1902.

This form differs from typical *A. glabrum* and resembles *A. glabrum* var. *tripartitum* (Nutt.) Pax in having at least some of the leaves 3-parted instead of merely lobed. From var. *tripartitum* it differs in the more deeply and acutely toothed leaf-margins and in having the terminal division longer-cuneate at base.

***Rhamnus betulaeifolia* Greene var. *obovata*, var. nov.**

Laminae foliorum obovatae crassiusculae 5–8 cm longae 4–5.5 cm latae.

Type: *Peebles & Smith* 13930, south end of Navajo Mountain, Coconino County, Ariz., at an altitude of 6,300 feet (U. S. National Herbarium No. 1732315). Occurs also in San Juan County, Utah, in Armstrong and White Canyons, 5,000 to 5,500 feet (*Rydberg & Garrett* 9411) and in Cottonwood Canyon, 4,200–4,500 feet (*Maguire* et al. 5750). A collection in the Charleston Mountains, Nev. (*Clokey* 727) has less pronouncedly obovate blades.

In typical *R. betulaeifolia* the leaf-blades are elliptic or oblong, usually narrower, thinner, and with veins slenderer and less prominent beneath than in var. *obovata*. The variety occurs considerably to the north and northwest of the main range of *R. betulaeifolia*.

***Sphaeralcea* spp.**

The following combinations, previously published as subspecies, are here renamed as varieties in conformity with the practice of most American botanists. The references in parentheses are to pages in the publication in which the subspecies were published.<sup>6</sup> *S. coulteri* var. *californica* (Rose) Kearney (p. 32); *S. coulteri* var. *margaritae* (Brandege) Kearney (p. 33); *S. axillaris* var. *rosacea* (Rose) Kearney (p. 36); *S. emoryi* var. *variabilis* (Cockerell) Kearney (p. 39); *S. emoryi* var. *nevadensis* Kearney (p. 40); *S. emoryi* var. *arida* (Rose) Kearney (p. 41); *S. ambigua* var. *rosacea* (Munz and Johnston) Kearney (p. 46); *S. ambigua* var. *monticola* Kearney (p. 47); *S. ambigua* var. *rugosa* Kearney (p. 49); *S. ambigua* var. *versicolor* Kearney (p. 50); *S. rusbyi* var. *gilensis* Kearney (p. 54); *S. rusbyi* var. *eremicola* (Jepson) Kearney (p. 56); *S. incana* var. *cuneata* Kearney (p. 59); *S. fendleri* var. *elongata* Kearney (p. 62); *S. fendleri* var. *albescens* Kearney (p. 62); *S. fendleri* var. *tripartita* (Woot. and Standl.) Kearney (p. 63); *S. fendleri* var. *venusta* Kearney (p. 63); *S. angustifolia* var. *lobata* (Wooton) Kearney (p. 69); *S. subhastata* var. *connata* Kearney (p. 75); *S. subhastata* var. *martii* (Cockerell) Kearney (p. 76); *S. subhastata* var. *latifolia* Kearney (p. 77); *S. subhastata* var. *thyrsoidea* Kearney (p. 77); *S. subhastata* var. *pumila* (Woot. and Standl.) Kearney (p. 78); *S. munroana* var. *subrhomboidea* (Rydberg) Kearney (p. 85); *S. grossulariaefolia* var. *pedata* (Torrey) Kearney (p. 88); *S. digitata* var. *tenuipes* (Woot. and Standl.) Kearney (p. 91); *S. coccinea* var. *dissecta* (Nutt.) Kearney (p. 96); *S. coccinea* var. *elata* (Baker) Kearney (p. 97).

***Koerberlinia spinosa* Zucc. var. *tenuispina*, var. nov.**

Frutex ramulis spinosis elongatis tenuis plerumque 5–9 cm longis ad basin, 1.5–3 mm crassis; cortex coeruleo-viridis; sepala deltoide-ovata 1.5–2 mm

<sup>6</sup> Kearney, Thomas H. The North American species of *Sphaeralcea*, subgenus *Eusphaeralcea*. Univ. California Publ. Bot. 19: 1–102. 1935.

longa longiora quam lata distincte denticulata; petala 4.2–6 mm longa; filamenta 2.5–5 mm longa.

Type: *Kearney & Peebles* 10969, Horse Tank, Castle Dome Mountains, Yuma County, Ariz., March 25, 1935 (U. S. National Herbarium No. 1634130). Has been collected in Yuma County, Ariz., near Wenden (*Peebles & Loomis* 6740) and in the Kofa Mountains (*Peebles & Loomis* 6772), and between Mesquite and Altar, Sonora (*F. Long* 27). Flowers in March.

Typical *K. spinosa*, which apparently occurs nowhere west of Tucson, Ariz., is usually lower-growing than var. *tenuispina*, which reaches a height of 3.6 meters. The typical form normally has shorter and stouter spines (3 to 6 cm long and 2.5 to 4 mm in diameter at base), yellowish-green bark, deltoid-orbicular sepals 1 to 1.5 mm long, wider than long, obscurely denticulate, petals not more than 4.5 mm. long, and filaments not more than 3.5 mm long. It flowers later than var. *tenuispina*, from July to October (exceptionally in May). There is an early-flowering form in Texas (var. *verniflora* Bogusch), but this has much shorter spines than var. *tenuispina*.

***Viola nephrophylla* Greene var. *arizonica* (Greene), comb. nov.**

*Viola arizonica* Greene, *Pittonia* 5: 33. 1902.

This form differs, apparently, from typical *V. nephrophylla* only in having sparsely pubescent or at least ciliolate leaf-blades.

***Chimaphila maculata* (L.) Pursh var. *dasystemma* (Torrey), comb. nov.**

*Chimaphila dasystemma* Torrey, in Rydb., *North Amer. Flora* 29: 32. 1914.

This form differs from most eastern specimens of *C. maculata* in its shorter and relatively wide leaf-blades, these 2 to 4 cm long, one-third to two-thirds as wide.

***Monotropia hypopitys* L. var. *latisquama* (Rydb.), comb. nov.**

*Hypopitys latisquama* Rydb., *Bull. Torrey Club* 40: 461. 1913.

Compared with *M. hypopitys* as represented in the Eastern United States, this form differs in the usually pink or red color of the plant, taller and stouter stems, broader leaves (scales) and more numerous and larger flowers, with petals 10 mm long or longer.

***Lysimachia ciliata* L. var. *validula* (Greene), comb. nov.**

*Steironema validulum* Greene, *Contr. U. S. Nat. Herb.* 16: 158. 1913.

Differs from most eastern specimens of *L. ciliata*, and from *Steironema ciliatum* var. *occidentale* Suksdorf, in having the leaf-blades at most obscurely ciliolate, rather than distinctly short-ciliate. The blades also are narrower than they are commonly in *L. ciliata*. The petioles are conspicuously ciliate, as in other forms of the species.

***Amsonia tomentosa* Torrey and Frém. var. *stenophylla*, var. nov.**

Folia 5–8 mm lata, inferiora distincte brevi-petiolata lamina rhomboideolanceolata, superiora lineari-lanceolata fere sessilia; folliculi maturi pubescentes vel glabrescentes.

Type: *Peebles & Fulton* 11944, Monument Valley, Navajo County, Ariz., altitude 5,300 feet, in flower June 4, 1935 (U. S. National Herbarium No. 1634559). Occurs also in the "Colorado Canyon" (*Mrs. Thompson* in 1872), and at Cameron, Coconino County, altitude 5,000 ft. (*Hanson* 160).

The Hanson collection was referred to *A. arenaria* Standley by Woodson

(Ann. Missouri Bot. Garden 15: 424. 1928), but the writers believe it to be nearer *A. tomentosa*, since the leaves of *A. arenaria* are all very narrowly linear-lanceolate and sessile or subsessile. From typical *A. tomentosa* this variety differs in its narrower leaves and in the less copiously pubescent, or glabrescent, mature pods.

**Mellichampia sinaloensis** (Brandege), comb. nov.

*Roulinia sinaloensis* Brandege, Zoe 5: 243. 1908.

This species differs from *M. ligulata* (Benth.) Vail (*M. rubescens* A. Gray) in having smaller, ochroleucous flowers, narrower and less pubescent corolla-lobes, corona-segments subquadrate at base and abruptly contracted into the subulate terminal portion (not gradually attenuate as in *M. ligulata*), and rounder, suborbicular or reniform anther-tips, these not or but slightly surpassing the stigmatic disk.

**Gilia aggregata** (Pursh) Spreng. var. **macrosiphon**, var. nov.

A *G. aggregata* f. *typica* corolla pallide purpureo-incarnata, lobis purpureo-maculatis, tubo cum fauce 3.5–4 cm longo, siccitate fauce ad apicem minus quam 3 mm lato, lobis caudato-acuminatis, distinguitur.

Type: *Peebles, Kearney, & Harrison 2522*, Santa Catalina Mountains, Pima County, Ariz., altitude 7,500 feet (U. S. National Herbarium No. 1367907). Known only from the type locality, where it is fairly abundant and where no other form of *G. aggregata* has been observed.

The very long narrow corolla and its purplish-pink color distinguish this variety from other forms of *G. aggregata*, in which the corolla rarely exceeds 3 cm. in length, is 3 to 4 mm wide at the throat in pressed specimens and varies in color from bright (spectrum) red to eosine pink.

**Scutellaria tessellata** Epling, sp. nov.<sup>7</sup>

Herba perennis altitudine plerumque 30–50 cm caulibus paucis e caudice lignoso ramoso ascendentibus utrimque pilis decurvis vix tamen appressis quam *S. wrightii* majoribus nisi glandulis sessilibus inconspicuis nullomodo glandulosis; calycibus rarius pilis extensis capitatis sparse conspersis; foliorum laminis *ovatis*, mediis 11–24 mm longis, 6–17 mm latis, petiolis 1–6 mm longis elatis, in apice obtusis in basi cuneato-angustatis etiam truncatis pilis extenso-decurvis hirtellis; calycibus glandulis inconspicuis sessilibus conspersis et pilis extensodecurvis rarius glandulosis hirtellis, labia inferiore 3–4.5 mm longa in maturitate paulo aucto, squama circiter 4.5 mm alta; corollarum violacearum galea cum tubo 12.5–19 mm longo, galea intus sparse piloso, tubo ad calycis os piloso-annulato, staminibus supra tubi basim 4–8 mm magnam partem circiter 5 mm positus, labia inferiore sparsissime pilosa; nuculis fuscis *tessellatis* quam *wrightii* etiam *resinosae* majoribus.

Type collected in the Huachuca Mountains by Marcus E. Jones, Sept. 3, 1903 (U. S. National Herbarium No. 856971). The species occurs in southern New Mexico and in central and southern Arizona, ranging in the latter state from near Ash Fork, Yavapai County, to the mountains of Cochise and Pima Counties, where it is especially abundant.

This species is distinguishable from *S. resinosa* and *S. wrightii* by the taller, more diffuse habit, the coarser pubescence, the ovate leaves, which are usually distinctly petioled, and the hairy annulus in the corolla tube. The nutlets are larger and the protuberances are flattened, giving a tessellate

<sup>7</sup> Contributed by Carl Epling, University of California at Los Angeles.

appearance somewhat as in *S. canescens*. It is readily distinguished from *S. potosina* by the small decurved hairs.

*Agastache barberi* (Robinson) Epling, comb. nov.<sup>7</sup>

*Brittonastrum barberi* Robinson, Proc. Amer. Acad. 43: 24. 1907.

*Agastache breviflora* (A. Gray) Epling, comb. nov.<sup>7</sup>

*Cedronella breviflora* A. Gray, Proc. Amer. Acad. 20: 309. 1885.

*Brittonastrum breviflorum* Briq.; Engler & Prantl Pflanzenfam. Nachtr. 1: 291. 1897.

*Monardella arizonica* Epling, sp. nov.<sup>7</sup>

Herba perennis saxicola suffruticosa 30–50 cm alta caulibus numerosis assurgentibus pilis brevibus decurvatis et praesertim longioribus ad 1 mm longis extensis vestitis; foliorum laminis sessilibus magnam partem lanceolatis 12–25 mm longis, 5–12 mm latis acutis integris, utrimque pilis extensis sparse conspersis et brevibus capitatis glandulosis; capitulis subnudis, bracteis angustioribus acutis calyces vix aequantibus; calycibus extus capitato-glandulosis et pilis longioribus extensis conspersis; corollis albis purpureo-maculatis.

Type collected by the author and Mrs. Epling in the Sierra Estrella, Maricopa County, Ariz., deposited in the herbarium of the University of California at Los Angeles. The species has been collected also in the Kofa Mountains, Yuma County, Ariz. (Kearney & Peebles 14220).

In an earlier paper (Ann. Missouri Bot. Gard. 12: 1–106. 1925) for want of sufficient evidence to do otherwise, the author referred to *M. linooides* A. Gray several species proposed by E. L. Greene: *M. anemonoides*, *M. epilobioides*, *M. oblonga*, and *M. viminea*. Since this time evidence has been accumulating to suggest that each of these proposed species, as well as *M. robisonii* Epling, the species here proposed, and two other probable entities not as yet named, form a complex of closely related localized species. Each apparently is ecologically different, inasmuch as the associations in which they occur are different, and each is morphologically different, although these differences are slight and not always constant. Under cultivation, these distinctions are usually increased. When further evidence has accumulated as to the range of variation of each, as well as their cytology, it is hoped to present their relationships and distribution more fully.

The plants from the Kofa Mountains and the Sierra Estrella seem certainly to be the same. They occur there, growing from under large granitic boulders in much the same way as *M. robisonii*, which is confined to the region of Key's Ranch near Twenty-nine Palms, Calif., and which they most closely resemble. They are found in the *Larrea climax* associated with *Encelia farinosa*, *Fouquieria splendens*, *Salvia mohavensis* and *Hyptis emoryi*. In habit they are characterized by the rather broad leaves (for this species group), which tend to spread. The spreading pubescence is similar to that of *M. robisonii* but more pronounced.

Plants from the Ute Mountains, Ariz., however, more nearly suggest *M. epilobioides*, which is confined to the San Bernardino Mountains, Calif. They, too, grow from under boulders in the stream bed, with much the same habit as the plants from the Sierra Estrella, but the leaves are narrow, seldom more than 5 mm broad, and are ascendent, similar to those of *M. epilobioides*. The pubescence is shorter and that of the calyces is wholly glandular; in this respect also they are more like *M. epilobioides*. Their associates are somewhat different, as they occur at the margin of the juniper belt with



*Salvia carnosa* subsp. *argentea*, *Salvia mohavensis*, *Yucca mohavensis*, *Rhus anisophylla*, *Quercus turbinella*, *Garrya flavescens*, and *Rhamnus* sp. Both forms are found growing with *Salvia mohavensis*, which is known from Arizona from only one other locality. But these are the associates of *M. robisonii* rather than those of *M. epilobioides*, which is usually found at the lower margin of the yellow pine belt, on the desert side, often growing amongst the pine needles.

***Penstemon angustifolius* Nutt. ex Pursh subsp. *venosus*  
Keck, subsp. nov.<sup>8</sup>**

Subsp. *caudatus* similis; bracteis lanceolatis ovatisve utrinque venosis nec nigrescentibus pallidis glaucis; corolla roseo-lilacina venis intus purpureis 15–20 mm longis; capsula 10–15 mm longa.

Type: *R. H. Peebles & H. J. Fulton* 11877, from 12 miles northeast of Tuba City, Coconino County, Ariz., at 5,300 feet elevation, June 3, 1935 (United States National Herbarium).

Specimens examined: ARIZONA: Apache County: 20 miles northeast of St. Johns, *Hope, King, & Harlan* 9321 (US); 4 miles northeast of Sweetwater, *Peebles & Smith* 13552 (CI, US); 9 miles northeast of Rock Point, *Peebles & Smith* 13530 (US). Navajo County: Jeddito Mesa, 1934, *Bartlett & Colton* (CI); Keams Canyon, *Hope, King, & Harlan* 9377 (US); Oraibi, *Whiting* 1272 (CI); Polacca-Winslow road, *Whiting* 795 (Mus. N. Ariz.). Coconino County: Klethla Valley, *Eastwood & Howell* 6505 (CAS); 23 miles north of Red Lake, *Peebles & Smith* 13894 (Sacaton); 6 miles east of Tuba City, 1901, *Ward* (US); Moencopi Sand Hill, 1934, *Colton & Bartlett* (CI). NEW MEXICO: San Juan County: Cedar Hill, *Standley* 7955 (US); Aztec, *Baker* 603 (GH, NY, RM, US); Bloomfield, *Waring* 27 (Ph); Farmington, *Standley* 6963 (US); plains west of Farmington, *Osterhout* 6960 (RM). UTAH: Grand County: between Moab and Castleton, *Cottam* 5618 (CI, Univ. Utah). San Juan County: Between Blanding and Bluff, *Stanton* 1021 (Ph); Bluff, *Cottam* 5585 (Univ. Utah), 5786 (CI, Univ. Utah); San Juan River, 10 miles northwest of Mexican Hat, *Maguire* 16260 (CI, Utah State). Garfield County: Escalante, *Cottam* 4385 (CI, Univ. Utah), *Stanton* 1022 (Ph). Millard-Juab County: Millard Sand Dunes, *Stanton* 5281 (Univ. Utah).

This subspecies is a rather constant plant of sand dunes. It grades over by fine steps into subsp. *caudatus* in western New Mexico, but it may usually be distinguished by the smaller, often pinkish flowers and the more venose bracts, which do not turn blackish in drying.

***Penstemon angustifolius* subsp. *caudatus* (Heller) Keck**

*Penstemon caudatus* Heller, Minnesota Bot. Stud. 2: 34. 1898.

*P. angustifolius* var. *caudatus* Rydb., Bull. Torrey Club 33: 151. 1906.

*P. secundiflorus caudatus* A. Nels., in Coult. & Nels., New Man. Bot. 444. 1909.

***Penstemon pachyphyllus* A. Gray ex Rydb. subsp. *congestus* (Jones) Keck**

*Penstemon acuminatus* Dougl. (var.) *congestus* Jones, Proc. California Acad. II, 5: 714. 1895.

*Penstemon congestus* Pennell ap. Graham, Ann. Carnegie Mus. 26: 331. 1937.

<sup>8</sup> This and the other new subspecies and combinations in *Penstemon* contributed by David D. Keck, Carnegie Institution of Washington, Stanford University, Calif.

**Penstemon virgatus** A. Gray subsp. **arizonicus** (A. Gray) Keck*Penstemon hallii* A. Gray var. *arizonicus* A. Gray, Syn. Fl. 2(1): 263. 1878.**Penstemon strictus** Benth. subsp. **strictiformis** (Rydb.) Keck*Penstemon strictiformis* Rydb., Bull. Torrey Club 31: 642. 1905.**Penstemon ambiguus** Torr. subsp. **laevissimus** Keck, subsp. nov.

Planta undique glaberrima nitida.

Type: *I. W. Clokey* 8113, from Wilson's Ranch, Charleston Mountains, Clark County, Nev., at 1,180 m. elevation, in gravelly soil, with brush, in the *Larrea* belt, June 7, 1938 (Dudley Herbarium of Stanford University).Typical *P. ambiguus* comes from Colorado. Its stems and usually the leaves are finely puberulent in contrast to the present subspecies in which the herbage is glabrous throughout. The two forms occupy adjacent ranges; the typical form is found on the plains of eastern Colorado, adjacent Kansas and southward through the panhandle of Texas, while subsp. *laevissimus* ranges from southwestern Texas northwesterly across central New Mexico and northern Arizona to southern Utah and Nevada.**Penstemon eatonii** A. Gray subsp. **undosus** (Jones) Keck*Penstemon eatonii* var. *undosus* Jones, Proc. California Acad. II. 5: 715. 1895.*P. coccinatus* Rydb., Bull. Torrey Club 36: 691. 1909.**Penstemon eatonii** subsp. **exsertus** (A. Nels.) Keck*Penstemon exsertus* A. Nels., Amer. Journ. Bot. 18: 438. 1931.*P. amplus* A. Nels., *ibid.* 25: 115. 1938.**Penstemon barbatus** (Cav.) Roth subsp. **torreyi** (Benth.) Keck*Penstemon torreyi* Benth. in DC., Prodr. 10: 324. 1846.*P. barbatus* var. *torreyi* A. Gray, Proc. Amer. Acad. 6: 59. 1862.**Penstemon barbatus** subsp. **trichander** (A. Gray) Keck*Penstemon barbatus* var. *trichander* A. Gray, Proc. Amer. Acad. 11: 94. 1876.*P. trichander* Rydb., Bull. Torrey Club 33: 151. 1906.**Mimulus cardinalis** Dougl. var. **verbenaceus** (Greene), comb. nov.*Mimulus verbenaceus* Greene, Leaflets 2: 2. 1909.This form apparently differs from typical *M. cardinalis* only in having the corolla-tube more exserted (often nearly twice as long as the calyx) whereas in the typical form the tube is scarcely to moderately exserted; but the intergradation between these forms is practically complete.**Castilleja patriotica** Fernald var. **blumeri** (Standley), comb. nov.*Castilleja blumeri* Standley, Muhlenbergia 5: 46. 1909.Seems not to differ from typical *C. patriotica* except in the smaller size of the flowers: calyx about 20 mm long, corolla less than 30 mm long, galea less than 20 mm long. Specimens intermediate in size of flower also occur.**Cordylanthus wrightii** A. Gray var. **pauciflorus**, var. nov.A *C. wrightii* f. *typica* caulibus et foliis obscure puberulentibus vel glabrescentibus, capitulis uni-vel bifloris distinguitur.Type: *Kearney & Peebles* 12884, 14 miles northeast of Tuba, Coconino County, Ariz., altitude 5,400 feet, September 27, 1935 (U. S. National

Herbarium No. 1651321). Occurs also in Navajo County, Ariz., in Keam Canyon (*Hough* in 1897, *Monson* in 1937), and on Jedito Mesa (*Zuck* in 1897).

***Sambucus racemosa* L. var. *microbotrys* (Rydb.), comb. nov.**

*Sambucus microbotrys* Rydb., Bull. Torrey Club 28: 503. 1901.

The glabrous or nearly glabrous branchlets and leaves and the more frequent occurrence of 7 leaflets seem to be the only characters distinguishing this form of the Rocky Mountain region from the form of *S. racemosa* (*S. pubens* Michx.) that occurs in the Eastern United States.

***Sambucus neomexicana* Woot. var. *vestita* (Woot. and Standl.), comb. nov.**

*Sambucus vestita* Woot. and Standl., Contr. U. S. Nat. Herb. 16: 175. 1913.

The writers can find no character except the persistently puberulent or tomentulose herbage to distinguish *vestita* from *neomexicana*.

BOTANY.—*A new variety of the willow Salix glaucophylla* Bebb.<sup>1</sup>

CARLETON R. BALL, U. S. Department of Agriculture.

Recently the writer received from Dr. Otto E. Jennings, curator of botany in the Carnegie Museum at Pittsburgh, their Pennsylvania Salices for determination and verification before use on the State distribution maps. Among the specimens were some 40 sheets, mostly from Erie County, which represent a hitherto unrecognized variety. Curiously enough, the earliest collection had been made 60 years ago, in 1879, and nearly all are more than 30 years old.

At first glance the plant seems to be a robust and very hairy *S. cordata*, with the broad, cordate leaves of Muhlenberg's type. In fruiting characters, however, it is like *S. glaucophylla* Bebb, a sand-dune plant of the western Great Lakes area. This new form is regarded as a variety of that species.

***Salix glaucophylla* Bebb, *albovestita* Ball, n. var.**

Straggling, divaricately branched shrub, 1–2.5 or 3 meters high; branchlets stout, yellowish brown to reddish brown to darker, often drying black, the seasonal shoots densely white-pilose, the 1-year and 2-year branchlets more or less gray-pubescent or puberulent to glabrous, dull; bud scales stout, ovoid or ovoid-lanceolate, 5–7 or 10 mm long, colored and clothed as the subtending branchlets; stipules semiovate to broadly reniform, 0.5–2 cm long, to 1 cm. wide, rounded to acutish or acute at apex, subtentire to shallowly crenulate-serrulate, colored and clothed as the leaf blades.

Leaves stipulate, petiolate, unfolding with the aments; petioles 7–15 or 20 mm long, stoutish, channeled, pubescent; blades lanceolate to broadly lanceolate, ovate-lanceolate, or sometimes ovate, rounded to deeply cordate at base, short-acuminate to acuminate at apex (narrowly to broadly elliptical and acute at both ends while unfolding), 7 or 8 to 10 or 12 cm long and

<sup>1</sup> Received July 22, 1939.