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DESCRIPTIONS OF NEW PLANTS PRELIMINARY TO A REPORT UPON THE FLORA OF
NEW MEXICO

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PREFACE.

The accompanying paper by Prof. E. O. Wooton, of the United States Department of Agriculture, and Mr. Paul C. Standley, Assistant Curator in the Division of Plants, United States National Museum, contains descriptions of many new plants from the State of New Mexico. These have been discovered by the authors while engaged in the preparation of a report upon the flora of that State which is designed for future publication as a volume of the Contributions from the United States National Herbarium. That a large number of undescribed plants have been detected in the progress of the work has resulted not only from the neglect of this area by most recent students of systematic botany, but also from the fact that there are now assembled for the first time fairly complete collections from all parts of the State.

The descriptions are here issued in advance of the complete work in order to secure for the later publication conciseness and uniformity. In addition to the diagnoses of many new species and one new genus, the publication of a number of new names is found necessary.

FREDERICK V. COVILLE,
Curator of the United States National Herbarium.

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DESCRIPTIONS OF NEW PLANTS PRELIMINARY TO A REPORT UPON THE FLORA OF NEW MEXICO.

By E. O. WOOTON and PAUL C. STANDLEY.

INTRODUCTION.

For several years the writers have had in preparation a flora of New Mexico. The manuscript of the grasses was the first part to be completed, the material of this family in the herbarium of the New Mexico Agricultural College having been carefully worked over in the winter of 1906-7. There has been published recently as a bulletin of the New Mexico Agricultural Experiment Station a list of the grasses and grass-like plants of the State in which are enumerated all the species of the Poaceae, Juncaceae, and Cyperaceae, which we have seen from within our limits, the paper being accompanied by keys to the genera and species. While the material in the Agricultural College Herbarium was the basis of that report, all of that in the National Herbarium has now been gone over carefully, resulting in many additions to our first list.

The Cactaceae of the State have been treated in a similar bulletin published by the same institution. The flora of New Mexico is particularly rich in representatives of this family, no less than 67 being known to occur within the State, while additional ones are doubtless to be discovered.

Other briefer papers dealing with special groups of New Mexican plants have been published from time to time, notably one treating the genus *Androsace*,¹ one upon the genus *Delphinium*,² and several describing miscellaneous new species from the State.³

¹ Wooton, E. O., and Standley, Paul C. The Genus *Androsace* in New Mexico. Bull. Torrey Club 34: 517-520. 1907.

² Wooton, E. O. The Larkspurs of New Mexico. Bull. Torrey Club 37: 31-41. 1910.

³ Wooton, E. O. A new Southwestern Rose. Bull. Torrey Club 25: 152-154. pl. 335. 1898.

Wooton, E. O. New Plants from New Mexico. Bull. Torrey Club 25: 257-264, 304-310, 451-459. 1898.

Wooton, E. O., and Standley, Paul C. Some Hitherto Undescribed Plants from New Mexico. Bull. Torrey Club 36: 105-112. 1909.

Wooton, E. O., and Standley, Paul C. A new *Lathyrus* from New Mexico. *Muhlenbergia* 5: 87. 1909.

Standley, Paul C. More Southwestern *Castillejas*. *Muhlenbergia* 5: 81-87. 1909.

During the winter of 1910-11 both writers gave most of their time to the completion of the report upon the flora of New Mexico, the work being carried on at the National Herbarium. Here are found nearly all the larger collections made in the State from the earliest times, the only important exceptions being those of the James, Wislizenus, and Emory expeditions. The National Herbarium includes the larger sets of Fendler, Wright, Bigelow, Newberry, Heller, Earle, Skehan, and Metcalfe, besides many smaller ones, prominent among the last being one by Dr. E. A. Mearns and another of several hundred numbers gathered by members of the Biological Survey in connection with their field work in the State. More important than these collections, at least for the purposes of determining distribution, are those secured by the writers themselves, embracing several thousands of specimens from almost every part of the State. During the summer of 1911, besides, a careful examination was made of all the New Mexican material in the herbarium of the Agricultural College, resulting in the addition of many other species to our lists. The latter herbarium contains all the more recent sets of New Mexican plants, besides specimens of nearly all collections made by the writers. In addition, there are hundreds of smaller collections to be found nowhere else, not having been made in duplicate. Such are those of Prof. T. D. A. Cockerell, Dr. C. L. Herrick, Mrs. W. T. Bartlett, Miss Charlotte Ellis, Messrs. Maltby and Coghill, and many others who have forwarded their specimens to the Agricultural College for identification.

As a result of our study of this rather ample material we have compiled a list of the plants of the State, which shows that the flora of New Mexico will compare favorably in number of species with that of any of the Western States. It is to be remembered that the plant life of the State is still imperfectly known, except in certain limited localities. Even in those areas which have been fully investigated unknown plants are often turning up; and there are extensive ranges of mountains and hills, as well as stretches of plains, where little or no collecting has been done. For example, the Jemez Range, one of the largest in the State, has never been visited by a botanist. Fewer things of interest are to be expected there, however, than in some of the regions near the boundaries, particularly on the eastern and southern sides. One of the writers in the summer of 1911 collected in the northwestern corner of New Mexico and found more than a hundred species that had not been known previously from the State. Equally productive would be collections made along the southern edge of New Mexico, especially in the Guadalupe and San Luis Mountains and about the south end of the Sacramentos. Along the western border there may be expected many Arizona species which have not yet been collected in New Mexico. When it is realized that the area

of New Mexico is above one hundred and twenty thousand square miles, which is considerably more than the combined areas of New York and the New England States, and that the number of those who have collected extensively in the region is less than a dozen, it is clear that there remains a fertile field for exploration by those interested in taxonomic botany. When new plants are still being found in New England, where for the past century or more hundreds of botanists and botanical collectors have been at work, it is evident that it will be many years before any botanist working in almost any part of New Mexico will fail to find plants that have not before been reported from the State.

There has been published but a single flora covering any considerable part of the great southwestern region, Coulter's *Botany of Western Texas*, although Doctor Gray published several more or less extended papers dealing with various collections from New Mexico. The latter, however, were reports upon the collections of the earliest botanical explorers, who passed through the country hurriedly and were unable to visit the most interesting collecting grounds. Certain groups of southwestern plants have been treated in monographs, but the material from New Mexico examined by students heretofore has been scant and often imperfect. Hence, as might be expected, an attempt to write a complete flora of New Mexico in the light of abundant material has found the taxonomy of our plants in an almost chaotic condition. This is particularly true of those groups which have not been monographed recently. The number of plants here described as new is thus rather large. The diagnoses published in the present paper, however, include practically all undescribed species found by us while working upon the flora of the State.

The manuscript for the proposed New Mexican flora is nearly completed and, it is expected, will be published shortly. It is deemed advisable for several reasons to issue the descriptions of the new species in advance of the complete work. A state flora in its usual form is bulky enough with the material that it must contain without being burdened with pages of descriptions of new plants. Moreover, the amateur in botanical work, for whose use a flora is chiefly intended, is likely, unless all the species are described therein, to have his attention attracted especially to those plants of which he finds descriptions and to strive unduly to associate his specimens with those species. The insertion of occasional diagnoses destroys the uniformity of a work also and seems to us in every way undesirable.

The descriptions published here are arranged by families in their natural order, the genera and species in most cases being in alphabetical sequence. Most of the species discussed are from the southern part of the State, where less botanical work has been done than elsewhere. Not a few, however, are from the northern part. The latter

might have been expected in Doctor Rydberg's Flora of Colorado, and their omission may have resulted from their being overlooked within that State; or they may be plants which do not range so far north. While the flora of those mountains which are the southern extension of the Sangre de Cristo Range, and form the great mass of peaks lying between Santa Fe and Las Vegas, is similar to that of the mountains of southern Colorado, there are found in their canyons and on their slopes more than a few well-known plants which apparently do not occur in Colorado.

The types of the following new species are all in the National Herbarium. With a few exceptions, which are plainly indicated, all are from New Mexico. In nearly every case we have had access to an abundance of material, consisting either of several collections from adjacent or distant localities or of additional individuals of the type collection. In every instance in which the material was scanty the plant was one so strongly marked that its specific distinctness could not be questioned.

Nearly all the new species, as well as new names, are published jointly by the two authors. Exceptions are clearly indicated. We have included descriptions of several plants determined as new species by Dr. E. L. Greene, but never described. These are principally from the collections made by Mr. O. B. Metcalfe. Many other plants of Mr. Metcalfe's collections, distributed under new names, we have associated with published species. The present paper includes also descriptions of several new species detected by Prof. J. J. Thornber, of the University of Arizona, in connection with his work upon the flora of that State.

DESCRIPTIONS AND NEW NAMES.

POACEAE.

Aristida pansa Wootton & Standley, sp. nov.

Erect, caespitose perennial, 25 to 40 cm. high, forming tufts 10 cm. or more in diameter; culms simple, rigid, though slender, minutely puberulent, glabrous in age, somewhat striate; leaves mostly basal, narrowly linear, involute, striate, puberulent throughout, more or less curled; sheaths of the basal leaves overlapping, 1 to 2 cm. exposed, those of the culms 4 to 5 cm. long, closely investing the culms; ligule a tuft of very fine, white hairs encircling the sheath both inside and out; blades 5 to 15 cm. long, those of the upper culms shortest; panicle at first strict, 10 to 20 cm. long, bearing many more or less crowded spikelets, at last spreading, the branches rigidly ascending, mostly in pairs; rachillæ slender, almost capillary, bearing several crowded small spikelets; glumes slightly unequal, the first shorter, glabrous, narrowly lanceolate, acuminate, 1-nerved, the nerve sometimes slightly produced, purple when young, yellowish in age, the second glume about the length of the lemma; this 8 to 10 mm. long, attenuate upwards, slightly twisted at maturity, scabrous above, callous and bearing a tuft of white hairs; awns short, 10 to 20 mm. long, at

first merely spreading, in age twisted at the base and bent at right angles to the glume.

Type in the U. S. National Herbarium, no. 690259, collected on Tortugas Mountain, Dona Ana County, October 6, 1904, by E. O. Wooton.

ADDITIONAL SPECIMENS EXAMINED: Tortugas Mountain, October 22, 1892, *Wooton* 1087.

Lloyd's 195, from foothills near Hacienda de Cedros, Mazapil, Zacatecas, Mexico, collected in 1908, is probably the same species.

In the type locality the species is associated with several others of the genus. It somewhat resembles *A. vaseyi*, with which it is found, but may be recognized by the spreading panicle with its numerous spikelets and by the widely divergent awns.

***Aristida vaseyi* Wooton & Standley, sp. nov.**

Aristida reverchoni angusta [*angusta*] Vasey, Contr. U. S. Nat. Herb. 3: 46. 1892.

TYPE LOCALITY: "Comanche Peak," Texas.

SPECIMENS EXAMINED: Socorro, 1895, *Plank* 56; mountains west of San Antonio, 1908, *Wooton* 3860; Tortugas Mountain, October 6, 1904, *Wooton*; Pena Blanca, October 21, 1906, *Wooton & Standley*; Mangas Springs, September 2, 1897, *Metcalfe*; Alamogordo, 1908, *Hitchcock* 2542.

Our New Mexican material exactly matches the type (Reverchon's plant), and some of it has been referred to *A. reverchoni* by various students of the genus. It is probably a distinct species. There seems to be a typographical error in the original publication, the name being printed *angusta*, not *angusta*, as Doctor Vasey doubtless intended.

In order to avoid the use of a name about which there is some uncertainty, and at the same time to give the plant the specific rank it certainly deserves, we dedicate it to Dr. George Vasey, who was for years a careful student of the grasses of the southwestern region and first recognized this plant as distinct.

This may prove to be *A. fasciculata* Torr., described from material collected by Doctor James in the "forests of the Canadian," a locality somewhere in northeastern New Mexico. We have been unable to compare our material with the type of that species or with authentic specimens.

CONVALLARIACEAE.

***Salomonina cobrensis* Wooton & Standley, sp. nov.**

Rootstocks slender; stems slender, somewhat flexuous, 20 to 40 cm. high, glabrous; leaf blades elliptic, 50 to 95 mm. long, 10 to 32 mm. wide, acute, narrowed at the base into a broad petiole 3 or 4 mm. long, glabrous, slightly paler beneath, very faintly nerved, none of the nerves prominent except the midrib; peduncles strongly and sharply deflexed, 10 to 15 mm. long, each dividing into 2 or 3 slightly shorter pedicels, these stout and strongly flattened laterally, glabrous; perianth 12 to 19 mm. long, tubular, somewhat expanded toward the mouth, the lobes oblong, obtuse, twice as long as the tube; anthers 6 mm. long, acute, slightly exceeding the almost filiform, slightly roughened filaments; no mature fruit seen, but that present about 6 mm. in diameter.

Type in the U. S. National Herbarium, no. 36170, collected in June at the Copper Mines (Santa Rita) by Dr. J. M. Bigelow (Mexican Boundary Survey no. 1473).

ADDITIONAL SPECIMENS EXAMINED: Copper Mines, 1851, *Wright* 1917; near Kingston, 1904, *Metcalfe* 1036.

Our plant is related to *S. biflora* and *S. commutata*. From the former it differs in its narrower and glabrous leaves, strongly deflexed peduncles, and larger flowers; it agrees with it, on the other hand, in the form of the stamens. From *S. commutata* it differs in the form of the stamens, the strongly deflexed peduncles, and the narrower and less prominently nerved leaves.

ALLIACEAE.

Allium deserticola (Jones) Wooton & Standley.

Allium reticulatum deserticola Jones, Contr. West. Bot. 10: 30. 1902.

Allium reticulatum as applied to plants of southern New Mexico in various reports by Watson, not Fraser.

This is the largest flowered wild onion we have in the State. The flowers are pale pinkish to white with a darker midrib, fading to a dry papery envelope in fruit. The plant is found with us in the foothills of the hotter and drier mountains. It is said to extend into eastern Utah and southern Colorado. We have it from the mountains of the northwestern corner of the State and from the Organ Range.

Allium rhizomatum Wooton & Standley, sp. nov.

Plants about 20 cm. high, arising from small, single, scaly-coated, ovate bulbs about 1 cm. in diameter, the outer coats grayish and opaque, the inner white and hyaline, having a few indistinct longitudinal nerves but not reticulate, the bulbs arising from slender, scaly rhizomes 2 or 3 cm. long; leaves 2 or 3, generally longer than the scape, flat, 2 to 3 mm. wide, much broader and clasping at the base, very finely serrulate; scape terete; spathe 2-valved, the valves scarious, broadly ovate, acute, at first pinkish-veined, becoming reflexed and white; umbels erect, few-flowered; pedicels (in young umbels) 1 cm. long or less; flowers small for the genus; perianth segments oblong to oblanceolate, acute, 6 to 8 mm. long, pale with purplish or pinkish midvein, slightly carinate at the base; stamens about equaling the perianth, included, the filaments dilated at the base and coalescent; stigma simple; ovary slightly crested; fruit not seen.

Type in the U. S. National Herbarium, no. 690251, collected at the Gila Hot Springs, August 20, 1900, by E. O. Wooton. Transition Zone.

We hesitate to name another *Allium*, but our material is like nothing else we have been able to discover, being the only species with long and slender rhizomes except *A. glandulosum* Link & Otto, which was named from central Mexico. All material of that species which we have seen comes from the central States of Mexico, not far from Mexico City, a thousand miles or more from the habitat of our plant, and the two are very conspicuously different.

DRACAENACEAE.

Yucca baileyi Wooton & Standley, sp. nov.

Acaulescent; plants solitary; leaves very numerous, rigid, short, 25 to 30 cm. long, 4 or 5 mm. wide or even narrower, smooth, glabrous, yellowish green, thick, convex on both sides near the base, toward the apex flat or shallowly concave on the upper surface, often triangular in cross section, armed with a short, stout tip, the edges of the young leaves with faint white margins, abundantly filiferous, the filaments soft and very slender; inflorescence a simple raceme 50 to 80 cm. long, stout, glabrous; lower bracts subtending the flowers elongated, 10 cm. long, scarious and white or purple at the base, with flat, green tips 4 to 8 cm. long; upper bracts broad, all or nearly all with green herbaceous tips; pedicels stout, 2 to 3 cm. long, erect in flower and in fruit;

perianth segments pure creamy white, not greenish, 60 to 65 mm. long, broadly lanceolate or lance-elliptic, acute; style narrowly oblong, about 1 cm. long, white; filaments slender, papillose; fruit oblong, dehiscent, 5 cm. long, 2.5 cm. thick, rough, costate on the back, erect, short-beaked; seeds dull black, semi-orbicular, somewhat oblique, rounded on the angles, 10 to 12 mm. long, 8 or 9 mm broad, smooth.

Type in the U. S. National Herbarium, no. 686602, collected on a dry slope in pine woods in the Tunitcha Mountains, August 8, 1911, by Paul C. Standley (no. 7638). The description of the fruit is drawn from specimens collected in a canyon of the Carrizo Mountains, July 30, 1911, *Standley* 7448. The plant is named for Mr. Vernon Bailey of the Biological Survey, who first collected it in the Chusca Mountains at an elevation of about 2,700 meters.

This was at first believed to be *Y. angustissima* Engelm., but when complete material was collected in the summer of 1911 it was seen to differ essentially from that species. *Yucca angustissima* has much smaller flowers, strongly constricted capsules, a branched inflorescence, and much smaller seeds of a different shape, and lacks the foliaceous bracts of the inflorescence. *Yucca baileyi* reaches a higher elevation than any other of our species of the genus, being the only one that extends into the Transition Zone. It reaches much farther up into the mountains than *Y. baccata*. So far as we know the species is confined to the chain of mountains including the Chuscas at one end and the Carrizos at the other. It is not improbable, however, that it may be found in some of the not far distant ranges of Arizona and Utah.

***Yucca neomexicana* Wooton & Standley, sp. nov.**

Acaulescent from a thick root, propagating by means of numerous radiating rootstocks, the young plants at the ends of these forming a more or less regular circle about the old plant; leaves short, 25 to 30 cm. long, 8 to 10 mm. wide, constricted near the base and there only about 5 mm. wide, acute and tipped with a slender, straw-colored, very sharp point, glabrous, rather thin, smooth, yellowish, the margins white, cartilaginous, abundantly filiferous below the middle with coarse, white, straight but finally curled filaments; inflorescence a simple raceme, 60 to 90 cm. high, stout, glabrous, bearing at the base 1 or 2 short, reduced leaves, above furnished with numerous narrowly triangular, scarious, white to purple bracts; pedicels stout, 12 to 20 mm. long, recurved in flower; perianth nearly white, 4 cm. long, the segments elliptic-oblong or oblong, obtuse or acutish; style short, greenish, 5 to 7 mm. long, swollen at the base; filaments densely papillose; fruit not seen.

Type in the U. S. National Herbarium, no. 685238, collected on a volcanic hill about half a mile north of Des Moines, Union County, June 20, 1911, by Paul C. Standley (no. 6208). Altitude about 2150 meters. Additional material is mounted on sheets 685239 and 685240. The description is drawn chiefly from material preserved in formalin. Young plants are growing in the greenhouse at Washington.

The plant was very abundant in this one locality, growing all over the top of a low hill, in loose, rocky soil. It was not observed elsewhere. *Yucca glauca* was common on the sides of the hill but the two were readily distinguished at a glance. The principal difference between the two is in the leaves, but this is so striking that the species can scarcely be confused.

AMARYLLIDACEAE.

***Agave neomexicana* Wooton & Standley, sp. nov.**

PLATE 48.

Leaves numerous, crowded together and forming a compact, almost globose rosette 45 to 60 cm. in diameter when mature; leaves 10 to 30 cm. long, oblong

to ovate-lanceolate, bluish green, glaucous, tipped with a very sharp spine, this brownish black when young, grayish in age, decurrent into a horny, toothed margin bearing 3 or 4 brown or gray, retrorsely hooked teeth on the upper half of the leaf, the lower part armed with fewer and smaller spines, the leaves thick and very rigid; panicle 3 to 5 meters high, with 10 to 15 divergent lateral branches bearing subumbellate clusters of flowers; fresh flowers dull brownish red outside, deep yellow to orange within, 5 to 6 cm. long including the exerted style and stamens; filaments attached by an expanded base to the base of the perianth segments in a saccate depression, 2 cm. long, yellow; anthers versatile, 15 mm. long; style slightly exceeding the stamens; fruit an oblong-elliptic, light brown capsule, 25 to 35 mm. long and about 20 mm. in diameter.

Type in the U. S. National Herbarium, no. 498333, collected in the Organ Mountains, in June, 1906, by Paul C. Standley (no. 541).

ADDITIONAL SPECIMENS EXAMINED: Tortugas Mountain, 1911, *Standley* 6431; San Andreas Mountains, December 10, 1902, *J. H. Gaut*.

This is a part of *Agave applanata* Mulford, but seems to be very distinct from *Agave applanata* Lem.

EXPLANATION OF PLATE 48.—From a field photograph by E. O. Wooton.

ORCHIDACEAE.

Achroanthes porphyrea (Ridley) Wooton & Standley.

Microstylis purpurea S. Wats. Proc. Amer. Acad. 18: 195. 1883, not Lindl.

Microstylis porphyrea Ridley, Journ. Linn. Soc. Bot. 24: 320. 1888.

Achroanthes purpurea Greene, Pittonia 2: 184. 1891.

FAGACEAE.

Quercus confusa Wooton & Standley, sp. nov.

A moderately large, spreading tree, 5 to 7 meters high, with short trunk, grayish, checked bark, and dull greenish gray, pubescent, stout twigs; leaves oblong, 6 to 8 cm. long, 2 to 3 cm. wide, bluish green, glabrous above, almost velvety beneath with yellowish stellate hairs, acute, sinuate-dentate with about 4 coarse, mucronate, lobe-like teeth on each side, only slightly crispate; petioles 1 cm. long or less; buds on new growth small, 2 to 3 mm. long, ovoid, with dark brown scales; acorn 20 to 23 mm. long, barrel-shaped, obtuse; cup hemispheric, 15 to 18 mm. in diameter, covering the lower third of the acorn; scales much thickened on the back.

Type in the U. S. National Herbarium, no. 691250, collected on Ruidoso Creek 5 miles east of Ruidoso Post-office, August 5, 1901, by E. O. Wooton. Altitude about 1650 meters.

ADDITIONAL MATERIAL EXAMINED: Gilmores Ranch on Eagle Creek, alt. 2220 meters, July 25, 1901, *Wooton*.

This species is most nearly related to *Q. fendleri*, from which it differs in being a tree and in having still larger leaves (persistent?) and a larger acorn. It occurs at a lower level than is common for *Q. fendleri*, being at home in the Upper Sonoran instead of the Transition Zone, although the latter sometimes comes into the Upper Sonoran.

Quercus media Wooton & Standley, sp. nov.

Low shrub, 1 to 3 meters high, with gray, smooth bark on the older stems, the young branches brown, sparingly pubescent; buds about 3 mm. long, with



AGAVE NEOMEXICANA WOOTON & STANDLEY, IN THE ORGAN MOUNTAINS.

rich reddish brown, glabrous scales; leaves green (not bluish green) and glabrate above, paler beneath and velvety-pubescent with yellowish, stellate hairs, oblong, elliptic, or obovate in outline, acute or obtuse, sinuate-dentate with 2 to 4 coarse, lobe-like teeth on each side, 4 to 7 cm. long, 2 to 3 cm. wide; petioles 1 cm. long or less; teeth mostly mucronate, not spinulose; acorns small, 10 to 13 mm. long, ellipsoidal, acute, the cup hemispheric, 10 to 12 mm. in diameter, the reddish brown scales little or not at all thickened at the base.

Type in the U. S. National Herbarium, no. 690255, collected at Glorieta, August 24, 1910, by E. O. Wooton. Transition Zone.

Another specimen of what seems to be the same is from Oak Canyon near Folsom, collected in 1903 by A. H. Howell (no. 178), in leaf only.

There would seem to be enough species of Rocky Mountain oaks already described, especially of the type of *Q. undulata*, which is at best of doubtful standing. Assuming that *Q. undulata* is a species with bluish green, persistent leaves, the species here described resembles it in nearly all particulars except that its leaves are bright chlorophyll green and probably deciduous. This would make it intermediate between the two groups of the region—the blue green leaved species, which it resembles in habit and shape of leaf, and the green-leaved species, which it resembles in color and texture of leaves and time of dropping its leaves. It might be a hybrid, but the plant was very common about Glorieta, forming numerous clumps of bushes a rod or so in diameter, and Mr. Howell's plant is almost a perfect match from a similar region farther east.

ARISTOLOCHIACEAE.

Aristolochia watsoni Wooton & Standley.

Aristolochia brevipes acuminata S. Wats. Proc. Amer. Acad. 18: 148. 1883, not *A. acuminata* Lam.

A not uncommon species of southern Arizona and northern Mexico, which barely reaches the southwestern corner of New Mexico.

POLYGONACEAE.

Eriogonum ainsliei Standley, sp. nov.

Perennial, 15 to 25 cm. high, from a stout, woody root; stems somewhat caespitose, well developed, slender, decumbent at the base and leafy, arachnoid-pubescent; leaves elliptic or linear-oblong, 3 to 4 cm. long, acutish, glabrate above, tomentose beneath, extending about half way up the stem, all on petioles one-third to one-half the length of the blades, attenuate at the base; inflorescence corymbose, the primary branches subtended by linear-subulate bracts 3 to 5 mm. long, the other branches furnished with smaller bracts; involucre short-pedunculate, 3 mm. long, 5-angled, viscid-tomentulose; perianths white tinged with purplish pink, glabrous, the segments obovate; fruit glabrous.

Type in the U. S. National Herbarium, no. 592284, collected at Cimarron, September 20, 1909, by Mr. C. N. Ainslie of the Bureau of Entomology. Additional material of the same collection is mounted on two other sheets.

ADDITIONAL MATERIAL EXAMINED: Cimarron, September 10, 1909, *Ainslie*; Raton Mountains, 1903, *Griffiths* 5097; Colfax, August 13, 1910, *Wooton*.

From the most closely related species, *E. nudicaule* and *E. tristichum*, this plant may be distinguished by its pubescent inflorescence and by the acute lobes of the involucre.

Eriogonum gypsophilum Wooton & Standley, sp. nov.

PLATE 49.

Perennial from a thick, woody, caespitose base, the short branches covered with the villous, scale-like bases of old leaves; leaves all basal, thickly clustered, broadly ovate to rotund or reniform, entire, abruptly mucronate, the blades 1 to 2 cm. long, 2 to 3 cm. wide, yellowish green, thick and succulent, glabrous except for a few hairs on the veins beneath and sometimes on the margins; petioles 2 to 3 cm. long, slender, villous, especially at the base; inflorescence a trichotomous cyme 10 to 15 cm. high; bracts small, not leaf-like, the lowest sparingly villous, the upper glabrous; involucre broadly campanulate, 4 or 5-toothed, glabrous, with 6 flowers; pedicels slender, articulated at the base of the perianth, 1 mm. long or less; perianth broadly campanulate, becoming urceolate, the segments ovate, acute or obtuse, the midrib greenish, otherwise bright yellow, sparingly white-pubescent on the middle or glabrous.

Type in the U. S. National Herbarium, no 564576, collected on a hill southwest of Lakewood, growing in pure gypsum, August 6, 1909, by E. O. Wooton. The hill is capped by 50 to 100 feet of limestone, the gypsum appearing in several layers in the lower two-thirds. Our plant did not grow on the limestone soil but was restricted to the outcroppings of the gypsum strata.

The species belongs to the section *Corymbosa* as used by Doctor Rydberg, but is not at all closely related to any of our western species.

EXPLANATION OF PLATE 49.—Part of the type specimen. Natural size.

Eriogonum leptophyllum (Torr.) Wooton & Standley.

Eriogonum effusum leptophyllum Torr. in Sitgreaves, Rep. Zuni & Colo. 168. 1854.

The plant is similar to *E. effusum*, with which it was at first associated, but differs in its linear and revolute instead of oblong and flat leaves, and in the low, sparingly branched inflorescence not more than 5 cm. high. In *E. effusum* the inflorescence is densely branched and often 15 to 20 cm. long.

Eriogonum leucophyllum Wooton & Standley, sp. nov.

Perennial from a thick, woody root, caespitose; leaves all basal, elliptic, 13 to 20 mm. long, about 7 mm. wide, narrowed at the base into a broad petiole 7 to 11 mm. long, densely tomentose beneath, sericeous on the upper surface, white in general appearance; stems scapiform, simple below, about 30 cm. high, slender, tomentose below, tomentulose about the inflorescence, loosely corymbose above, the corymb being 10 to 15 cm. high, its slender branches ascending; involucre in the forks of the branches on slender peduncles 20 to 35 mm. long, the others on peduncles 7 mm. long or more, broadly campanulate, 2 mm. high, with triangular teeth almost equaling the tube, finely sericeous; perianth yellow, densely silvery-pubescent, some of the flowers reflexed in age; ovary densely pubescent.

Type in the U. S. National Herbarium, no. 564577, collected at Lakewood August 6, 1909, by E. O. Wooton.

While related to *E. lachnogynum*, our plant is evidently distinct in its broader, more densely pubescent leaves, taller stems, openly branched inflorescence, and much smaller and more numerous involucre.

Eriogonum pannosum Wooton & Standley, sp. nov.

Perennial from a thick, woody caudex covered with the persistent bases of the dead leaves; stems numerous, stout, 20 to 45 cm. high, corymbosely branched above, densely white silky pubescent; leaves mostly basal, those of the stem few, scattered, reduced, the basal ones oblanceolate or spatulate, obtuse, abruptly short-acuminate, narrowed at the base into a long, margined petiole, 40 to 65 mm. long, densely and finely tomentose beneath, sericeous



ERIOGONUM GYPSOPHILUM WOOTON & STANDLEY.

above with a white pubescence, this often denser along the veins so as to produce the appearance of longitudinal silvery lines; involucre 2 or 3 mm. long, campanulate, sericeous, the teeth low, triangular, acute, all on stout pedicels 5 to 10 mm. long; perianth 2 mm. long, yellow, conspicuously sericeous, the segments oblong, on slender, glabrous pedicels reflexed at maturity; achenes glabrous, 3 mm. long, spherical and turgid at the base, narrowly winged above the middle.

Type in the U. S. National Herbarium, no. 45775, collected in the Organ Mountains, August, 1881, by G. R. Vasey.

ADDITIONAL SPECIMENS EXAMINED: Organ Mountains, June 25, 1894, *Wooton*.

Our proposed species is nearest *E. hieracifolium*. That species differs, however, in the loose and longer, coarser pubescence of the leaves and stem, greater size, larger and narrower, more acute leaves, larger involucre 3 to 5 mm. long, and the larger perianths.

CHENOPODIACEAE.

***Atriplex flagellaris* Wooton & Standley, sp. nov.**

Perennial; stems trailing, slender, 30 to 40 cm. long, weakly ascending at the tips; cortex at first densely white-scurfy, becoming glabrous, shining, shreddy near the base of the stems; leaves numerous, small, 1 to 3 cm. long, scarcely half as broad, oblong to narrowly obovate, tapering into a short petiole, glabrate above, white-scurfy beneath, obtuse or acute, the margins entire or with a few coarse teeth on each side; flowers few, axillary; pistillate flowers 2 to 5 in the axil, usually only one producing fruit; staminate flowers in small, spherical heads 2 mm. in diameter in the same axils; fruiting bracts cuneate-obovate, 5 or 6 mm. long, united to above the middle, prominently 3 to 5-nerved, not appendaged on the back, the upper part of each bract herbaceous with one large central tooth and one or two small lateral ones on each side; seed lenticular.

Type in the U. S. National Herbarium, no. 562291, collected in the Mesilla Valley, June, 1906, by Paul C. Standley (no. 490).

ADDITIONAL SPECIMENS EXAMINED: Mesilla Valley, July 4, 1906, *Wooton*; Mesilla Valley, May 1, 1907, *Wooton & Standley*.

Judging from the description alone and from the character of the fruit, our plant is related to *A. barclayana* D. Dietr., but it differs in having much larger fruit with fewer teeth, while the plant is much smaller and slenderer than that species of the western coast of Mexico.

This is a dooryard and wayside weed commonly found in locations preferred by *A. elegans*, with which it was confused for a long time. Herbarium specimens look somewhat like that species, but the habit of the two is very different, as are their fruits.

***Atriplex collina* Wooton & Standley, sp. nov.**

Low, densely branched shrub, 25 cm. high or less, forming broad, rounded clumps; branches ascending or spreading, ending in sharp, spinose tips, stout, loosely but copiously lepidote; leaves very numerous, small, 2 cm. long or shorter, elliptic-oval to elliptic or nearly lanceolate, thick and fleshy, densely lepidote, obtuse or acutish, acute or cuneate at the base, on very short, broad petioles; plants dioecious, apparently, only the pistillate collected, the fertile flowers axillary, sessile; bracts united only at the base, rather thin, very broadly ovate or quadrilateral, 8 mm. long or smaller, densely lepidote, broadly cuneate at the base, acutish, all or nearly all obtusely dentate on the margins, smooth on the backs.

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Type in the U. S. National Herbarium, no. 686447, collected on dry hills near the north end of the Carrizo Mountains, July 31, 1911, by Paul C. Standley (no. 7481).

Related to *A. confertifolia*, but with dentate bracts not rounded at the apex, much smaller leaves, and sessile fertile flowers.

AMARANTHACEAE.

Gomphrena viridis Wooton & Standley, sp. nov.

Low, caespitose perennial from a long, woody root; basal leaves bright green, obovate to elliptic-oblong, the blades 3 to 7 cm. long, obtuse or acutish, gradually narrowed at the base into a long, slender petiole, sparingly strigose with fine short hairs or nearly glabrous on the upper surface; stems slender, prostrate or spreading, tortuous, 3 to 10 cm. long, cinereous-puberulent to thinly sericeous; cauline leaves a single pair, in outline like the basal ones, or broader, often orbicular, on slender petioles 5 to 10 mm. long; peduncles terminal, slender, 35 to 70 mm. long, loosely sericeous but not densely so; heads subglobose, 8 to 20 mm. high; bracts scarious, white, ovate, acute; calyx lobes linear-oblong or oblanceolate, obtuse, entire, with a broad green midvein and scarious white margins, densely long-hairy.

Type in the U. S. National Herbarium, no. 660403, collected on Hanover Mountain, Grant County, July 31, 1911, by J. M. Holzinger.

ADDITIONAL SPECIMENS EXAMINED: 1851-2, *Wright* 1753; base of San Luis Mountains, up to 1800 meters, September 5, 1893, *Mearns* 2133.

The species also occurs in southeastern Arizona.

Closely related to *Gomphrena caespitosa*, but with green, narrower leaves, sparse pubescence, more conspicuously petioled cauline leaves, and prominently green calyx lobes.

ALLIONIACEAE.

Allionia linearifolia filifolia Standley.

Allionia gracillima filifolia Standley, Contr. U. S. Nat. Herb. 12: 340, 1909.

An examination of the type of *Oxybaphus linearifolius* S. Wats. shows that *Allionia gracillima* Standley is a synonym of that species.

Allionia subhispida (Heimerl) Standley.

Mirabilis linearis subhispida Heimerl, Ann. Cons. Jard. Genève 5: 186, 1901.

Allionia linearis subhispida Standley, Contr. U. S. Nat. Herb. 12: 342, 1909.

This was well described by Doctor Heimerl. It may be distinguished from *A. linearis* by its abundant hirsute pubescence present on all parts of the branches. It has been collected in New Mexico several times recently.

PORTULACACEAE.

Talinum angustissimum (A. Gray) Wooton & Standley.

Talinum aurantiacum angustissimum A. Gray, Pl. Wright. 1: 14, 1852.

This has long been confused with *T. aurantiacum*, a larger, stouter, more succulent plant with larger, orange-colored flowers. It is difficult to distinguish the two by herbarium specimens, but no one can confuse them in the field. Both species have been confused with *T. lineare* H. B. K., a plant known only from central Mexico.

Talinum longipes Wooton & Standley, sp. nov.

Root slender, very long and tortuous, the crown covered with the persistent bases of dead leaves; leaves numerous and crowded, appearing basal, 12 to

20 mm. long, terete, acutish, slender; scapes very slender, 10 to 12 cm. high, corymbosely branched above; flowers few (3 to 5), all on slender pedicels 3 to 6 mm. long; bracts lanceolate or triangular, scarious; sepals nearly orbicular, 2 mm. long, very thin; petals pinkish, 4 or 5 mm. long; stamens 10; capsule nearly spherical, 3.5 mm. high.

Type in the U. S. National Herbarium, no. 690249, collected on Tortugas Mountain, August 27, 1894, by E. O. Wooton. Apparently the same is part of Wright's 875 in the National Herbarium.

Our plant is unlike the related species, such as *T. parviflorum*, in the form of the sepals and the number of stamens, and in the well-developed pedicels.

***Talinum pulchellum* Wooton & Standley, sp. nov.**

Roots stout, dark brown, woody; stems stout and fleshy, 10 cm. high or less, simple below, corymbosely branched above; leaves apparently terete, perhaps slightly flattened, 12 to 20 mm. long, 1.5 to 2 mm. in diameter, not narrowed at the base, blunt, scattered along the stems; flowers axillary, solitary; peduncles stout, 2 or 3 mm. long; pedicels slender, 6 to 20 mm. long; sepals elliptic-lanceolate, about 7 mm. long, acute, smooth, greenish below, scarious-margined; petals about 15 mm. long, purplish red; stamens about 20.

Type in the U. S. National Herbarium, no. 617671, collected near Queen, August 2, 1909, by E. O. Wooton. Altitude about 1,770 meters.

The proposed species is nearest *T. brevifolium*, but differs in habit, size of flowers, form of sepals, and length of pedicels. The two species form a section very unlike the other members of the genus.

ALSINACEAE.

***Arenaria mearnsii* Wooton & Standley, sp. nov.**

A slender, diffusely branched perennial; stems reclining at the base, minutely cinereous-puberulent; leaves linear or linear-elliptic, bright green, numerous, glabrous, somewhat pungently pointed, 8 to 12 mm. long, 2 mm. wide or less; flowers numerous, on slender, ascending, almost glabrous pedicels 10 to 15 mm. long; sepals lanceolate to lance-ovate, attenuate to long, subulate tips, glabrous, bright green with scarious margins, 4 to 5 mm. long; petals 1 or 2 mm. longer than the sepals; capsules 1 to 2 mm. shorter than the sepals.

Type in the U. S. National Herbarium, no. 233375, collected in a canyon of the San Luis Mountains on the New Mexico-Mexico boundary, September 11, 1893, by Dr. E. A. Mearns (no. 2216).

• Our specimens seem not to agree with any described species of the United States or Mexico. They are nearest *A. saxosa* and *A. confusa*, but differ from both in the narrow, glabrous, more or less pungently pointed leaves and sparser pubescence. From the former they also differ in the longer pedicels, and from *A. confusa* they are distinguished by the longer sepals and ascending pedicels.

***Drymaria pachyphylla* Wooton & Standley, sp. nov.**

Annual; stems slender, prostrate, glabrous, sparingly branched; basal leaves spatulate; cauline leaves ovate, obtuse, glabrous, glaucous, thick, 10 mm. long or less, 6 to 8 mm. wide, narrowed at the base into a slender petiole one-half as long as the blade or more; flowers solitary on the pedicels, clustered in the axils, on rather stout, glabrous pedicels 3 or 4 mm. long; sepals oblong, 3 mm. long, glaucous, with thin, scarious, white margins; capsule slightly exceeding the sepals.

Type in the U. S. National Herbarium, no. 330629, collected on the dry plains south of the White Sands, August 20, 1897, by E. O. Wooton (no. 405). Altitude

tude about 1,230 meters. Also gathered by the same collector at the same place, August 5, 1899.

The type collection was distributed as *D. holosteoides* Benth., a plant of Lower California. Our species is cited from western Texas under this name in the Synoptical Flora. That species, however, has much narrower, acutish leaves, and puberulent pedicels. Another related species is *D. crassifolia* Benth., also of Lower California, but that has much thicker, fleshier leaves, and is a very densely branched perennial.

Besides the New Mexican specimens cited above we have a sheet collected by Havard on the Tarlinga River in western Texas.

FUMARIACEAE.

Capnoides euchlamydeum Wooton & Standley, sp. nov.

Annual or biennial with very slender, ascending or decumbent, glabrous stems; leaves twice pinnate, glabrous, the ultimate segments cuneate or oblong, acute or obtuse, bright green above, glaucous beneath; primary pinnæ mostly divaricate, a pair inserted usually almost at the base of the rachis; flowers in slender, few-flowered racemes; bracts 12 to 25 mm. long, broadly oblanceolate, 4 to 9 mm. wide, acute or acuminate, thin; corolla bright yellow, about 15 mm. long; spur horizontal, thick, half as long as the body; fruit 20 to 30 mm. long, rather slender, not very conspicuously torulose, strongly curved, not angled, on a stout, deflexed pedicel; seeds black and shining, almost smooth, with very obtuse margins.

Type in the U. S. National Herbarium, no. 690256, collected at Cloudcroft in the Sacramento Mountains, August 8, 1890, by E. O. Wooton.

ADDITIONAL SPECIMENS EXAMINED: James Canyon, June 26, 1899, *Wooton*; Ruidoso Creek, alt. 1,980 meters, June 29, 1895, *Wooton*; Cloudcroft, 1912, *Stearns* 348.

This *Capnoides* is related to *C. aureum*, but may be distinguished by its very large bracts and by the presence of pinnæ at the base of most of the petioles. It is, besides, a rather more slender plant, with more dissected and delicate leaves.

RANUNCULACEAE.

Clematis neomexicana Wooton & Standley, sp. nov.

A woody climber, one or two meters high; stems striate, finely pubescent; leaves pinnately 5-foliolate, on petioles 4 to 6 cm. long; leaflets ovate in outline, 35 to 60 mm. long, 25 to 45 mm. wide, shallowly 3-lobed, the terminal lobe acute to obtuse, never long-attenuate, the lobes entire or coarsely crenate with obtuse teeth; leaflets bright green, slightly paler beneath, finely and loosely pubescent on both surfaces; flowers in a loose, few-flowered panicle, on a peduncle about 5 cm. long; pedicels about 25 mm. long; sepals oblong-spatulate, obtuse, finely pubescent, 12 mm. long, much exceeding the stamens; carpels densely hairy, tapering gradually into the plumose tail 15 to 35 mm. long.

Type in the U. S. National Herbarium, no. 233000, collected in the San Luis Mountains, September 5, 1893, by Dr. E. A. Mearns (no. 2136). The collector states that it occurs "from the base up to 6000 feet."

ADDITIONAL SPECIMENS EXAMINED: San Luis Mountains, 1893, *Mearns* 2455; Organ Mountains, alt. 2,100 meters, September 23, 1906, *Wooton & Standley*; Organ Mountains, alt. 1,410 meters, 1897, *Wooton* 150; Organ Mountains, alt. 1,950 meters, 1897, *Wooton*; east side Organ Mountains, alt. 1,350 meters, August 17, 1895, *Wooton*.

The plant is near *C. ligusticifolia*, but differs in its pubescent leaflets and stems, the different form of the leaflets, the shorter tails of the carpels, and the shape of the carpels. It may be *Clematis ligusticifolia californica* S. Wats., but the Californian material seems to be of a different species.

Myosurus egglestonii Wooton & Standley, sp. nov.

Plant glabrous; leaves linear or linear-oblong, obtuse, thick and somewhat fleshy, 8 to 14 mm. long; scapes solitary or numerous, very short, 2 to 5 mm. long, slender; sepals scarious, linear-oblong, obtuse, 3 mm. long, with a slender spur 1 mm. long; petals not seen, apparently wanting; heads of achenes elongated-oblong, 8 to 13 mm. long, 2.5 mm. in diameter; achenes small, the backs suborbicular, with a low, obtuse border, strongly keeled and with a beak from once to twice as long as the diameter of the back, the beak ascending.

Type in the U. S. National Herbarium, no. 660739, collected on a mesa on the road between Tierra Amarilla and Park View, Rio Arriba County, altitude 2,250 meters, April 18 to May 25, 1911, by W. W. Eggleston (no. 6472).

Evidently related to *M. cupulatus*, but readily distinguished by the very short fruiting spikes, the short scapes, and the elongated beaks of the achenes. In size the plant suggests *M. alopecuroides* Greene, of California, but the achenes of the two are very dissimilar.

Viorna filifera (Benth.) Wooton & Standley.

Clematis filifera Benth. Pl. Hartw. 285. 1848.

Viorna palmeri (Rose) Wooton & Standley.

Clematis palmeri Rose, Contr. U. S. Nat. Herb. 1: 118. 1891.

BRASSICACEAE.

Arabis angulata Greene, sp. nov. in herb.

Perennial from a rather thick, woody root; stems simple, clustered, slender, erect, 25 to 40 cm. high, pubescent below with few branched hairs, glabrous above; basal leaves oblanceolate to spatulate, 25 to 35 mm. long, 11 mm. wide or less, obtuse, with a few coarse teeth, rather bright green, pubescent with branched hairs; cauline leaves rather remote, smaller, oblong-lanceolate to almost linear, sessile, auricled, the auricles mostly acute, the lower leaves pubescent, the upper glabrous, obtuse or acute; racemes elongated, slender; pedicels slender, divergent, 12 mm. long or less; sepals purplish, oblong, obtuse, 2.5 mm. long, with scarious margins, usually with a few hairs; petals twice as long, purple; pods slender, 45 to 60 mm. long, 1 mm. wide, curved upward, glabrous; seeds in a single row.

Type in the U. S. National Herbarium, no. 495141, collected at Mangas Springs, April 9, 1903, by O. B. Metcalfe (no. 12). Altitude 1,430 meters.

A species of the group to which belongs *A. fendleri*, distinguished especially by its very long, slender pods conspicuously curved upward.

Doctor Greene recognized this as an undescribed species when Mr. Metcalfe's plants were being named, and the plants were distributed under the name here given to them; a description, however, has not been published until now.

Arabis porphyrea Wooton & Standley, sp. nov.

Perennial from a long, slender, woody root; stems slender, erect, pubescent below with branched hairs, glabrous above, purplish; basal leaves 40 mm. long or less, spatulate or oblanceolate, stellate-pubescent, long-petioled; lower cauline leaves petioled, oblanceolate, obtuse, stellate-pubescent, the upper ones linear or linear-oblong, acute, glabrous, sessile and auricled, reduced; pedicels divaricate or reflexed, 10 or 12 mm. long, slender; sepals oblong, obtuse or acutish, 3 mm.

long, with a few branched hairs, purple; petals purple, twice as long as the sepals; pods about 35 mm. long and 1.5 mm. wide, purplish, glabrous, stout, straight or curved downward; seeds in 2 rows, winged.

Type in the U. S. National Herbarium, no. 561991, collected on the dry hills near the Cueva on the west side of the Organ Mountains, April 25, 1907, by E. O. Wooton and Paul C. Standley.

ADDITIONAL SPECIMENS EXAMINED: Modoc, March 19, 1905, *Wooton*; Magdalena Mountains, June, 1880, *Vasey*.

This somewhat resembles *A. angulata*, but has much shorter, broader, purplish pods curved downward instead of upward.

***Dithyreaa griffithsii* Wooton & Standley, sp. nov.**

Stems erect, stout, branched, densely stellate-pubescent; cauline leaves entire, narrowly lanceolate, 25 to 40 mm. long, acute, narrowed to the base, sessile, finely stellate-pubescent on both surfaces; pedicels about 15 mm. long, slender, divergent; flowers numerous, at first congested, becoming more distant after anthesis; sepals narrowly oblong, 3 mm. long; petals obovate, clawed, the whole petal 6 or 7 mm. long; fruit 10 mm. wide, the segments 5 mm. high, truncate at the apex, cordate at the base, glabrous, conspicuously reticulate-veined, the border not well developed.

Type in the U. S. National Herbarium, no. 486760, collected by Dr. David Griffiths on the Arroyo Ranch, near Roswell, September 1 to 4, 1903 (no. 5687). A specimen collected by Mrs. Matilda Cox Stevenson near Zuni in 1902 (no. 74) appears to be the same.

From our other species, *D. wislizeni*, this may be distinguished at once by its glabrous, conspicuously veined fruit. Its cauline leaves, too, are quite entire, while in *D. wislizeni* almost all have a few sinuate teeth, at least near the base.

***Draba gilgiana* Wooton & Standley, sp. nov.**

A densely caespitose perennial from a very thick, woody root covered at the crown with the persistent bases of old leaves; leaves mostly basal, very numerous, densely clustered, linear-oblancoolate, acutish, 35 mm. long and 3 mm. wide or less, tapering gradually into a slender, flat, yellowish petiole; blades bright green, glabrous, or with a very few scattered hairs; stems long and slender, ascending or reclining, 12 cm. long or less, glabrous; cauline leaves few and remote, linear to oblanceolate, 4 to 10 mm. long, acute; flowers few, clustered at the end of the stem, the racemes elongating in fruit; pedicels slender, glabrous, nearly erect, 5 or 6 mm. long; sepals rounded-oblong, glabrous, obtuse, 2.5 mm. long; petals bright yellow, about twice as long; fruit almost 6 mm. long, oblong-lanceolate, acute, glabrous, ending in a slender style slightly more than 1 mm. long.

Type in the U. S. National Herbarium, no. 561295, collected on Organ Peak in the Organ Mountains, September 23, 1906, at an altitude of about 2,550 meters, by E. O. Wooton and Paul C. Standley. The plant was growing high up near the summit of the peak, in the Transition Zone, in rich, deep soil in the shade of oak chaparral.

ADDITIONAL SPECIMENS EXAMINED: Van Pattens, August 29, 1894, *Wooton*; Organ Mountains, alt. 2040 meters, 1897, *Wooton* 675; Tortugas Mountain, September, 1893, *Wooton*.

The specimen from Tortugas Mountain has even narrower leaves than those from the Organs. It seems improbable that a plant of the dry Lower Sonoran Zone can be the same as one found high up in the moist canyons. Our material from Tortugas Mountain, however, is insufficient for satisfactory determination.

Our species is nearest *D. petrophila* Greene, but it is much more slender and nearly glabrous, while the cauline leaves are fewer and more reduced; the basal leaves, too, are different in outline.

The plant was marked as a new species in the National Herbarium by Dr. E. Gilg, but apparently was never published by him, probably because of the scantiness of the material he had examined.

***Draba tonsa* Wooton & Standley, sp. nov.**

A low perennial, 6 cm. high or less, densely cespitose from a long, thickened root; leaves in a dense cluster at the base of the scape, linear-oblancoolate, obtuse, 6 to 18 mm. long, glabrous except for the long-ciliate margins; stems scapose, with a few scattered leaves very unlike the basal ones, glabrous; cauline leaves oblong to ovate, thick, 5 to 16 mm. long, 2 to 6 mm. wide, obtuse or acutish, glabrous, or with a few long hairs on the margins; flowers congested at the ends of the simple stems, few, on glabrous pedicels 3 mm. long or less; sepals broadly rounded-oblong, obtuse, glabrous, 2.5 mm. long; petals bright yellow, about twice as long as the sepals; ovary glabrous, with a long, slender style; mature fruit not seen.

Type in the U. S. National Herbarium, no. 225083, collected on Hermits Peak, in the Las Vegas Mountains, in August (year not given), by F. H. Snow. Also collected near Beulah, at an altitude of 2,400 meters, by T. D. A. Cockerell.

Although our specimens have no fruit, we feel safe in describing them as new, for they seem amply distinct from *D. streptocarpa*, the most nearly related species, in their glabrous stems and nearly glabrous leaves, the sepals, too, being glabrous, and the cauline leaves broader.

***Cheirinia desertorum* Wooton & Standley, sp. nov.**

Stout, herbaceous biennial or short-lived perennial, 30 to 50 cm. high, with one or several rigid, more or less angled stems rising from a dense cluster of basal leaves, the whole plant cinereous throughout with the appressed, 2-parted hairs common in the genus; basal leaves very numerous, 10 to 20 cm. long, narrowly lanceolate or oblanceolate, tapering into a slender petiole, acute, mostly entire, or some with a few coarse teeth, persisting until the plant is in fruit; cauline leaves linear, 3 to 5 cm. long, strongly ascending or erect; flowers small, 6 to 8 mm. long, pale yellow, the claws of the petals little if at all longer than the sepals; pods almost terete, 3 to 7 cm. long, erect or strongly ascending, on short, thick, ascending pedicels.

Type in the U. S. National Herbarium, no. 563775, collected near Hachita, June 16, 1906, by E. O. Wooton.

From the description this would appear to be most closely related to *C. parviflora*, and upon using Doctor Rydberg's key to the genus in the Flora of Colorado one would run to that species at once. But our plant is affiliated with *C. bakeri* and *C. argillosa* in habit and other characters, and is found in dry rocky soil. It is easily distinguishable from either of these species by its small flowers. It is somewhat anomalous in a genus of plants that lose their basal leaves usually before the flowers appear, and especially so in that it inhabits perhaps the driest and hottest region from which species of the genus have been reported.

***Euklisia valida* (Greene) Wooton & Standley.**

Disaccanthus validus Greene, Leaflets 1: 225. 1906.

Disaccanthus mogollonicus Greene, loc. cit.

Disaccanthus luteus Greene, loc. cit.

All these may be *Streptanthus carinatus* Wright, but that is described as having a purple calyx and petals. In our plants they are always yellow.

In the type of *D. luteus* the flowers are of a deeper yellow than in the plant of the Rio Grande region. Following his description of *D. mogollonicus*, Doctor Greene says: "All white-flowered material from New Mexico, from Las Cruces to the upper Gila, belongs here." As a matter of fact, none of our plants have white flowers, but in all both the calyx and corolla are a pale, clear yellow. This fades on drying, so that the flowers often appear white in old specimens.

***Lesquerella lata* Wooton & Standley, sp. nov.**

A caespitose perennial, 10 cm. high or less, from a stout, woody root; stems slender, ascending or prostrate, rather densely lepidote-stellate, with but few, rather distant leaves; these spatulate or oblanceolate, obtuse, thick, tapering at the base into a slender petiole, lepidote-stellate on both surfaces, 13 to 30 mm. long, 4 to 9 mm. wide, the basal leaves longer and on longer petioles; racemes 3 to 4 cm. long, rather densely many-flowered; pedicels slender, spreading, or reflexed in age, 7 mm. long; sepals oblong, 3.5 mm. long; petals 6 or 7 mm. long, bright yellow; capsules oblong to obovate, thinly lepidote-stellate, 3 mm. high, short-stipitate, much surpassed by the very slender style.

Type in the U. S. National Herbarium, no. 563020, collected somewhere in the Lincoln National Forest in 1903, by Mr. Fred G. Plummer. Here, too, belong young specimens collected by E. O. Wooton on White Mountain Peak, July 6, 1895, at an altitude of about 2,890 meters.

From our other species with pubescent capsules this is easily separated by its broad leaves, small capsules, and very long styles.

***Lesquerella pinetorum* Wooton & Standley, sp. nov.**

Perennial from a rather slender root; stems clustered, slender, ascending, 10 to 20 cm. high, lepidote-stellate but not very densely so, leafy, the leaves not crowded; basal leaves spatulate, obtuse, long-petioled; cauline leaves spatulate or oblanceolate, obtuse or acutish, entire or slightly undulate, tapering gradually at the base into a winged petiole, the whole leaf 20 to 30 mm. long, 3 to 7 mm. wide; racemes long, many-flowered, dense; pedicels about 8 mm. long, erect, stout; petals bright yellow, obovate, clawed, 6 or 7 mm. long; sepals oblong, 4 mm. long, densely lepidote-stellate; capsules nearly spherical, 3.5 mm. long, not compressed, glabrous, not stipitate; style slender, slightly longer than the capsule; seeds about 5 in each capsule.

Type in the U. S. National Herbarium, no. 561347, collected on a dry hillside under pine trees at Gilmores Ranch on Eagle Creek in the White Mountains, August 25, 1907, Wooton & Standley (no. 3460). Transition Zone; altitude about 2220 meters. The plant was also collected at Gilmores Ranch, July 29, 1901, by E. O. Wooton, and apparently the same is a specimen from the top of White Mountain Peak, collected by E. O. Wooton, August 16, 1897.

The species is nearest *L. fendleri*, but is not nearly so densely pubescent—indeed, the plants appear green rather than whitish; the leaves, too, are much broader and thinner, and the capsules are smaller.

***Lesquerella praecox* Wooton & Standley, sp. nov.**

A dense, caespitose, branched perennial, 4 to 6 cm. high, from a thick, woody root; leaves numerous, much crowded upon the short, stout stems; leaves linear-oblanceolate, 25 to 30 mm. long, 2.5 mm. wide or less, acutish, thick, white with a dense, lepidote-stellate pubescence, attenuate to the base; pedicels few, axillary or all arising from the tips of the branches, never racemose, 20 mm. long, erect, usually shorter than the leaves; sepals linear, 5 mm. long, sometimes persistent; petals bright yellow, obovate, 7 or 8 mm. long; capsules spherical or nearly so, not compressed, slightly channeled along the edge of the septum, glabrous, not stipitate, 5 mm. high.

Type in the U. S. National Herbarium, no. 4869, collected in New Mexico in 1853 by J. M. Bigelow.

ADDITIONAL SPECIMENS EXAMINED: Gallinas Mountains, August 27, 1904, *Wooton*; Cabra Springs, 1878, *W. B. Pease*.

From *L. fendleri*, its nearest relative, this plant is at once distinguished by its lower, densely caespitose habit and its few pedicels which are surpassed by the leaves. The general appearance of the two is very different.

***Lesquerella rectipes* Wooton & Standley, sp. nov.**

Perennial or biennial from a rather slender, woody root; stems slender, clustered, ascending or spreading, 12 to 18 cm. long, sparsely leafy, lepidote-stellate but not densely so; basal leaves narrowly oblanceolate or spatulate, obtuse; cauline leaves linear-oblanceolate, obtuse, 13 to 25 mm. long, lepidote-stellate on both surfaces; racemes loosely few-flowered, 4 cm. long or less; pedicels ascending, stout, 6 or 7 mm. long; sepals 4.5 mm. long, oblong-lanceolate, only sparingly lepidote; petals pale yellow, 7 mm. long, oblanceolate, obtuse; capsules broadly oblong to almost spherical, not compressed, 4.5 mm. long, not stipitate, very lightly lepidote-stellate; styles much longer than the capsules.

Type in the U. S. National Herbarium, no. 4799, collected in New Mexico June 6, 1883, by C. C. Marsh (no. 81). The exact locality is not given on the label, but it was somewhere in the northwestern part of the State.

ADDITIONAL SPECIMENS EXAMINED: Thirteen miles south of Atarque de Garcia, July 19, 1906, *Wooton*; along the banks of the Rio Grande 19 miles west of Santa Fe, alt. 1630 meters, May 31, 1897, *Heller* 3634.

Our plant has been confused with *L. argentea*, but that species has smaller, very densely pubescent capsules on strongly recurved pedicels.

***Sophia adenophora* Wooton & Standley, sp. nov.**

A coarse, canescent annual, generally with a single erect stem 80 to 120 cm. high, branching rather freely above but not at the base; leaves pinnately or bipinnately divided into rather coarse, obtuse or acute, oblong-lanceolate segments, the upper cauline leaves once pinnate with oblong, abruptly acute segments, the lower leaves once or twice pinnate, at least some of the segments broader; inflorescence an elongated, terminal raceme, 20 cm. long or more in fruit, glandular-pubescent throughout; flowers rather pale yellow; sepals 2 to 3 mm. long, oblong, obtuse, yellow, glandular; petals oblanceolate, spatulate, yellow, slightly longer than the sepals; siliques linear, 12 to 20 mm. long, acute, spreading or ascending; seeds crowded as if in one row; pedicels as long as the pods or longer, slightly ascending or divergent.

Type in the U. S. National Herbarium, no. 562504, collected by E. O. Wooton July 13, 1900, at the Head and Wilson Ranch south of Mule Creek, in northwestern Grant County.

ADDITIONAL SPECIMENS EXAMINED: Rio Frisco, July 25, 1900, *Wooton*; Tularosa Creek, Socorro County, July 14, 1906, *Wooton*; Reserve, July 9, 1906, *Wooton*.

This species is most closely related to *S. obtusa* Greene, from which it differs in having longer, more divergent pedicels, larger petals, and strongly glandular inflorescence. It is found in the Upper Sonoran Zone.

***Sophia glabra* Wooton & Standley, sp. nov.**

A slender, erect, sparingly branched, canescent annual, 30 to 60 cm. high; stems more or less purplish throughout; leaves and stems covered with a thick coat of short, branched hairs, not at all glandular; leaves all bipinnately divided into small, oblong, obtuse or acute segments 1 to 3 mm. long, some of these again lobed; racemes elongated in fruit; flowers small, 1 to 2 mm. long;

sepals purplish, stellate-pubescent; petals yellow, as long as the sepals, narrowly oblanceolate or spatulate; fruiting racemes, rachis, pedicels, and siliques perfectly glabrous; pedicels about 10 mm. long, divergent or slightly ascending; siliques 5 or 6 mm. long, oblong, acute at both ends; seeds in two rows.

Type in the U. S. National Herbarium, no. 564228, collected in the Organ Mountains, March 21, 1907, by E. O. Wooton and Paul C. Standley. The specimens were collected in an arroyo at the foot of the mountains not far from Van Pattens Camp. They grew among the rocks and about the edges of cliffs.

ADDITIONAL SPECIMENS EXAMINED: Van Pattens, April 25, 1895, *Wooton*; Fillmore Canyon, April 18, 1903, *Wooton*; Bishops Cap, March 30, 1895, *Wooton*; Bishops Cap, 1908, *Wooton* 3815.

The species is most closely related to *S. halictorum*, but is distinguished by its habit, its strictly glabrous racemes, and the slightly smaller fruit. So far as our material shows, it is restricted to the Organ Mountains, where it is the common and almost the only *Sophia*, though it is not nearly as abundant as the nearly related species of the adjacent Mesilla Valley. It occurs in the Upper Sonoran Zone.

***Thelypodium vernale* Wooton & Standley, sp. nov.**

Probably biennial, glabrous, about 40 cm. high; stems slender, branched throughout, glaucous, purplish near the base, the branches strongly ascending; cauline leaves triangular-lanceolate, attenuate, 35 to 50 mm. long, slightly glaucous, entire, somewhat undulate, auriculate-clasping at the base, the lobes obtuse, 5 to 7 mm. long; pedicels ascending, slender, about 5 mm. long; sepals narrowly oblong, obtuse, 2.5 mm. long, green or tinged with purple; petals white, slightly tinged with purple, narrowly oblong, tapering gradually toward the base, the whole 5 mm. long or less; pods slender, 40 to 60 mm. long, somewhat divergent, arcuate; septum without a midrib; style truncate, not bilobate.

Type in the U. S. National Herbarium, no. 690257, collected in the low mountains west of San Antonio, Socorro County, April 14, 1908, by E. O. Wooton (no. 3847).

This slightly resembles *T. sagittatum*, but the flowers are much smaller, the leaves more acute, and the whole plant much smaller and more slender.

CAPPARIDACEAE.

***Peritoma breviflorum* Wooton & Standley, sp. nov.**

Slender annual, 40 to 50 cm. high, simple at the base, above with numerous ascending or spreading branches; stems green, glabrous; leaflets 3, elliptic or narrowly elliptic-oblanceolate, green, glabrous, abruptly acute; terminal racemes very short, 4 to 6 cm. long, slender, villous; bracts small, 3 mm. long or less, nearly linear, attenuate; pedicels slender, 4 to 7 mm. long; calyx united at the base, persistent, the lobes narrowly triangular, acute, yellowish green; petals deep yellow, small, 2.5 to 4 mm. long, oblong-obovate, obtuse, entire, abruptly contracted at the base into a very short claw; stamens 6, only slightly exceeding the petals; capsules oblong, 15 to 20 mm. long, acutish, glabrous, torulose, on a slender stipe 4 mm. long; seeds 6 or fewer, ovoid, 3.5 mm. long, brownish, irregularly tuberculate; style very short, about 0.5 mm. long.

Type in the U. S. National Herbarium, no. 686249, collected on the dry, stony hills about Shiprock, July 25, 1911, by Paul C. Standley (no. 7282). Upper Sonoran Zone; altitude about 1425 meters.

The plant is fairly abundant in the region along the low mesas bordering the valley of the San Juan River. It is associated with various species of *Atriplex* and other plants characteristic of alkaline situations. It is similar to *P. luteum*, but the flowers are only half as large, the petals relatively broader and with

shorter claws, as well as of a deeper color, the inflorescence villous instead of glabrous, and the capsules smaller and on much shorter stipes.

HYDRANGEACEAE.

Fendlera falcata Thornber, sp. nov.

An erect shrub, 1.5 to 2 meters tall, with grayish, furrowed bark; twigs of one year's growth glabrous or nearly so, somewhat shining, reddish; leaves 15 to 40 mm. long, 5 to 7 mm. wide, nearly sessile, tapering at the base and apex, lanceolate to narrowly lanceolate, more or less falcate, shining above and below, glabrous, or sparsely strigose beneath, the margins revolute; sepals, pedicels, and hypanthium glabrous or slightly pubescent, glabrate at maturity; sepals lanceolate to ovate-lanceolate, 8 to 10 mm. long, about three-fifths the length of the capsule; petals 17 to 22 mm. long, 11 to 13 mm. wide, tapering into a long claw, the margins erose; anthers about 4 mm. long; capsules 11 to 16 mm. long, 7 to 8 mm. in diameter, conical, very gradually tapering upward.

Type in the U. S. National Herbarium, no. 686760, collected in the Tunitcha Mountains on the Navajo Reservation in August, 1911, by Paul C. Standley (no. 7806).

ADDITIONAL SPECIMENS EXAMINED: COLORADO—Dolores, alt. 2,200 meters, June 15, 1902, *Crandall*; Cerro Summit, alt. 2,420 meters, 1901, *Baker* 165; Bayfield, 1907, *Cary* 174; Mancos, 1898, *Baker* 393. ARIZONA—Carrizo Mountains, 1911, *Standley* 7406; Fort Apache, July 28, 1905, *Thornber*. NEW MEXICO—Without locality, 1869, *Palmer*; Cedar Hill, alt. 1,900 meters, 1911, *Standley* 7971.

Fendlera tomentella Thornber, sp. nov.

Shrub 1 to 1.5 meters high, with dark gray, furrowed branches, and somewhat shining, reddish or straw colored, puberulent twigs, the short flowering ones with 2 to 5 pairs of leaves; leaves lanceolate to narrowly lanceolate, 15 to 30 mm. long, 4 to 7 mm. wide, dull green and hispid or hispidulous above, strongly 3-nerved beneath and strigose and tomentose, appearing hoary; calyx, hypanthium, and pedicels permanently hirsute, the lanceolate sepals extending to beyond the middle of the capsule; flowers not seen; capsules 10 to 12 mm. long, 6 to 6.5 mm. thick, gradually tapering above.

Type in the U. S. National Herbarium, no. 497677, collected in the canyon of the Blue River near Coopers Ranch, Graham County, Arizona, in 1905, by Walter Hough (no. 470).

ADDITIONAL SPECIMENS EXAMINED: NEW MEXICO—Mangas Springs, alt. 1,450 meters, 1903, *Metcalf* 39; Hurrah Creek, September 25, 1853; *Bigelow*; Embudo, alt. 1,760 meters, 1897, *Heller* 3513; Animas Mountains, alt. 2,000 meters, 1908, *Goldman* 1385. COLORADO—Los Pinos, 1899, *Baker* 367. ARIZONA—Santa Catalina Mountains, alt. 900 meters, August 20, 1903, *Jones*.

Fendlerella cymosa Greene, sp. nov.

A much branched, rather erect, low shrub, 40 to 60 cm. high, with scaly root-stocks; young stems grayish or nearly white; whole plant more or less strigillose with nearly colorless hairs, some of those on the lower surfaces of the leaves with white, papilliform bases; leaves numerous, nearly sessile, narrowly lanceolate to oblanceolate, 10 to 25 mm. long, 1.5 to 5 mm. wide, 3-nerved, acute, with ciliate, slightly revolute margins; cymes several to many-flowered, terminating the leafy branches; hypanthium turbinate, pubescent like the lanceolate or oblong-lanceolate sepals, these 4 mm. long; petals white, oblong-elliptic, 3 to 4 mm. long; filaments of the shorter stamens dilated to near the base, those of the longer ones with a well-defined, constricted neck above; capsules narrowly elongated.

Type in the U. S. National Herbarium, no. 45788, collected in the Huachuca Mountains of southern Arizona, July 7, 1884, by C. G. Pringle.

ADDITIONAL SPECIMENS EXAMINED: TEXAS—Guadalupe Mountains, 1901, *Bailey* 699. NEW MEXICO—Canyon on the east side of San Luis Mountains, 1893, *Mearns* 2253; San Luis Mountains, 1892, *Mearns* 530; Organ Mountains, June 10, 1906, *Standley*; Organ Mountains, alt. 2,000 meters, 1897, *Wooton* 459. ARIZONA—Chiricahua Mountains, alt. 1,666 meters, 1907, *Blumer* 1725; Huachuca Mountains, September, 1882, *Lemmon*.

SAXIFRAGACEAE.

Heuchera pulchella Wooton & Standley, sp. nov.

Acaulescent, with a very thick rootstock; flowering branches scapiform, naked, 7 to 10 cm. high, minutely glandular; leaf blades cordate, 13 mm. wide or less, rather deeply lobed, the teeth broadly ovate, acuminate, bristle-tipped; blades glabrous above, glandular beneath, bright green, ciliate; inflorescence secund, dense, most of the flowers solitary but occasionally two together; hypanthium densely glandular, slightly villous, campanulate, together with the oblong, obtuse sepals 4 mm. long; sepals purplish; petals linear-filiform, not surpassing the sepals; stamens slightly exceeding the sepals.

Type in the U. S. National Herbarium, no. 690250, collected from crevices of rocks on the summit of the Sandia Mountains, August 4, 1910, by E. O. Wooton. Another sheet in the National Herbarium was collected in New Mexico in 1869 by Dr. Edward Palmer.

This is nearest *H. nana*, but has a larger hypanthium and calyx, a more densely glandular hypanthium, a brighter colored calyx, shorter petals, and a denser inflorescence; the ciliæ of the leaf margins, too, are much shorter and fewer.

ROSACEAE.

Oreobatus rubicundus Wooton & Standley, sp. nov.

Shrub about 1 meter high, with spreading branches; stems slender, the bark soon exfoliating in thin layers; young branches reddish, very finely and closely pubescent; leaves 30 to 40 mm. long and about as wide, round-ovate in outline, cordate at the base or truncate, the sinus always broad and open, conspicuously 3-lobed, the lobes obtuse and often again lobed, crenate-dentate, the teeth ovate, usually obtuse and abruptly acuminate, glabrous above or nearly so, sparingly pubescent beneath along the veins, thin, bright green, the veins inconspicuous and scarcely reticulate; petioles slender, as long as the blades or considerably shorter, finely pubescent, reddish; peduncles solitary, short, 5 to 15 mm. long, stout, finely pubescent and glandular; sepals at anthesis about 10 mm. long, lanceolate, acuminate, in age becoming 15 mm. long and ovate, with long, linear tips, finely pubescent on both surfaces, with numerous reddish glands on the outer face; petals white, fugacious, 10 to 15 mm. long, broadly oblong; fruit small, with few, small, nearly dry drupelets.

Type in the U. S. National Herbarium, no. 560937, collected at Van Pattens Camp in the Organ Mountains, June 9, 1906, by Paul C. Standley. The shrubs are found in the Upper Sonoran Zone on the faces of cliffs and in deep rocky canyons.

ADDITIONAL SPECIMENS EXAMINED: Organ Mountains, September 17, 1893, May 15, 1892, *Wooton*; Van Pattens, August 29, 1894, July 27, 1902, *Wooton*.

This plant near *O. neomexicanus*, but has smaller leaves, flowers, and fruit, and nearly glabrous leaves, and the pubescence of the branches and petioles is

fine and appressed instead of loosely spreading. We have seen it only from the Organ Mountains.

***Rosa adnosepala* Wooton & Standley, sp. nov.**

Branches smooth, reddish brown, armed with few, slender, straight spines; stipules broad, acute, densely glandular and soft-pubescent; petioles soft-pubescent, with numerous stalked glands; leaflets on short petiolules, obovate, obtuse, broadly cuneate at the base, sharply and deeply incised-serrate two-thirds of the way to the base or more, dull green, glabrous above or nearly so, beneath densely glandular-puberulent, of about the same color on both surfaces; flowers in clusters of 3 to 5 at the ends of the branches, on glandular peduncles about 1 cm. long; hypanthium glabrous; sepals 15 to 20 mm. long, linear-lanceolate, with very long narrow tips scarcely dilated at the apex, densely glandular-bristly with red glands 1 or 2 mm. long, villous along the margins; petals about 15 mm. long; sepals reflexed after anthesis; fruit not seen.

Type in the U. S. National Herbarium, no. 306499, collected along the Pecos River 8 miles east of Glorieta, San Miguel County, June 9, 1897, by A. A. and E. Gertrude Heller (no. 3674). Altitude 1,950 meters.

Nearest *R. fendleri*, perhaps, but readily distinguished by the densely glandular-bristly calyx lobes.

***Rosa hypoleuca* Wooton & Standley, sp. nov.**

Stems bright reddish brown, more or less glaucous when young, densely armed with very slender, straight, short spines; stipules large, narrow, acute, with glandular margins; petioles with rather few stalked glands, otherwise glabrous; leaflets usually 9, elliptic-oblong or oblong-ovate, obtuse, rounded at the base, coarsely but not deeply incised-serrate, glabrous, strongly glaucous beneath, dull green above, 13 to 20 mm. long; flowers in clusters at the ends of the ascending branches on short, glabrous peduncles; hypanthium glabrous; sepals narrowly lanceolate with long, linear tips, about 15 mm. long, glabrous below, glandular toward the tips, entire or with a few subulate lobes, tomentulose along the margins; petals obovate, deeply notched, bright pink, 15 to 20 mm. long; fruit not seen.

Type in the U. S. National Herbarium, no. 497843, collected near Kingston, Sierra County, June 1, 1904, by O. B. Metcalfe (no. 940). Altitude 1,980 meters.

This is as closely related to *R. fendleri* as to any species. It differs, however, in the perfectly glabrous leaflets, strongly glaucous beneath.

Here we have placed Standley's 4031, collected along Winsor Creek, June 29, 1908, altitude 2,520 meters. This has larger flowers and leaflets than the type but otherwise seems indistinguishable.

MALACEAE.

***Amelanchier goldmanii* Wooton & Standley, sp. nov.**

A shrub 1.5 meters high or less, with spreading branches; bark on the older stems grayish, on the younger ones dark reddish brown; bud scales reddish, sparingly villous; leaves almost perfectly rotund, on petioles 8 to 15 mm. long, 30 to 40 mm. in diameter, rounded or cordate at the base, with rounded serrate teeth reaching almost to the base; petioles and blades glabrate, probably more or less tomentulose when young; flowers not seen; fruit bluish black, spherical, 7 mm. in diameter, in terminal racemose clusters of several fruits.

Type in the U. S. National Herbarium, no. 562614, collected by E. A. Goldman in Copper Canyon in the Magdalena Mountains, September 3, 1909, at an altitude of 2,550 meters.

ADDITIONAL SPECIMENS EXAMINED: Mogollon-Magdalena Road, in the Mogollon Mountains, about 15 miles east of Mogollon, August 8, 1900, *Wooton*.

AMYGDALACEAE.

PADUS.

Since all but one of our seven species of *Padus* appear to be new it seems desirable to publish a key to them along with the descriptions.

KEY TO THE NEW MEXICAN SPECIES.

Calyx persistent in fruit.

Young branches densely tawny-pubescent; young fruit pubescent ----- *P. rufula*.

Young branches and fruit glabrous ----- *P. virens*.

Calyx deciduous soon after anthesis.

Plants glabrous throughout ----- *P. melanocarpa*.¹

Plants pubescent on the peduncles, petioles, and lower surface of the leaves.

Leaves not glaucous beneath at maturity, of about the same color on both surfaces ----- *P. pumicea*.

Leaves whitish beneath at maturity.

Pedicels longer than the fruit, slender; seeds 8 to 10 mm. in diameter ----- *P. mescaleria*.

Pedicels shorter than the fruit, stout; seeds 7 mm. in diameter or less.

Pedicels glabrous; racemes slender; leaves elliptic, narrowed at the base; buds narrowly lanceolate in outline ----- *P. calophylla*.

Pedicels pubescent; racemes stout; leaves oblong to ovate or obovate, rounded to subcordate at the base; buds ovoid ----- *P. valida*.

***Padus rufula* Wooton & Standley, sp. nov.**

Branches slender, grayish brown, with numerous small, gray lenticels; young branches densely soft-pubescent with reddish brown hairs; petioles pubescent, slender, one-fourth as long as the blades or less; leaf blades thin, elliptic, acute, 40 or 50 mm. long, acute at the base, finely and very sharply serrate, dull green and glabrous above, pale beneath, glabrous except for an abundant persistent, tawny tomentum along the midvein; racemes slender, many-flowered, pubescent at the base, glabrous above; pedicels stout, 4 mm. long or less; flowers not seen; hypanthium and sepals persistent; fruit sessile in the hypanthium, globose, 8 to 10 mm. in diameter, pubescent when young, glabrate at maturity.

Type in the U. S. National Herbarium, no. 563898, collected on the West Fork of the Rio Gila, August 6, 1900, by E. O. Wooton.

ADDITIONAL SPECIMENS EXAMINED: NEW MEXICO—Mogollon Mountains, August, 1881, *Rusby* 119. ARIZONA—Santa Rita Mountains, 1881, *C. G. Pringle*.

This is one of the most distinct species of the genus. It is related to *P. salicifolia* of Mexico, but is distinguished at once by the abundant tomentum of the leaves, the densely pubescent branchlets, and the pubescent fruit.

¹ *Padus melanocarpa* (A. Nels.) Shafer in Britt. & Shaf. N. Amer. Trees 504. 1908.

***Padus virens* Wooton & Standley, sp. nov.**

A tree 7 meters high or less, with a smooth, reddish brown trunk and slender, slightly drooping branches; young branchlets and racemes glabrous; leaves ovate, obovate, or oval, 5 or 6 cm. long, acutish or slightly acuminate, truncate or usually rounded at the base, thin, bright green, shining, of about the same color on both surfaces, finely crenulate-serrate with appressed teeth; petioles slender, glabrous, one-third to one-half as long as the blades; leaves glabrate in age, when young with a rather abundant tawny tomentum along the midvein, some of this persistent at maturity; flowers in slender, loose racemes; pedicels slender, 5 or 6 mm. long; hypanthium glabrous, saucer-shaped, 5 mm. broad, the lobes triangular, acute; petals 4 mm. long, obovate; fruit black, glabrous, globose, 7 or 8 mm. in diameter, sessile in the hypanthium.

Type in the U. S. National Herbarium, no. 560917, collected at Van Pattens Camp in the Organ Mountains, June 9, 1906, by Paul C. Standley.

ADDITIONAL SPECIMENS EXAMINED: Organ Mountains, alt. 1,710 meters, 1897, Wooton 123; Van Pattens, May 14, 1895, April 29, 1899, Wooton; Organ Mountains, 1893, Wooton 1108; Rio Frisco, August 9, 1900, Wooton; Sycamore Creek, August 13, 1902, Wooton; Pine Cienaga, July 17, 1900, Wooton; San Francisco Mountains, July 27, 1900, Wooton; Alizo near Kellys, July 24, 1900, Wooton; Holts Ranch, July 20, 1900, Wooton; near Joseph, July 10, 1906, Wooton; Tularosa Creek, August 6, 1901, Wooton; Cloudercroft, July 18, 1899, Wooton; Burro Mountains, 7 miles southeast of Leopold, alt. 2,250 meters, 1908, Goldman 1521; Burro Mountains, 5 miles southeast of Leopold, alt. 1,950 meters, 1908, Goldman 1510; Florida Mountains, alt. 1,800 meters, 1908, Goldman 1500.

This has passed as *P. capuli*, a Mexican species, from which our plant differs in its broader leaves with the midvein tomentose instead of glabrous. In the Organ Mountains this species occurs in abundance in the opening of the canyon in which Van Pattens Camp is located. It is known from only this one locality in the range, where it grows along with *Quercus grisea* and *Q. arizonica*. Attempts have been made to use the trees as stocks for grafting various fruits but they have been unsuccessful.

The material from the western part of the State may represent a different species. It is usually much smaller, only a tall shrub, and its leaves are narrower, thicker, not so bright a green, and on shorter petioles.

***Padus pumicea* Wooton & Standley, sp. nov.**

Branches stout, numerous, ascending, dark reddish brown, the younger ones finely pubescent; petioles mostly one-fifth as long as the blades, sometimes longer, finely pubescent, each bearing two large glands; leaf blades obovate or oblong, averaging about 45 mm. long, rounded or truncate at the base, acute or acuminate, finely serrulate to the base with incurved teeth, bright green and glabrous above, finely pubescent and of the same color beneath, often becoming glabrate; flowers not seen; racemes stout, few-fruited, finely pubescent near the base, glabrous above; pedicels stout, glabrous, much shorter than the fruit; seeds globose, 6 or 7 mm. in diameter.

Type in the U. S. National Herbarium, no. 563903, collected at the "Craters," Valencia County, July 28, 1906, by E. O. Wooton.

ADDITIONAL SPECIMENS EXAMINED: Mountains south of Canjilon, August 17, 1904, Wooton 2706.

From all our pubescent species this differs in having the leaves of about the same color on both surfaces. The fruits, too, are very few and the pedicels remarkably short. The branches are very densely furnished with leaves, so that in general appearance this is unlike any of our other chokecherries.

The type specimen is without fruit, but one of the same collection in the herbarium of E. O. Wooton is well fruited, as is the specimen from Canjilon.

***Padus mescaleria* Wooton & Standley, sp. nov.**

Branches slender, grayish brown, the younger ones finely and sparingly pubescent; buds ovoid, small; petioles about one-third as long as the blades, finely pubescent, with several glands above the middle; blades oblong to narrowly obovoid, acute or slightly acuminate, usually rounded at the base, glabrous and dark green above, strongly glaucous and finely pubescent beneath, rather thick, sharply and evenly serrate to the base; flowers not seen; racemes slender, loosely few-fruited, the rachis glabrous; pedicels slender, noticeably longer than the fruit, glabrous, straight; seeds 7 to 9 mm. in diameter, scarcely at all flattened.

Type in the U. S. National Herbarium, no. 690233, collected on Tularosa Creek near the Mescalero Agency, August 6, 1901, by E. O. Wooton.

The most distinctive features of this are the long pedicels, glabrous racemes, large seeds, and rather narrow, deep green leaves strongly glaucous beneath.

***Padus calophylla* Wooton & Standley, sp. nov.**

Branches stout, dark gray, the younger ones densely and finely pubescent; buds lanceolate to narrowly elliptic in outline; petioles slender, reddish, one-fourth as long as the blades, very finely pubescent, usually with a pair of glands just below the blade; blades elliptic, acute, acutish at the base, 45 to 60 mm. long, about 30 mm. wide, dull pale green above and glabrous, decidedly paler and finely pubescent beneath, especially on the veins, rather thick and coriaceous, very finely and inconspicuously serrulate; veins prominent, the midvein reddish; flowers not seen; racemes slender, the rachis slender, dark reddish purple; pedicels rather slender, shorter than the fruit, often curved, glabrous; fruit about 9 mm. in diameter, abundant and persistent, the seed flattened, 5 mm. in diameter.

Type in the U. S. National Herbarium, no. 562677, collected 5 miles west of Chloride, October 12, 1909, by E. A. Goldman (no. 1768).

The foliage is different from that of any other species, the leaves being especially handsome because of their thick texture and of their pale green coloring, which contrasts with the red of the veins and petioles. The seeds are remarkably small; the fruits are densely clustered and persistent, instead of scattered and soon falling as in most of the related species.

***Padus valida* Wooton & Standley, sp. nov.**

Branches very stout, dark reddish brown, all the younger ones densely but very finely pubescent; buds large, ovoid; petioles less than one-fourth as long as the blades, stout, densely pubescent; blades obovate, oval, or oblong, usually 50 to 70 mm. long, rounded or subcordate at the base, acute or more often abruptly acuminate, thick, dull green and glabrous above, glaucescent and pubescent beneath, inconspicuously serrulate with sharp, nearly subulate, inflexed teeth; racemes very numerous, stout, densely pubescent, often recurved, bearing only a few fruits; pedicels stout, pubescent, much shorter than the fruit; flowers not seen; fruit 10 or 12 mm. in diameter; seeds flattened, about 7 mm. in diameter.

Type in the U. S. National Herbarium, no. 498048, collected in canyons near Kingston, Sierra County, August 24, 1904, by O. B. Metcalfe (no. 1243). Altitude 1980 meters.

ADDITIONAL SPECIMENS EXAMINED: Copper Canyon, alt. 2700 meters, September 3, 1909, *Goldman* 1675; Copper Canyon, alt. 2250 meters, September 3, 1909, *Goldman* 1676; Hop Canyon, May 13, 1895, *Herrick* 535.

A most striking species, characterized by its stout branches and racemes, large fruits, and densely pubescent pedicels and racemes.

MIMOSACEAE.***Morongia occidentalis* Wooton & Standley, sp. nov.**

Stems prostrate, stout, striate, densely and finely puberulent, armed with very few, distant, recurved prickles; leaves bipinnate, with 5 or 6 pairs of pinnæ; petioles slender, about 4 cm. long, striate, finely puberulent, armed with few stout prickles; leaflets oblong, about 4 mm. long, acute or acutish, thick, smooth, not nerved, glabrous or nearly so; flowers pink, in dense heads; calyx glabrous or nearly so, the thin lobes ovate, acute; peduncles 2 to 6 cm. long, puberulent, with few weak prickles or none; pods slender, 7 to 9 cm. long, 2 or 3 mm. wide, flattened, armed on the sides with long, slender, sparingly puberulent prickles, usually naked on the margins or with prickles of the same kind as on the sides, narrowed at the base, bearing at the apex a stout beak 5 to 7 mm. long.

Type in the U. S. National Herbarium, no. 660612, collected near Nara Visa, July 4, 1911, by Mr. Geo. L. Fisher (no. 190). Also collected near Nara Visa, August 17, 1910, by Mr. Fisher (no. 58).

Most closely allied, perhaps, to *M. angustata*, but distinguished by the flat, puberulent pods armed with but few prickles, and by the few prickles of the abundantly pubescent stems.

CAESALPINIACEAE.***Chamaecrista rostrata* Wooton & Standley, sp. nov.**

A slender annual, 20 cm. high or less, simple at the base, sparingly branched above; stems herbaceous, reddish, puberulent; leaflets 10 or 12, narrowly oblong, rounded at the apex, very shortly mucronulate, 8 or 10 mm. long, glabrous; petiolar gland oblong, small, short-stipitate; stipules linear-lanceolate, long-attenuate; peduncles few, supra-axillary, arcuate, 1-flowered; petals bright yellow, 12 mm. long; sepals one-half to two-thirds as long as the petals, lanceolate, membranaceous; pods 25 to 35 mm. long, 5 mm. wide, appressed-pubescent, ending in a beak 2 to 3 mm. long.

Type in the U. S. National Herbarium, no. 660032, collected in sandy soil at Logan, October 5, 1910, by Mr. Geo. L. Fisher (no. 93).

While related to *C. fasciculata*, this may be readily distinguished by the long beaks of the pods, the fewer leaflets neither acute nor conspicuously mucronate, the 1-flowered peduncles, and the shorter sepals.

FABACEAE.***Anisolotus greenei* Wooton & Standley.**

Hosackia mollis Greene, Bull. Calif. Acad. 1: 185. 1885, not Nutt.

Lotus mollis Greene, Pittonia 2: 143. 1890, not Balf.

***Anisolotus neomexicanus* (Greene) Wooton & Standley.**

Lotus neomexicanus Greene, Pittonia 2: 141. 1890.

***Anisolotus nummularius* (Jones) Wooton & Standley.**

Hosackia rigida nummularia Jones, Bull. Calif. Acad. II. 5: 633. 1895.

***Anisolotus puberulus* (Benth.) Wooton & Standley.**

Hosackia puberula Benth. Pl. Hartw. 305. 1848.

Lotus puberulus Greene, Pittonia 2: 142. 1890.

***Anisolotus trispermus* (Greene) Wooton & Standley.**

Lotus trispermus Greene, Erythea 1: 258. 1893.

Aragallus veganus (Cockerell) Wooton & Standley.

Aragallus pinetorum veganus Cockerell, *Torreyia* 2: 155. 1902.

Apparently this is a most distinct species, found only on the tops of the highest mountains in the ranges lying between Santa Fe and Las Vegas. The assignment of the plant to rank as a subspecies under *A. pinetorum* was most unfortunate, since the plant is not at all closely related to that species, but finds its affinities among some of the alpine species of Colorado and Wyoming.

Astragalus albulus Wooton & Standley, sp. nov.

Plant 40 to 60 cm. high, much branched from a woody root, hirsutulous-canescens throughout; stipules whitish, membranaceous, large, connate opposite the leaves, the free tips broadly triangular; leaves 5 to 8 cm. long, with very short petioles; leaflets 8 to 10 pairs, linear or narrowly oblong, 10 to 15 mm. long, acute or obtuse, glabrous above; flowers in loose, axillary racemes 10 to 15 cm. long; peduncles 3 to 5 cm. long, the pedicels very short, subtended by white, membranous, ovate bracts half the length of the calyx; flowers dull yellow, tinged with purple; calyx cylindric, about 7 mm. long, the subulate teeth one-fourth as long, appressed-pubescent with both black and white hairs; corolla about 12 mm. long, the wings and banner only a little longer than the keel; mature fruit not seen, the very young pods 1-celled, several-seeded, with a very short stipe, slightly flattened dorso-ventrally at the base, acute, appressed-pubescent.

Type in the U. S. National Herbarium, no. 690252, collected in a canyon on the road to Zuni some distance south of Gallup, August 1, 1904, by E. O. Wooton. Upper Sonoran Zone.

Without mature fruit the relationship of this plant can not be stated definitely, but it is unlike any species known to us.

Astragalus altus Wooton & Standley, sp. nov.

Perennial, 40 to 60 cm. high, with several slender, erect, sparingly branched stems, these indistinctly striate, sparsely pubescent with very short, appressed hairs; stipules triangular-lanceolate, acuminate, neither connate nor adnate to the expanded bases of the petioles; leaves 8 to 10 cm. long; petioles 1 cm. long or less; leaflets 10 to 14 pairs, elliptic to elliptic-oblong, when mature 8 to 10 mm. long, entire, acute or obtuse, appressed-pubescent beneath; flowers in axillary racemes 6 to 10 cm. long, the peduncles elongating slightly in fruit, the flowers crowded in a short raceme, not capitate; calyx yellowish, sparsely pubescent with appressed, black hairs, 5 mm. long including the small, acute teeth scarcely 1 mm. long; corolla bright yellow, hardly 10 mm. long, the wings and banner considerably surpassing the obtuse keel; pods (about half mature) 15 to 20 mm. long including the stipe (8 to 10 mm. long), oblong, acute, membranous, the lower suture somewhat sulcate, several-seeded, sparsely appressed-pubescent with minute black hairs.

Type in the U. S. National Herbarium, no. 690253, collected at Toboggan in the Sacramento Mountains, Otero County, July 31, 1899, by E. O. Wooton.

ADDITIONAL SPECIMENS EXAMINED: Upper Tularosa Creek, Sacramento Mountains, August 6, 1901, *Wooton*.

At first glance this might be confused with *A. rusbyi*, which it resembles in a general way. It differs in having shorter and broader leaflets, crowded flowers on much shorter peduncles, and pods with longer stipes and much less inflexed sutures.

Astragalus neomexicanus Wooton & Standley, sp. nov.

Herbaceous perennial about 30 cm. high, with somewhat the aspect of *Aragallus deflexus*; stems ascending, branched from the base, pubescent; stipules

narrowly triangular-lanceolate, about 10 mm. long, adnate to the petiole, not connate; leaves 10 to 18 cm. long, with about 20 pairs of leaflets, villous throughout with weak, spreading hairs; leaflets elliptic to ovate-lanceolate, 10 to 12 mm. long, narrowed at the apex, acute, entire, glabrate above; flowers in elongated, several to many-flowered racemes 15 to 25 cm. long (including the peduncles); bracts linear-lanceolate, twice as long as the ascending pedicels (these 2 or 3 mm. long); calyx campanulate, slightly gibbous above, 7 to 9 mm. long, the subulate teeth about one-third as long, pubescent with black and white, loosely appressed hairs, the black ones more noticeable on the buds; corolla purple, about 20 mm. long, the banner and wings considerably surpassing the rounded keel; mature fruit not seen; very young pods 1-celled, several-seeded, thick-walled, terete, neither suture intruded, densely appressed-pubescent.

Type in the U. S. National Herbarium, no. 690254, collected in James Canyon in the Sacramento Mountains near Cloudcroft, Otero County, July 23, 1899, by E. O. Wooton. Altitude about 2,550 meters.

We hesitate to describe this species for which the mature fruit is lacking, but it is so distinct from anything else we have seen that the description is given and a name applied merely as a means of recording the plant.

Lupinus argillaceus Wooton & Standley, sp. nov.

Low annual of the *Platycarpus* group; stem about 10 cm. high, with numerous lateral divaricate branches as long or longer; whole plant softly silky villous, the pubescence being somewhat appressed and thus not conspicuous; petioles 3 to 5 cm. long; leaflets 5 to 7, 1 to 2 cm. long, oblanceolate, obtuse or acute, about equally pubescent on both sides; flowers few, in contracted, head-like clusters at the ends of peduncles mostly shorter than the petioles of the adjacent leaves, with broadly ovate-lanceolate bracts 3 or 4 mm. long; calyx similar to that of *L. kingii*, the upper lobe deeply 2-cleft, the divisions lanceolate, acute, the lower lobe minutely 3-toothed at the apex, the toothings more or less obscured by the pubescence in dried material, the upper lobe about two-thirds as long as the lower, with minute bracts at the sinuses between the two lobes; corolla blue or white, the banner narrowly ovate, reflexed, shorter than the wings and the elongated, rather straight keel; stamens monadelphous, the lower five anthers linear, almost as long as their filaments, the upper anthers minute; ovary with 2 ovules; fruit a short, rhombic-ovate, 2-seeded legume; seeds almost rotund, lenticular, whitish, without markings.

Type in the U. S. National Herbarium, no. 498990, collected near Pecos, San Miguel County, at an altitude of 2,010 meters, August 17, 1908, by Paul C. Standley (no. 4974). The plants grew on the low hills about Pecos, especially in the deep gullies, in a heavy red clay soil.

ADDITIONAL SPECIMENS EXAMINED: Near Pecos, alt. 2,010 meters, 1908, *Standley* 4975; El Rito, August 17, 1904, *Wooton*.

Standley's specimens were distributed as *L. kingii* and are listed as that species in his report upon his 1908 collections in *Muhlenbergia*.¹ Of the two numbers collected in the same locality one had white flowers and the other blue.

Lupinus laetus Wooton & Standley, sp. nov.

A slender perennial with few spreading or ascending branches; stems finely and sparingly appressed-pubescent; petioles slender, about as long as the leaflets, these elliptic-oblanceolate, 45 to 60 mm. long, obtuse, mucronate, bright green and glabrous above, with a few scattered, appressed hairs beneath; raceme 15 to 20 cm. long, loosely few-flowered, short-pedunculate; pedicels slender, ascending, 8 mm. long, sparingly pubescent; calyx sericeous, the lobes about equal, broad, rather obtuse; corolla 12 mm. long, bright blue; fruit not seen.

¹ 5: 17-30. 1909.

Type in the U. S. National Herbarium, no. 562219, collected at Winter Folly in the Sacramento Mountains north of Cloudcroft, August 13, 1899, by E. O. Wooton. Altitude about 2,700 meters.

The plant is of the group of *L. plattensis*, but its bright blue flowers at once distinguish it.

***Lupinus aquilinus* Wooton & Standley, sp. nov.**

A much branched, suffrutescent perennial, 60 to 150 cm. high; stems slender, spreading, sparingly and finely sericeous; petioles slender, about equaling the leaflets, these elliptic-oblongate, 35 to 45 mm. long, obtuse, mucronate, grayish green, glabrous above, finely sericeous beneath; racemes on short peduncles, dense, 5 cm. long or less, few-flowered; pedicels ascending, stout, sericeous, 4 mm. long; calyx densely sericeous, scarcely gibbous, the two lobes almost equal, rather broad, acute, entire; corolla 12 mm. long, pale bluish and yellowish, the banner with a dark spot; pods 30 mm. long and 8 mm. wide or less, 3 or 4-seeded; seeds 4 mm. long, greenish gray, finely splashed with dark green.

Type in the U. S. National Herbarium, no. 562095, collected at Gilmores Ranch, on Eagle Creek, in the White Mountains, August 25, 1907, by E. O. Wooton and Paul C. Standley (no. 3613). Altitude 2,220 meters.

ADDITIONAL SPECIMENS EXAMINED: Gilmores Ranch, August 15, 1897, *Wooton* 537; Sierra Grande, August, 1903, *Howell* 229.

This is a grayish plant with numerous slender, spreading branches. It is rather abundant about Gilmores Ranch, growing on slopes in the shade of pines. It is of the *L. plattensis* group and is related to *L. sierra-blancae*, which grows not far away. It is a lower plant, however, than *L. sierrae-blancae*, with more branches, fewer flowers, and shorter, obtuse leaflets.

***Lupinus sierrae-blancae* Wooton & Standley, sp. nov.**

A tall perennial, 1 meter high or more, much branched; stems stout and somewhat succulent, finely white-pubescent, the pubescence loose; petioles equaling the leaflets, these 7 to 9, 50 to 70 mm. long, linear-elliptic, very acute, attenuate to the base, yellowish green, glabrous above, finely strigillose beneath or almost glabrous; racemes long (25 to 30 cm.), many-flowered, rather loose; pedicels divergent, stout, 10 mm. long, densely pubescent with short, spreading hairs; calyx slightly gibbous, loosely pubescent, the upper lip longer than the lower, both narrow, entire, attenuate; corolla 12 mm. long, dull bluish tinged with yellow, the banner with a large darker spot; pods ascending, stout, 35 mm. long and 35 mm. wide or less, densely hirtellous, 5 to 7-seeded; mature seeds not seen.

Type in the U. S. National Herbarium, no. 562220, collected on the lower part of White Mountain Peak, July 6, 1895, by E. O. Wooton. Altitude 2,340 meters.

ADDITIONAL SPECIMENS EXAMINED: Gilmores Ranch, on Eagle Creek, July 14, 1895, *Wooton*; Gilmores Ranch, July 29, 1901, *Wooton*; Ruidoso Creek, July 5, 1895, *Wooton*.

The plant is known only from the open meadows or parks which are so numerous on the timbered slopes of White Mountain Peak. The largest of our New Mexican lupines, it is a conspicuous feature of the vegetation where it occurs. While related to *L. plattensis*, it may be distinguished by its larger, acute leaves and the much larger size of the plants.

***Petalostemum prostratum* Wooton & Standley, sp. nov.**

Stems slender, prostrate, 60 cm. long or less, glabrous, with numerous orbicular, reddish brown glands; leaves long-petioled, the leaflets mostly 7, glabrous, glaucous, glandular-dotted, cuneate-oblongate, nearly sessile, rounded at the

apex; racemes rather densely many-flowered, long-peduncled, about 5 cm. long; flowers sessile; calyx angled, glabrous, straw colored, with a few pellucid, yellowish glands, the lobes lanceolate, green, attenuate, silky-pubescent along the margins; corolla rose purple, about 8 mm. long; stamens 6; fruit glabrous, 3.5 mm. long, semiorbicular in outline.

Type in the U. S. National Herbarium, no. 370697, collected near Albuquerque in 1909 by Winnie Harward (no. 17).

ADDITIONAL SPECIMENS EXAMINED: Near Belen, August 1, 1906, *Wooton*.

This is so unlike all other species of the genus that it can scarcely be confused with any. The habit alone is sufficient to distinguish it. In general appearance it much more closely resembles certain species of *Parosela*, but the structure of the flower and number of stamens makes it impossible to place it with them.

***Phaseolus dilatatus* Wooton & Standley, sp. nov.**

Perennial from a thickened root; stems long, slender, twining, glabrous or sparingly puberulent; stipules small, lanceolate; petioles slender, equaling or longer than the leaflets, these linear-lanceolate to triangular-ovate, entire, or dilated and with 2 small rounded lobes at the base, obtuse, bright green, scaberrulous, ciliolate; peduncles slender, somewhat exceeding the leaves, 5 to 12 cm. long; pedicels 4 mm. long or less, sparingly puberulent; calyx puberulent, with rounded lobes; bracts minute, elliptic-oblong; corolla 10 to 12 mm. long; pods about 20 mm. long and 5 mm. broad, stout, slightly curved, nearly glabrous, with a slender style 1.5 mm. long.

Type in the U. S. National Herbarium, no. 138616, collected in the Mogollon Mountains August 30, 1881, by Dr. H. H. Rusby. Another specimen is in the herbarium of Dr. E. L. Greene, collected in the Burro Mountains in June, 1881, by Doctor Rusby.

This suggests *P. grayanus*, but the leaflets are not lobed as in that species, the peduncles are shorter, the pod is nearly glabrous and smaller, and the style is long and slender.

***Phaseolus grayanus* Wooton & Standley, sp. nov.**

Phaseolus wrightii A. Gray, Pl. Wright. 2: 33. 1853, not A. Gray, op. cit. 1: 43. 1852.

Perennial with long, slender, climbing stems, these sparingly puberulent; stipules small, triangular-lanceolate; petioles one-half to two-thirds as long as the leaflets; leaflets deeply 3-lobed, at least the terminal one, the lobes narrowly oblong or rhombic, blunt, bright green, thin, nearly glabrous, but puberulent along the veins; peduncles much longer than the leaves, 10 to 25 cm. long, slender, glabrous or puberulent, pubescent about the flowers; flowers few, distant, on pedicels 5 mm. long or less; calyx puberulent, the lobes broadly rounded, ciliate; corolla purplish, 12 to 15 mm. long; pods broad, 25 to 30 mm. long and 8 or 9 mm. wide, curved, densely soft-pubescent, acute, with a very short, stout style.

Type in the U. S. National Herbarium, no. 232982, collected in the San Luis Mountains, September 5, 1893, by Dr. E. A. Mearns (no. 2124).

ADDITIONAL SPECIMENS EXAMINED: San Luis Mountains, alt. 1,720 meters, 1893, *Mearns* 2534; Horseshief Canyon, near Fort Bayard, alt. 2,100 meters, November 9, 1905, *Blumer* 162; Mogollon Creek, alt. 2,400 meters, July 18, 1903, *Metcalf* 259; Mangas Springs, August, 1901, *Metcalf*; 1851, *Wright* 952.

The species also occurs in Arizona.

Our plant has always been referred to *P. wrightii*. Doctor Gray, in *Plantae Wrightianae*, speaks of Wright's specimen, stating that it differs from the Texas plant in certain particulars and that the description of that plant must be modified. The Texan plant, true *P. wrightii*, differs from ours in having

smaller, usually entire, more pubescent leaflets, much shorter peduncles, glabrate pods, and a long, slender style.

Phaseolus metcalfei Wooton & Standley, nom. nov.

Phaseolus retusus Benth. Pl. Hartw. 11. 1839, not Moench.

We have assigned the specific name in honor of Mr. J. K. Metcalfe, late of Mangas Springs, New Mexico. Mr. Metcalfe was the first to introduce this plant into cultivation, and it has been popularly known as the Metcalfe bean. It has proved of some value as a forage plant in the Southwest and has been treated of in some of the Department of Agriculture publications under this name.

Phaseolus tenuifolius (A. Gray) Wooton & Standley.

Phaseolus acutifolius tenuifolius A. Gray, Pl. Wright. 2: 33. 1853.

In *P. acutifolius* the leaflets are triangular-lanceolate or ovate, not much longer than the peduncles, while in *P. tenuifolius* they are elongated-linear to linear-oblong, and about twice as long as the peduncles. The latter, too, is usually a much larger, taller plant.

Psoralea megalantha Wooton & Standley, sp. nov.

A low perennial, 10 cm. high or less; stems very short; petioles equaling or twice as long as the leaflets, sericeous, also with a few spreading hairs; leaflets usually 6, obovate, 27 mm. long or less, cuneate at the base, rounded at the apex, densely sericeous beneath, sparingly sericeous above, dull green; peduncles stout, 20 mm. long or shorter, sericeous; bracts lanceolate or lance-ovate, 11 mm. long or less, acute or somewhat acuminate, present only at the base of the inflorescence; flowers rather few, nearly capitate, on pedicels 3 mm. long; calyx about 18 mm. long, hirsute, the lobes nearly equal, linear, acute, equaling or shorter than the tube; corolla 20 mm. long.

Type in the U. S. National Herbarium, no. 368979, collected at Aztec, May 18, 1899, by C. F. Baker (no. 440).

The collection was distributed as *P. mephitica* S. Wats., and it is related to that species. The flowers, however, are twice as large in our plant, the inflorescence subcapitate instead of elongated, and the pubescence mostly appressed instead of spreading or retrorse.

Robinia rusbyi Wooton & Standley, sp. nov.

Shrub with stout, nearly glabrous, reddish brown branches; spines stout, straight, 15 mm. long or less; rachis of the leaves slender, minutely puberulent or glabrate; leaflets oval or broadly oblong, rounded and mucronate at the apex, rounded or slightly narrowed at the base, grayish green, glabrous above, minutely strigillose beneath; racemes many-flowered, short-peduncled, pubescent; pedicels stout, densely glandular-pubescent; corolla 20 mm. long or more; calyx lobes ovate, acute; pods 45 to 85 mm. long, 18 mm. broad or less, glabrous, purplish.

Type in the U. S. National Herbarium, no. 690238, collected on the Mogollon Road 15 miles east of Mogollon, August 8, 1900, by E. O. Wooton.

ADDITIONAL SPECIMENS EXAMINED: Eagle Peak, August 2, 1900, *Wooton*; Burro Mountains, alt. 2,250 meters, 1903, *Metcalfe* 189; Deep Creek, August 9, 1900, *Wooton*; head of Carrizo Creek, Mescalero Reservation, alt. 2,220 meters, 1903, *Plummer*.

The last specimen cited may not belong here, for the leaflets are narrower, longer, and acute. It certainly is not *Robinia neomexicana*. *R. rusbyi* differs from that species conspicuously in its glabrous fruit and merely glandular-pubescent peduncles and pedicels.

Dr. H. H. Rusby seems to have been the first to observe this shrub and called our attention to it. He collected it somewhere about the Mogollon Mountains in 1880 or 1881.

Trifolium longicaule Wooton & Standley, sp. nov.

Perennial; stems slender, reclining, glabrous, much branched, 60 cm. long or less; petioles slender, several times as long as the leaflets; stipules narrow, attenuate, entire or nearly so; leaflets obovate to elliptic-oblong, rounded or obtuse at the apex, cuneate at the base, bright green, glabrous, prominently veined, the veins slightly prolonged beyond the low teeth; peduncles slender, 40 to 60 mm. long, nearly glabrous but with a few long crinkled hairs, often tomentulose just below the head; involucre short, one-third to one-half as long as the flowers, of linear-lanceolate, subulate bracts distinct almost to their bases; calyx one-half or two-thirds as long as the corolla, the teeth linear-subulate, almost twice as long as the tube; corolla pale purplish, 11 mm. long or less, the banner emarginate.

Type in the U. S. National Herbarium, no. 562146, collected along Eagle Creek at Gilmores Ranch in the White Mountains, August 25, 1907, by E. O. Wooton and Paul C. Standley. Altitude 2,220 meters. The plants grew in gravelly soil at the very edge of the water.

ADDITIONAL SPECIMENS EXAMINED: White Mountains, alt. 1,890 meters, 1897, *Wooton* 235; Cold Spring Canyon, August 17, 1899, *Wooton*.

This is related to *T. lacerum*, the flowers being of the same size, but the involucre is more deeply cleft and the segments much narrower, while the peduncles are more or less pubescent instead of glabrous.

Vicia melilotoides Wooton & Standley, sp. nov.

Perennial from a long, slender root; stems slender, angled, soft-pubescent, 80 cm. long or less, ascending or prostrate; leaflets 10 to 16, linear-oblong or linear-lanceolate, 25 mm. long or less, obtuse and mucronate or acute, bright green, rather thick, finely veined, loosely pubescent on both surfaces, becoming nearly glabrous in age; racemes many-flowered (15 to 20 or more), on peduncles as long as or often much shorter than the rachis; pedicels 1.5 mm. long or less; calyx 1.5 mm. long, at first loosely pubescent, glabrate in age; corolla 7 mm. long, creamy white; pods 25 to 30 mm. long, glabrous, about 8-seeded.

Type in the U. S. National Herbarium, no. 498706, collected at Winsors Ranch in the Pecos River National Forest, July 16, 1908, by Paul C. Standley (no. 4364). Altitude 2,520 meters. The plants were abundant all through this region on open, stony hillsides in the Transition Zone.

ADDITIONAL SPECIMENS EXAMINED: Mountains west of Las Vegas, 1881, *Vasey*; Upper Pecos River, July 27, 1898, *Maltby & Coghill* 108; Coolidge, June 16, 1887, *Tracy* 255; Hillsboro Peak, alt. 3,000 meters, 1904, *Metcalf* 1245; Mogollon Creek, alt. 2,400 meters, 1903, *Metcalf* 266; 1851, *Wright* 943; Middle Fork of the Gila, August 5, 1900, *Wooton*; McClures Ranch, August 2, 1900, *Wooton*; near Cloudcroft, July 31, 1899, *Wooton*; White Mountains, alt. 2,100 meters, 1897, *Wooton* 288.

This has long been confused with *V. pulchella*, which it closely resembles in general appearance. The flowers, however, are white, instead of blue as in that species, and much more numerous, while the peduncles are shorter, and the calyx less pubescent. Both species are found in the same region in the White Mountains, where they are easily distinguished in the field.

GERANIACEAE.

Geranium eremophilum Wooton & Standley, sp. nov.

Perennial from a slender, branched caudex; stems erect or ascending, very slender, 30 cm. long, much branched, minutely retrorse-pubescent, not glandular; leaf blades somewhat pentagonal in outline, 35 to 45 mm. broad, in age glabrate, when young sparingly pubescent, 3 or 5-lobed, the divisions with abruptly acuminate, ovate teeth; pedicels slender, glandular; sepals oblong-lanceolate, about 10 mm. long, ending in an awn 2 mm. long, more or less pubescent, not glandular; petals purplish pink, obovate, retuse, 15 to 20 mm. long; style column canescent or rarely glandular; carpel bodies sparingly hirsute; seeds reticulate.

Type in the U. S. National Herbarium, no. 233003, collected in the San Luis Mountains, September 5, 1893, by Dr. E. A. Mearns (no. 2142).

ADDITIONAL SPECIMENS EXAMINED: San Luis Mountains, September 26, 1893, *Mearns* 2443; San Luis Mountains, September 11, 1893, *Mearns* 2194; Organ Mountains, alt. 1,800 meters, September 23, 1906, *Wooton & Standley*.

It seems undesirable to describe any additional species of *Geranium* in this group where the species are so closely related and so poorly known. These plants, however, could not be placed under any name in Dr. Rydberg's recent revision of the genus without stretching specific limits more than seems reasonable. This species is near *G. fremontii* and *G. caespitosum*, but is more slender, has paler, rather larger flowers, scarcely any glandular pubescence, and nearly glabrous leaves with broader, blunter segments.

Geranium lentum Wooton & Standley, sp. nov.

Perennial with a stout caudex; stems weak, slender, ascending or spreading, 30 to 60 cm. long, branched, densely glandular-villous; leaf blades reniform-pentagonal, 35 to 45 mm. wide, dull green, thin, glandular-hirsute on both surfaces, 5-parted, the divisions cuneate and with rounded obtuse teeth; petioles very long and slender, densely glandular; pedicels long and slender, glandular; sepals elliptic-oblong, tipped with an awn less than 1 mm. long, glandular-pilose; petals white, 7 to 10 mm. long; style column densely glandular; seeds finely reticulate.

Type in the U. S. National Herbarium, no. 561079, collected on the West Fork of the Gila, August 7, 1900, by E. O. Wooton.

ADDITIONAL SPECIMENS EXAMINED: Craters, Valencia County, July 28, 1906, *Wooton*; Rio Zuni, July 28, 1892, *Wooton*; West Fork of the Gila, August 6, 1900, *Wooton*; Middle Fork of the Gila, August 5, 1900, *Wooton*.

The specimens cited here have passed as *G. wislizeni*, a Mexican species. Apparently none were examined in the preparation of the Geraniaceae for the North American Flora, for no description in that work agrees with our plant. *Geranium wislizeni* is the plant to which this is most closely related, but that lacks the dense glandular pubescence characteristic of our plant, being glandular only on the style column.

LINACEAE.

Cathartolinum vestitum Wooton & Standley, sp. nov.

Annual, 15 to 25 cm. high; stems slender, striate, densely puberulent, simple below, branched above the middle, the branches strongly ascending; leaves small, linear-lanceolate, glandular-denticulate, acute, thick, glaucous; bracts linear-lanceolate, 3 to 4 mm. long, aristate-tipped; floral branches slender, 6 to 35 mm. long; sepals lanceolate, 5 or 6 mm. long, acute, bristle-tipped, with many glandular teeth on the margins, puberulent on the nerves; petals bright

yellow, 13 to 15 mm. long; capsules oblong-ovoid, 4 to 5 mm. long, shorter than the sepals.

Type in the U. S. National Herbarium, no. 562282, collected at Mangas Springs, August, 1901, by O. B. Metcalfe.

The only species with which this can be confused is *C. puberulum*, but that is a short, stout plant with short, thick pedicels and much shorter petals. Our plant, too, is simple below, while *C. puberulum* is invariably branched.

Evidently related to this and probably the same is Doctor Mearns's no. 47, collected in the Carrizalillo Mountains in 1892.

ZYGOPHYLLACEAE.

***Kallstroemia laetevirens* Thornber, sp. nov.**

Plants semierect, 30 to 50 cm. tall, branched from the base; stems 30 to 60 cm. long, straight, sparingly pubescent throughout, beset above with scattered stiff hairs; stipules 5 to 6 mm. long, subulate to linear-lanceolate, hispid; leaves 30 to 55 mm. long, the petioles mostly equal to the lowest leaflets; leaflets 4 to 6 pairs, 9 to 20 mm. long, acutish, oblong to elliptical, glabrous above, pubescent with appressed hairs beneath; margins of leaflets prominently ciliate; peduncles in fruit 15 to 40 mm. long, equaling or exceeding the subtending leaves, thickened above, appressed-pubescent and with scattered stiff hairs on the upper half, in age spreading or reflexed; sepals subulate to linear-lanceolate, 6 to 8 mm. long, densely hispid with long, yellowish or tawny hairs; petals bright yellow, 7 to 12 mm. long, rather showy, exceeding the sepals; fruit finely canescent, the beak 5 to 8 mm. long, columnar, grooved, pubescent, often twice the length of the fruit body; nutlets 8 to 10, 3.5 to 4 mm. long, sharply tuberculate on the back, faintly reticulate on the faces.

Type in the U. S. National Herbarium, no. 660420, collected on Hanover Mountain, New Mexico, July 31, 1911, by J. M. Holzinger.

This well marked species differs from *K. parviflora* in its more erect habit, and also in having larger leaflets, leaves, and flowers. It differs from *K. intermedia* in its habit of growth, in its longer peduncles, and in the stems being very pilose.

ADDITIONAL SPECIMENS EXAMINED: ARIZONA—Fort Huachuca, 1894, *Wilcox* 295; without locality, 1869, *Palmer*; Empire Ranch, 1902, *Griffiths & Thornber* 284. NEW MEXICO—Lincoln County, 1898, *Skehan* 52; Organ Mountains, alt. 1,360 meters, 1897, *Wooton* 423; Fort Bayard, 1905, *Blumer* 23; Kingston, alt. 2,000 meters, 1904, *Metcalfe* 1197; San Luis Mountains, 1893, *Mearns* 2202.

RUTACEAE.

***Eutosma purpureum* Wooton & Standley sp. nov.**

Perennial from a long, thick tap-root; stems very numerous, erect, sparingly branched, 30 cm. high or less, densely punctate with slightly raised glands; leaves linear, 15 mm. long or less, obtuse, thick, abundantly punctate, sessile; pedicels 1.5 mm. long or less; calyx lobes rounded-ovate, obtuse, less than 1 mm. long, purple; petals ovate, obtuse, dull reddish purple except near the base, there yellowish; fruit nearly sessile, 5 mm. high and 6 mm. wide at the top, the carpels strongly diverging, glabrous, conspicuously punctate.

Type in the U. S. National Herbarium, no. 560630, collected on an arid, rocky slope at Bishops Cap at the south end of the Organ Mountains, April 4, 1903, by E. O. Wooton.

ADDITIONAL SPECIMENS EXAMINED: Bishops Cap, March 30, 1905, *Wooton*; Organ Mountains, September 23, 1906, *Wooton & Standley*; Carrizalillo Mountains, April 20, 1892, *Mearns* 118; 3 miles south of Hillsboro, alt. 1,650 meters, June 6, 1904, *Metcalf* 1293; Mangas Springs, alt. 1,380 meters, 1903, *Metcalf* 784.

Other specimens have been seen from western Texas and southern Arizona.

Doctor Gray, in the second part of *Plantae Wrightianae*, mentions this as "*Rutosma texanum*, var. *corolla purpurea*." His specimens came from "hills near El Paso." *Rutosma texanum*, the other species of the Southwest, occurs in southwestern Texas and adjoining Mexico. It has yellow petals much larger than those of *R. purpureum*, and the carpels are erect instead of spreading.

POLYGALACEAE.

Polygala neomexicana Wooton & Standley, sp. nov.

Stems slender, erect or ascending, 20 to 35 cm. high, flexuous, simple or branched above, cinereous-puberulent; leaves numerous, thin, bright green, nearly sessile, sparingly puberulent or glabrate, lanceolate or elliptic, 15 to 30 mm. long, acute; inflorescence of few-flowered racemes; flowers soon pendulous, 6 mm. long, on pedicels 2 mm. long; perianth early deciduous; wings obovate, ciliolate, the keel naked; mature fruit oval or broadly oblong, about 10 mm. long, emarginate, the sinus closed, the faces puberulent, the margins ciliate, the seeds narrowly obovoid, hairy, the caruncle lobes forming processes one-third to one-half the length of the seed.

Type in the U. S. National Herbarium, no. 497803, collected on Miller Hill, Grant County, September 8, 1897, by O. B. Metcalfe.

ADDITIONAL SPECIMENS EXAMINED: Guadalupe Canyon, August 16, 1892, *Mearns* 692; San Luis Mountains, September 5, 1893, *Mearns* 2139.

We have also seen specimens from southeastern Arizona.

While closely related to *P. puberula*, our plant differs decidedly in its taller, more slender stems, larger, broader, thinner, nearly glabrous leaves, larger flowers, larger, puberulent fruit, and different seeds. The flowers appear to be yellow or white, but possibly they have faded in the herbarium.

EUPHORBIACEAE.

Chamaesyce chaetocalyx (Boiss.) Wooton & Standley.

Euphorbia fendleri chaetocalyx Boiss. in DC. Prodr. 15²: 39. 1862.

In his original description Boissier says: "Ab *E. Fendleri* habitu diversa videtur, sed auctoritate cl. Engelm. qui formas intermedias observasse monuit cum ea junxi." Continued observation in the field compels us to regard this as a distinct species. It differs decidedly from *C. fendleri* in its erect rather than prostrate stems, its narrow, acute leaves, its elongated internodes, and its narrow appendages.

Chamaesyce micromera (Boiss.) Wooton & Standley.

Euphorbia micromera Boiss. in DC. Prodr. 15²: 44. 1862.

Chamaesyce serrula (Engelm.) Wooton & Standley.

Euphorbia serrula Engelm. in Torr. U. S. & Mex. Bound. Bot. 188. 1859.

Croton eremophilus Wooton & Standley, sp. nov.

Perennial, suffrutescent at the base, 35 cm. high or less; stems slender, erect, densely stellate, corymbosely branched above; petioles 25 to 30 mm. long, slender; lower leaf blades oblong or oval, obtuse, 35 to 45 mm. long, grayish beneath with dense, stellate pubescence, green above and with a fine, rather

sparse, or at least not dense, stellate pubescence; upper leaves lanceolate or narrowly oblong, acute; flowers densely clustered, on stout pedicels 5 mm. long; sepals 5 or 6 mm. long, oblong, acute, densely stellate-pubescent; staminate flowers with oblong, ciliate, acute petals; pistillate flowers apetalous; styles 3, bipartite; seeds oblong, brownish gray, 4.5 mm. long, with a stipitate caruncle.

Type in the U. S. National Herbarium, no. 234163, collected by Dr. E. A. Mearns at Dog Spring in the Dog Mountains, September 16, 1893 (no. 2336).

ADDITIONAL SPECIMENS EXAMINED: Parkers Well, July 19, 1901, *Wooton*.

Similar to *C. corymbulosus*, but the two surfaces of the leaves are dissimilar in color, the upper being greener and much less densely pubescent; the upper leaves, too, are acute instead of obtuse, the petals are acute, and the sepals longer.

***Croton luteovirens* Wooton & Standley, sp. nov.**

A slender, branched annual, 80 cm. high or less; stems glabrous, yellowish; petioles slender, glabrous, one-third to one-half as long as the blades, these oblong-lanceolate, glabrous, yellowish green, acute; flowers few, scattered, only a few in each raceme; sepals lanceolate, with a few stellate hairs, acute; petals wanting; capsules sparingly stellate-pubescent when young, soon glabrous; seeds broadly oval, 3 mm. long, light and dark brown striped, with an inconspicuous caruncle.

Type in the U. S. National Herbarium, no. 690232, collected on the Rio Gila, August 15, 1902, by E. O. Wooton.

The plant is very abundant in this region, growing with the related *C. texensis*. Patches of the two are distinguishable at a distance because of their different color. *Croton texensis* is stellate-pubescent throughout, while our plant is glabrous; thus the two may be separated at a glance.

***Tithymalus altus* (Norton) Wooton & Standley.**

Euphorbia alta Norton, Rep. Mo. Bot. Gard. 11: 108. 1899.

***Tithymalus chamaesula* (Boiss.) Wooton & Standley.**

Euphorbia chamaesula Boiss, Cent. Euphorb. 38. 1860.

***Tithymalus luridus* (Engelm.) Wooton & Standley.**

Euphorbia lurida Engelm. Proc. Amer. Acad. 5: 173. 1861.

***Tithymalus mexicanus* (Engelm.) Wooton & Standley.**

Euphorbia dictyosperma mexicana Engelm. in Torr. U. S. & Mex. Bound. Bot. 191. 1859.

Euphorbia mexicana Norton, Rep. Mo. Bot. Gard. 11: 105. 1899.

***Zygophyllidium delicatulum* Wooton & Standley, sp. nov.**

A slender annual, sparingly branched; stems erect or ascending, green, glabrous, sometimes purplish; leaves mostly alternate, the floral ones opposite or ternate, ovate to oblong, acute or obtuse, 15 to 30 mm. long, thin, bright green, finely serrulate, rounded to cuneate at the base; petioles slender, about as long as the blades; stipules mostly obsolete; flowers solitary, or clustered in the axils; pedicels 2 to 4 mm. long; involucre glabrous, with 5 glands; appendages obovate, greenish or purplish white; capsules glabrous, 4 mm. in diameter; seeds ovoid, terete, papillose, not carunculate.

Type in the U. S. National Herbarium, no. 562959, collected on Mineral Creek, Sierra County, at an altitude of 2,250 meters, September 26, 1904, by O. B. Metcalfe (no. 1414).

ADDITIONAL SPECIMENS EXAMINED: Tularosa Creek, August 18, 1899, *Wooton*; Ruidoso Creek, alt. 2,100 meters, June 30, 1895, *Wooton*.

A very different plant from any of the other species of the genus, differing most noticeably in the width and shape of the leaf blades and the glabrous involucre.

Zygophyllidium exstipulatum (Engelm.) Wooton & Standley.

Euphorbia exstipulata Engelm. in Torr. U. S. & Mex. Bound. Bot. 189. 1859.

ANACARDIACEAE.

Rhus choriophylla Wooton & Standley, sp. nov.

Low shrub, 1 or even 2 meters high, with few branches; stems stout, the younger ones purplish, finely pubescent; leaflets 3 or 5, ovate, abruptly acuminate, 30 to 60 mm. long, thick and coriaceous, glabrous, pale green, rather dull on the upper surface, mostly unequally rounded at the base; rachis finely puberulent; terminal leaflet larger and broader than the others; flowers in dense panicles much shorter than the leaves; bracts ovate, acuminate, densely pubescent; flowers almost sessile; fruit spherical, 5 mm. in diameter, orange, densely hirtellous.

Type in the U. S. National Herbarium, no. 560279, collected in Guadalupe Canyon, on the Mexican boundary, near the southwest corner of New Mexico, August 16, 1892, by Dr. E. A. Mearns (no. 699).

ADDITIONAL SPECIMENS EXAMINED: Guadalupe Canyon, 1893, *Mearns* 2524; Pena Blanca, November 30, 1901, *Mae Gilmore*; San Andreas Mountains, February 9, 1902, *Wooton*.

In addition to the specimens cited, we have seen others from western Texas, southern Arizona, and northern Chihuahua.

Evidently this is closely related to *R. virens* Lindh., but the vegetative characters are noticeably different, the leaflets being uniformly broader, rounded at the base, abruptly acuminate, glabrous, and of about the same shade of pale green on both surfaces. The leaflets, too, are fewer.

ACERACEAE.

Acer brachypterum Wooton & Standley, sp. nov.

Tree of medium size, with spreading, smooth, brownish, slender branches; young twigs finely and densely pubescent; petioles usually shorter than the blades, mostly densely and finely velvety pubescent even in age; leaf blades averaging 5 cm. long and 6 to 8 cm. broad, 5-lobed, all the lobes divergent, the two basal ones much smaller than the others or sometimes wanting; leaves cordate or truncate at the base, dull green and glabrous above, paler and pubescent beneath, thick, the lobes triangular-lanceolate or oblong-lanceolate, entire or with one or two low, rounded, lateral lobes, acutish; flowers not seen; calyx persistent; inflorescence short and few-fruited; pedicels slender, 20 to 35 mm. long, pubescent; body of the fruit turgid, glabrous, strongly reticulate, the wings small, 15 mm. long and 10 mm. wide or smaller, glabrous, strongly veined, reddish.

Type in the U. S. National Herbarium, no. 560270, collected in the San Luis Mountains, July 19, 1892, by Dr. E. A. Mearns (no. 535).

ADDITIONAL SPECIMENS EXAMINED: San Luis Mountains, 1892, *Mearns* 71, 569; San Luis Mountains, alt. 1,800 meters, October 1, 1893, *Mearns* 2481.

A species near *A. grandidentatum*, but the leaves have very different lobes and are more densely pubescent, and the wings of the fruit are much shorter.

A note by Doctor Mearns on one of the sheets says: "This is the hard maple of this region. I also saw it in the Mogollon Mountains of Arizona, where the leaves turned red in October. Usually it is a small tree in ravines or canyons of the mountains. There is a photograph of the tree in the Report¹ which grew

¹ Report of the Boundary Commission upon the Survey and Re-marking of the Boundary between the United States and Mexico west of the Rio Grande, pl. facing p. 15. 1898.

in a moist canyon (Turkey Canyon) on the west side of the San Luis Mountains. It is the largest seen, measuring 225 cm. in circumference one meter above the ground. The trunk is of about the same size for 6 meters, when it divides into 3 branches of nearly equal size. The height was estimated at about 18 meters. There are several trees in the neighborhood which approach this one in height."

The tree also occurs in southeastern Arizona. Possibly the Mogollon Mountain specimens mentioned above are true *Acer grandidentatum*.

MALVACEAE.

Malvastrum micranthum Wooton & Standley, sp. nov.

Stems numerous, stout, erect, 20 cm. high or less, much branched above, the branches ascending, densely and finely stellate-pubescent; leaves mostly about 12 mm. long, rarely as much as 18 mm., 3-cleft, the divisions all of about the same length, most of them deeply 3-lobed, the lobes oblong-oblancoate, entire, rounded at the apex, densely stellate-pubescent beneath, sparingly so above; flowers few, only 3 to 5, approximate at the end of each branch; pedicels stout, 3 mm. long; calyx 3 to 4 mm. high, the lobes ovate-lanceolate, acute, longer than the tube; petals orange, 8 mm. long or shorter; fruit depressed; carpels 9 or 10, finely stellate-pubescent, not cuspidate, semioblong, faintly reticulate on the inner surface; seeds solitary, filling the carpel.

Type in the U. S. National Herbarium, no. 561154, collected by E. O. Wooton near Tiznitzin, August 4, 1904 (no. 2673).

ADDITIONAL SPECIMENS EXAMINED: Mountains southeast of Patterson, August 16, 1900, *Wooton*.

A very distinct species because of its small flowers and small, peculiarly divided leaves.

Sphaeralcea arenaria Wooton & Standley, sp. nov.

A low perennial, 30 cm. high or less, from a thick, woody root; stems slender, erect or spreading, much branched in age, densely stellate-pubescent with a rather grayish, close pubescence; petioles one-third as long as the blades or less; blades lanceolate, subhastate, rather obtuse, broadly cuneate or rounded at the base, about 25 mm. long, densely and finely grayish stellate pubescent on both surfaces; flowers axillary, solitary; leaves of the inflorescence but little reduced; pedicels slender, 5 to 10 mm. long; calyx 7 or 8 mm. high, the lobes lanceolate, acute, densely stellate-pubescent; petals obovate, emarginate, 12 mm. long, orange red; carpels numerous, 2-ovuled, 1-seeded, 5 or 6 mm. high, with a slender beak more than 0.5 mm. long, smooth above, reticulate below, densely stellate-pubescent on the back.

Type in the U. S. National Herbarium, no. 330390, collected by E. O. Wooton on the White Sands, Otero County, July 17, 1897 (no. 165). Altitude, 1,200 meters.

ADDITIONAL SPECIMENS EXAMINED: Albuquerque, *Herrick*; Providencia Lake, July 3, 1900, *Wooton*; mesa west of Organ Mountains, August 26, 1899, *Wooton*; near Suwanee, August 1, 1906, *Wooton*; White Sands, August 31, 1904, *Wooton* 2662; between Tularosa and Mescalero Agency, June 22, 1895, *Wooton*.

A common plant of the sandy mesas of southern New Mexico, coming into flower usually in late summer. It is low, with many spreading branches. It is similar to *Sphaeralcea subhastata*, but is finely instead of coarsely pubescent, and has thinner, mostly less lobed leaves, and the flowers are on long and slender pedicels rather than short, stout ones.

Doctor Coulter's *Sphaeralcea subhastata* was a composite species, judging from material in the National Herbarium. One specimen of Wright's collecting which he has named "*S. subhastata*, n. sp.," is evidently our *Sphaeralcea arenaria*. Another, however, marked in the same way is what we take to be *S. subhastata*. The original description points rather plainly to the second plant.

***Sphaeralcea tenuipes* Wooton & Standley, sp. nov.**

Perennial from a thick, woody root; stems 30 cm. high or less, very slender, much branched at the base, simple above, erect or ascending, sparingly stellate-pubescent with scattered, yellowish hairs; petioles as long as the blades or shorter; blades pedate, the lobes cuneate-oblongate, obtuse, 10 to 15 mm. long, entire or with 1 or 2 obtuse lateral lobes, rather bright yellowish green, sparingly stellate-pubescent on both surfaces; flowers in terminal racemes, solitary, rather distant, on slender pedicels 7 to 22 mm long; bracts linear-subulate, reddish; calyx 8 mm. high, cleft half or two-thirds the way to the base, the lobes lanceolate, attenuate, densely stellate-pubescent; petals cuneate-oblongate to narrowly obovate, obtuse or retuse, 15 mm. long, 5 to 7 mm. wide, orange red.

Type in the U. S. National Herbarium, no. 564301, collected on Tortugas Mountain southeast of Las Cruces, May 6, 1906, by Paul C. Standley.

ADDITIONAL SPECIMENS EXAMINED: Tortugas Mountain, alt. 1,320 meters, September 1, 1908, *Wooton & Standley*; Tortugas Mountain, April 22, 1894, March 2, 1902, August 27, 1894, August 29, 1902, *Wooton*; between El Paso and Monument 53, September, 1892, *Mearns* 992.

In general appearance this is similar to *S. pedata*, but it is less pubescent and greener, the petals are narrower, and the flowers are solitary on long, slender pedicels instead of fascicled and on short, stout pedicels.

This may be *Sphaeralcea pedata angustiloba* A. Gray.¹ We have seen no material of that subspecies, but the description seems to define a different plant.

Sphaeralcea tenuipes is rather common among the rough limestone rocks on Tortugas Mountain. It is a handsome plant, with its almost naked, slender racemes of bright colored flowers. Doubtless it occurs in similar situations about El Paso, Texas, and in northern Chihuahua.

LOASACEAE.

***Mentzelia asperula* Wooton & Standley, sp. nov.**

Annual with erect, branching stems 30 to 50 cm. high, at first scabrous but becoming smooth below, the upper branches strongly ascending, the lower ones divergent then erect; petioles 1 cm. long or less; leaf blades narrowly ovate to lanceolate, coarsely and irregularly serrate-dentate, sometimes lacinately 2 to 4-lobed near the base, hispid with barbed hairs; flowers solitary, appearing axillary, really terminal, the stem branching below after the flower is well grown, sessile; calyx tube terete, short-clavate, elongating in fruit, densely hispid with barbed hairs, the lobes at first narrowly lanceolate, acuminate, becoming subulate, persisting on the fruit, 3 to 5 mm. long; petals 5, ovate to obovate, 6 to 8 mm. long, short-apiculate, orange, deciduous; filaments shorter than the petals, none of them dilated; fruit cylindric to long-clavate, 18 to 25 mm. long; seeds about 8, pyriform, obscurely and bluntly angled, gray, with fine, parallel, curved striæ.

¹Proc. Amer. Acad. 22: 292. 1887.

Type in the U. S. National Herbarium, no. 498146, collected on Trujillo Creek, Sierra County, at an altitude of 2400 meters, September 14, 1904, by O. B. Metcalfe (no. 1364).

ADDITIONAL SPECIMENS EXAMINED: NEW MEXICO—Organ Mountains, September 10, 1899, *Wooton*. ARIZONA—Sonoita Valley, 1874, *Rothrock* 642; near Fort Huachuca, 1894, *Wilcox* 431; Bowie, 1884, *Jones* 4308; pass of the Chiricahua Mountains, 1851, *Wright* 1981. TEXAS—Limpio Canyon, 1889, *Nealley* 659. MEXICO—Near Durango, 1896, *Palmer* 484.

The material from southern New Mexico and Arizona has mostly been referred to *Mentzelia aspera*, a West Indian species with larger flowers, the outer row of filaments petaloid, the leaves acuminate and with more finely toothed margins and longer petioles. The Mexican representatives have been referred to *Mentzelia hispida* Willd., which has much larger flowers and leaves. Some of the Texas specimens have been called *Mentzelia oligosperma*, but that is a tuberous-rooted perennial with different leaves and habit.

***Mentzelia monosperma* Wooton & Standley, sp. nov.**

Tuberous-rooted perennial with divaricately branched stems 30 to 40 cm. high, forming a plant of as great or greater diameter; cortex on young stems yellowish green, hispid, becoming smooth, white, and papery; leaves broadly ovate in outline, obscurely 3-lobed, with a few coarse, sinuate teeth, broadly cuneate at the base, on petioles 2 or 3 mm. long, almost sessile above, acute or obtuse, bright green; flowers solitary, resembling those of *M. oligosperma* but smaller and with broader, shorter petals and calyx lobes; outer row of filaments about twice as wide as the inner ones; fruit clavate, woody when mature, about 1 cm. long, with a single large seed 3 mm. long, this elliptic-oblong more or less triangular in cross section, dull brownish, finely striate with undulating lines.

Type in the U. S. National Herbarium, no. 690230, collected in the Organ Mountains, August 29, 1894, by E. O. Wooton.

ADDITIONAL SPECIMENS EXAMINED: Thirty-five miles west of Roswell, 1900, *Earle* 521.

In root and seed characters this plant is very similar to *Mentzelia oligosperma*, to which it has been referred. The flowers and habit of the plant are different from those of that species. It has been collected only once in the type locality, therefore is probably very rare.

***Nuttallia gypsea* Wooton & Standley, sp. nov.**

Tufted, herbaceous perennial, 20 to 40 cm. high, branching freely above, leafy to the top; cortex white and smooth below, scabrous above; leaves green, oblong in outline, 2 to 4 cm. long, about 1 cm. wide or less, pinnately divided into linear, mostly obtuse segments barely 1 mm. wide, short-petiolate, never clasping or auriculate at the base, rough with scattered, recurved, stout, white, barbed hairs swollen at the bases; flowers small, on short, terminal pedicels, subtended by 1 or 2 small, linear bracts; hypanthium campanulate, 3 to 4 mm. long; sepals ovate-lanceolate, acuminate in bud, about 5 mm. long, becoming triangular-subulate; petals lanceolate, broader than the 5 inner staminodia, pale yellow, tapering to the base, acute, 12 to 15 mm. long, 2 to 3 mm. wide; stamens numerous, the outer filaments somewhat dilated, about as long as the petals, the inner ones shorter; capsules almost hemispheric, about 7 mm. long; seeds numerous, flat, winged, minutely tuberculate.

Type in the U. S. National Herbarium, no. 564614, collected on pure gypsum near Lakewood, August 6, 1909, by E. O. Wooton.

ADDITIONAL SPECIMENS EXAMINED: On gypsum soil on plains 35 miles south of Torrance, August 10, 1909, *Wooton*.

This species seems to be affiliated with *Nuttallia laciniata*, but is much smaller in every way, and the flowers are pale yellow. The time of opening of the flowers is not known. The specimens collected in the morning about 11 o'clock were as wide open as those taken about sundown.

Nuttallia laciniata (Rydb.) Wooton & Standley.

Touterea laciniata Rydb. Bull. Torrey Club 31: 565. 1904.

Nuttallia procera Wooton & Standley, sp. nov.

Perennial herb, 60 to 100 cm. high, slender, strict, sometimes branching at the base; cortex white and papery, smooth except on the young stems; leaves small, sessile, oblong, obtuse, 30 to 50 mm. long, about 5 mm. wide, with 5 to 10 coarse, rounded teeth on each side, very rough with short, stout, white barbed hairs; flowers rather small, on slender, terminal peduncles, or the stems somewhat corymbosely branched above; sepals narrowly lanceolate, abruptly acuminate; petals rather bright yellow, about 1 cm. long, oblanceolate, acute, the 5 staminodia narrower and sometimes short-acuminate; outer filaments somewhat dilated; capsules oblong-cylindric, 10 to 12 mm. long, 6 or 7 mm. in diameter; seeds numerous, disk-shaped, surrounded by a broad wing, white, tuberculate.

Type in the U. S. National Herbarium, no. 516161, collected on the White Sands, August 18, 1907, by E. O. Wooton and Paul C. Standley.

The plant has been collected in the vicinity of the White Sands several times. Wooton's 571, distributed as *Mentzelia pumila?*, is the same species collected on the Sands in 1897. It has also been collected above Tularosa in the White Mountains (Wooton 567 in 1897).

The species is most nearly related to *Nuttallia multiflora*, but is of very different habit, much more slender, and has smaller, less pinnatifid leaves and smaller flowers and fruit.

Nuttallia strictissima Wooton & Standley, sp. nov.

Fifty to 70 cm. high or more; stems simple below, with a few erect branches near the top, whitish, scabrous; lower leaves linear or linear-elliptic, acutish, scabrous, very shallowly dentate, sessile; uppermost leaves linear or linear-lanceolate, reduced and bract-like, crowded, mostly entire, attenuate; calyx lobes about 1 cm. long, very thick, scabrous with short, stiff, whitish hairs, narrowly triangular, attenuate; flowers few; petals 18 to 22 mm. long, linear-oblanceolate, very acute, with as many or twice as many petal-like staminodia; stamens numerous, the filaments of the outer ones broad and flattened; capsules 2 cm. long, 8 mm. in diameter, cylindric, scabrous.

Type in the U. S. National Herbarium, no. 496766, collected on the Arroyo Ranch, near Roswell, in September, 1903, by David Griffiths (no. 5701).

ADDITIONAL SPECIMENS EXAMINED: Twenty miles south of Roswell, alt. 1,080 meters, August, 1900, *Earle* 317.

Related to *N. multiflora*, but distinguished by its strict habit, narrow petals, and the peculiar bract-like upper leaves.

ONAGRACEAE.

Anogra amplexicaulis Wooton & Standley, sp. nov.

Stems stout, reddish, much branched, sparingly hirsute and with a sparse, fine, cinereous pubescence; lower leaves short-petioled, the upper clasping by an auriculate base, oblong-lanceolate, oblong, or triangular-lanceolate, acute, entire or runcinate-toothed near the base, green, puberulent and more or less villous;

calyx tips free; calyx tube slender, 30 to 40 mm. long, villous; sepals 15 to 20 mm. long, sparingly villous; petals white fading pink, about 13 mm. long; pistil slightly exserted; capsules ascending, cylindric, 40 mm. long and 2 or 3 mm. in diameter. villous.

Type in the U. S. National Herbarium, no. 497937, collected by O. B. Metcalfe on a sandbar along the Mimbres River, July 1, 1904 (no. 1054).

Very like *Anogra neomexicana*, but with much smaller flowers, clasping, more pubescent leaves, longer capsules, and more pubescent stems.

***Anogra ctenophylla* Wooton & Standley, sp. nov.**

Biennial, 30 cm. high or less; stems stout, with divergent branches, densely and finely cinereous, often with a few long hairs; leaves 35 to 60 mm. long, short-petiolate or sessile, deeply pinnatifid almost to the midrib, the divisions elliptic-oblong, acute, densely puberulent and more or less hirsute; tips of the calyx lobes free in bud; calyx segments 2 cm. long, densely and minutely cinereous, sparingly hirsute; petals 35 to 40 mm. long, white; pistil shorter than the petals; capsules ascending, cylindric, 35 mm. long, minutely cinereous and hirsute.

Type in the U. S. National Herbarium, no. 564751, collected near Zuni, in 1902, by Mrs. Matilda Coxe Stevenson (no. 99).

ADDITIONAL SPECIMENS EXAMINED: Crawford Ranch, June 21, 1906, *Wooton*; Reserve, July 9, 1906, *Wooton*; Defiance, June 22, 1883, *Marsh* 121; Burro Mountains, alt. 2,100 meters, August 4, 1906, *Blumer* 1827; Ruidoso Creek, August 20, 1897, *Wooton*.

The last two specimens are somewhat doubtful, but probably belong here. The species is related to *Anogra runcinata*, but it has long hairs among the appressed pubescence and its leaves are deeply pinnatifid.

***Anogra engelmanni* (Small) Wooton & Standley.**

Oenothera albicaulis trichocalyx Engelm. Amer. Journ. Sci. II. 34: 335. 1862, not *O. trichocalyx* Nutt.

Anogra pallida engelmanni Small, Bull. Torrey Club 23: 176. 1896.

The type of this came from Las Vegas, New Mexico, collected by Wislizenus in 1846. We have seen only a single additional collection from the State, one gathered by Mr. Geo. L. Fisher near Nara Visa in 1910 (no. 54).

***Anogra leucotricha* Wooton & Standley, sp. nov.**

Low and spreading or prostrate, with many divergent branches; stems stout, densely hirsute, 20 cm. long or less; leaves short-petiolate, 30 to 40 mm. long, deeply pinnatifid, the segments triangular-lanceolate and acute, densely strigillose and somewhat hirsute; calyx tube about 25 mm. long; sepals 15 mm. long, finely appressed-pubescent and hirsute; corolla 20 mm. long, white; capsules divergent, cylindric, 30 to 40 mm. long, hirsute.

Type in the U. S. National Herbarium, no. 690235, collected on the San Augustine Plains, July 22, 1904, by E. O. Wooton (no. 2735).

ADDITIONAL SPECIMENS EXAMINED: Willard, August 26, 1904, *Wooton*; plains 10 miles east of Horse Spring, June 20, 1892, *Wooton*.

Related to *Anogra engelmanni*, but with deeply pinnatifid and short-petiolate leaves and different pubescence.

***Anogra runcinata* (Engelm.) Wooton & Standley.**

Oenothera albicaulis runcinata Engelm. Amer. Journ. Sci. II. 34: 334. 1862.

Anogra pallida runcinata Small, Bull. Torrey Club 23: 175. 1896.

A common species found in almost all parts of New Mexico in the Lower and Upper Sonoran zones.

***Galpinsia camporum* Wooton & Standley, sp. nov.**

Low perennial, 15 cm. high, from a thick, woody base; stems very numerous, simple or branched, slender, flexuous, finely and densely villous, glandular; leaves very numerous, green, elliptic-lanceolate, 15 to 20 mm. long, acute, entire or nearly so, glandular-pubescent or glandular-puberulent; calyx tube 4 cm. long, slender, sparingly glandular or villous; sepals 12 mm. long, slightly villous, the free tips 2 mm. long; petals 12 to 18 mm. long, rounded-obovate; capsules cylindric, erect, 13 mm. long, soft-pubescent and glandular.

Type in the U. S. National Herbarium, no. 564592, collected at Knowles, July 29, 1909, by E. O. Wooton.

ADDITIONAL SPECIMENS EXAMINED: Highest point of the Llano Estacado, June 17, 1903, *Bailey* 518; near Causey, August 17, 1909, *Wooton*; Buchanan, August 12, 1909, *Wooton*; Hondo Hill, July 28, 1905, *Wooton*; Nara Visa, October 2, 1907, *W. Belknap*.

The type was collected in sandy soil on the broad plains near Knowles. It is similar to *Galpinsia greggii* and *G. lampsana*. From the former it is distinguished by its larger flowers and the different form of the leaves, and from the latter by its much smaller flowers and shorter, less abundant pubescence.

***Galpinsia lampsana* (Buckl.) Wooton & Standley.**

Oenothera lampsana Buckl. Proc. Acad. Phila. 1861: 454. 1862.

A common species of western Texas and eastern New Mexico.

***Gaura brassicea* Wooton & Standley, sp. nov.**

Stems numerous, slender, ascending, 90 cm. high or less, purplish, densely hispid; basal leaves oblanceolate, 5 to 9 cm. long, sinuate-toothed; cauline leaves oblong to oblanceolate, sessile, acutish or obtuse, deeply sinuate-dentate, abundantly hirsute, especially along the veins; branches of the inflorescence glabrous, slender; bracts broadly obovate, acuminate, short-ciliate; calyx glabrous; fruit glabrous, narrowly ovoid, sharply angled, short-stipitate, 8 to 10 mm. long, acute.

Type in the U. S. National Herbarium, no. 45764, collected at Socorro in May, 1881, by G. R. Vasey. Another specimen of the same collection is mounted on sheet 45763.

***Gaura cinerea* Wooton & Standley, sp. nov.**

Probably tall and much branched; stems slender, ascending, covered with a dense, loose, rather stiff pubescence; leaves elliptic or narrowly oblong, 20 to 25 mm. long, abruptly acuminate with subulate tips, sessile, sinuate-serrate below the middle, covered with a dense, coarse, curled pubescence; branches of the inflorescence densely cinereous; bracts ovate-lanceolate, with attenuate, subulate tips, pubescent; calyx and ovary densely cinereous; fruit on a slender cinereous stipe as long as the body.

Type in the U. S. National Herbarium, no. 382592, collected 20 miles south of Roswell, in August, 1900, by F. S. and Esther S. Earle (no. 533). Altitude 1,080 meters.

We have also seen a specimen collected at Big Spring, Texas, in September, 1881, by Dr. V. Havard.

Both sheets are in poor condition, showing neither open flowers nor mature fruit, but the plants are so distinct that one can not hesitate to describe them. The only species with which to compare this is *Gaura villosa*, but in that the branches of the inflorescence are glabrous and the pubescence on the flowers and stems is of an entirely different kind.

Gaura induta Wooton & Standley, sp. nov.

Gaura glabra Rydb. in part, not Lehm.

Low perennial, 30 cm. high or less, with numerous branched, slender, glabrous stems; lower leaves lanceolate-oblong, sparingly toothed, acute, sessile, glabrous, the upper ones linear; bracts linear, much exceeding the ovary; calyx tube 7 or 8 mm. long, it and the lobes densely strigose; petals 6 mm. long, rhombic, long-clawed; fruit 5 or 6 mm. long, with a thick stipe, densely and minutely cinereous.

Type in the U. S. National Herbarium, no. 498956, collected on the dry, clay hills near Pecos, August 15, 1908, by Paul C. Standley (no. 4933). Altitude 2,010 meters.

ADDITIONAL SPECIMENS EXAMINED: Santa Fe, alt. 2,160 meters, 1897, *Heller* 3659; 1847, *Fendler* 231b; Las Vegas, June 24, 1891, *Dewey*; Sandia Mountains, 1898, *Herrick* 276; near Tesuque, August 20, 1904, *Wooton*; Patterson, August 15, 1900, *Wooton*; mouth of Pino Canyon, 1898, *Herrick* 276; Farmington, alt. 1,600 meters, 1911, *Standley* 6919; Cedar Hill, alt. 1,900 meters, 1911, *Standley* 7911; Dulce, alt. 2,150 meters, 1911, *Standley* 8165; Nutritas Creek, alt. 2,250 meters, 1911, *Eggleston* 6638; Raton, alt. 2,100 meters, 1911, *Standley* 6297; north of Ramah, July 25, 1906, *Wooton*; Estancia, September 22, 1907, *M. B. Atkinson*; Hebron, September 21, 1907, *C. de Foresta*; Santa Fe, 1908, *Standley* 4482.

Most, if not all of the material placed by Doctor Rydberg under *Gaura glabra* in the Flora of Colorado belongs here. That species was described as being glabrous, and such a plant is well represented in the National Herbarium by specimens from Montana and adjoining States. Our plant has a wide range outside of New Mexico, extending from Arizona and Utah to Wyoming and South Dakota. It occurs chiefly in the low foothills and on the dry plains of the Upper Sonoran Zone.

Gaura glandulosa Wooton & Standley, sp. nov.

Stems usually numerous, slender, much branched, erect, 90 cm. high or less, copiously hirsute; basal leaves oblanceolate, somewhat sinuate-dentate, 7 to 10 cm. long, slender-petioled; cauline leaves linear or linear-oblong, entire or remotely repand-toothed, pubescent especially on the margins and veins, acute to obtuse, bright green, sessile; racemes slender, the branches glabrous except among the flowers and buds, there glandular; bracts ovate, acute, ciliolate, glandular; calyx tube 5 mm. long, glandular; petals oblanceolate, obtuse, 6 mm. long; fruit sessile, broadly ovoid, sharply angled, glabrous, not stipitate.

Type in the U. S. National Herbarium, no. 561072, collected at Reserve, July 9, 1906, by E. O. Wooton.

ADDITIONAL SPECIMENS EXAMINED: Gila Hot Springs, August 20, 1900, *Wooton*; Middle Fork of the Gila, August 5, 1900, *Wooton*; Sapello Creek, August 22, 1900, *Wooton*; N Bar Ranch, August 2, 1900, *Wooton*.

This has always passed as *Gaura nealleyi* Coulter, but that is a nearly glabrous plant with short-stipitate fruit.

Gaura gracilis Wooton & Standley, sp. nov.

Stems very slender, with numerous corymbose, ascending branches, 50 to 80 cm. high, villous; cauline leaves linear, 25 to 35 mm. long, entire, bright green, glabrous or sparingly puberulent, acute, short-petiolate; branches of the inflorescence glabrous; bracts ovate, acuminate, ciliolate, strigillose; calyx tube 4 mm. long, strigillose; petals 5 mm. long; fruit sessile, elliptic-ovoid, sharply angled, glabrous, 7 or 8 mm. long, not stipitate.

Type in the U. S. National Herbarium, no. 499693, collected at the Forest Nursery at Fort Bayard, August 29, 1905, by J. C. Blumer (no. 44).

ADDITIONAL SPECIMENS EXAMINED: Filmore Canyon, September 4, 1897, *Wooton*; Filmore Canyon, alt. 1,800 meters, September 23, 1906, *Wooton & Standley*; Mimbres River, alt. 1,650 meters, 1904, *Metcalf* 1033.

***Gaura linearis* Wooton & Standley, sp. nov.**

Stems slender, erect or ascending, branched, glabrous; leaves linear, bright green, entire, acute, sessile, 10 to 15 mm. long, numerous; branches of the inflorescence cinereous-puberulent among the flowers; bracts lanceolate or ovate, acuminate, usually less than half as long as the ovary; calyx tube 3 mm. long, strigose like the lobes; petals 6 or 7 mm. long, oblanceolate, obtuse, long-clawed; mature fruit not seen, but the ovary densely whitish-strigose.

Type in the U. S. National Herbarium, no. 564593, collected on gypsum soil near Lakewood, August 6, 1909, by E. O. Wooton.

Related to *Gaura induta*, but readily distinguished by the short, broad, acuminate bracts and narrow leaves.

***Gaura podocarpa* Wooton & Standley, sp. nov.**

Stems slender, branched from the base and again above, erect, hirsute, reddish; leaves narrowly oblanceolate or oblong, 4 to 6 cm. long, with a few low, repand teeth, acute, the uppermost leaves entire, linear, hirsute along the veins, ciliate; branches of the inflorescence glabrous; bracts ovate, acute, ciliate; calyx tube glabrous, 5 mm. long; petals oblanceolate, obtuse, 6 or 7 mm. long; fruit ovoid, 8 mm. long, acutish, very sharply angled, contracted into a short stipe below.

Type in the U. S. National Herbarium, no. 495277, collected by O. B. Metcalfe on Bear Mountain near Silver City, Grant County, June 17, 1903 (no. 166). Altitude 1,500 meters.

ADDITIONAL SPECIMENS EXAMINED: West Fork of the Gila, alt. 2,040 meters, 1903, *Metcalf* 841; West Fork of the Gila, alt. 2,100 meters, August 6, 1900, *Wooton*; Van Pattens, August 29, 1894, *Wooton*; Filmore Canyon, October 29, 1904, *Wooton*.

The plant also occurs in the Huachuca Mountains of Arizona.

This, with *Gaura strigillosa*, *G. gracilis*, and *G. glandulosa*, described here, has passed as *G. suffulta* Engelm., a plant originally described from Lindheimer's collections. All four of our plants have much narrower leaves, broader and much shorter bracts, smaller flowers, and larger fruit; while each one, in addition, differs from that species in other particulars.

***Gaura strigillosa* Wooton & Standley, sp. nov.**

Stems slender, ascending, much branched, 60 cm. high or less, reddish, hirsute; leaves oblong or linear-oblong, or the uppermost linear, the larger ones sinuate-dentate, sessile, acutish, glabrous except for the short-hirsute mid-vein and ciliate margins; branches of the inflorescence glabrous; bracts ovate or ovate-lanceolate, acute, strigillose, ciliate; calyx strigillose, the tube 6 mm. long; petals 6 mm. long; fruit glabrous, narrowly ovoid, sharply angled, short-stipitate, 8 mm. long.

Type in the U. S. National Herbarium, no. 561073, collected by E. O. Wooton at Wingfields Ranch on Ruidoso Creek in the White Mountains, July 8, 1895.

***Lavauxia hamata* Wooton & Standley, sp. nov.**

Cespitose perennial with a short, thick stem 5 to 6 cm. long; leaves narrowly elliptic-lanceolate, deeply and irregularly pinnatifid, the segments acute, attenuate, long-petioled, bright green, glabrous except along the puberulent margins; calyx tube 5 to 7 cm. long, slender, glabrous or nearly so, the lobes 15 to 20 mm. long, nearly glabrous; petals 2 cm. long; capsules 20 to 25 mm. long, 10 mm.

thick, sharply angled, the angles furnished below the top with stout, divaricate, hooked processes, the beak of the capsule stout, the whole finely puberulent.

Type in the U. S. National Herbarium, no. 45766, collected at Socorro, in May, 1881, by G. R. Vasey.

The stout, hooked beak on the wings distinguish this from all our other species; otherwise it is similar to *Lavauxia flava*.

***Lavauxia taraxacoides* Wooton & Standley, sp. nov.**

Caudex short and thick; leaves 20 to 30 cm. long, narrowly oblanceolate, deeply pinnatifid near the base into narrow, acute, distant lobes, the terminal portion merely slightly toothed, long-petioled, glabrous; calyx tube 18 to 20 cm. long, slender, glabrous; sepals 35 mm. long, glabrous; petals 35 to 40 mm. long; capsules oblong, 25 mm. high, acute at the apex, narrowly winged, glabrous or slightly puberulent.

Type in the U. S. National Herbarium, no. 563856, collected in James Canyon of the Sacramento Mountains, July 6, 1899, by E. O. Wooton.

ADDITIONAL SPECIMENS EXAMINED: Tularosa Creek, August 18, 1899, *Wooton*; White Mountain Peak, August 1, 1901, *Wooton*; James Canyon, June 26, 1899, *Wooton*; White Mountains, alt. 3,000 meters, August 16, 1897, *Wooton* 664.

A species readily distinguished by its large leaves and flowers and by its lack of pubescence.

***Oenothera irrigua* Wooton & Standley, sp. nov.**

Probably a biennial, 2 meters high or less, with very numerous stout, spreading branches; stems stout, terete, densely and finely canescent, also with numerous short, spreading hairs; basal leaves not seen, the cauline ones narrowly elliptic-lanceolate, 14 cm. long and 2 cm. wide or less, acute, narrowed to the base, sessile or on short, winged petioles, obscurely repand-denticulate, rather densely appressed-pubescent on both surfaces, grayish green; inflorescence a short, dense raceme; ovary densely strigose; calyx tube rather stout, 35 to 45 mm. long, strigose; sepals about 40 mm. long, separate when reflexed, the tips connivent in bud, 5 to 8 mm. long; petals 35 mm. long, yellow, drying purplish red; pistil slightly exserted; mature capsules not seen, but the immature ones columnar, densely silky-strigose, much exceeded by the floral leaves.

Type in the U. S. National Herbarium, no. 561366, collected in the Mesilla Valley, Dona Ana County, in June, 1906, by E. O. Wooton and Paul C. Standley. Altitude about 1,150 meters. The plant is very abundant along the banks of irrigating ditches and in moist cultivated fields.

ADDITIONAL SPECIMENS EXAMINED: Mesilla Valley, July 25, 1907, *Wooton & Standley*; Farmington, August 8, 1904, *Wooton* 2732; Albuquerque, October 13, 1894, *Herrick*; Aztec, July 1, 1895, *Griffin*; Mesilla Valley, *Ivah Mead*.

A plant similar to *O. hookeri*, but much larger and more abundantly branched, and with very different pubescence.

***Oenothera macrosiphon* Wooton & Standley, sp. nov.**

Perennial, 50 cm. high or less, with slender, weak, decumbent branches; stems several from each root, branched, hirsute, the hairs rising from papillæ, also minutely cinereous, but sparingly so; cauline leaves lanceolate or elliptic-lanceolate, 7 to 9 cm. long, 25 mm. wide or less, undulate, acute, cuneate at the base or rounded to a short, winged petiole, sparingly repand-denticulate, finely appressed-pubescent, hirsute along the veins, the leaves of the inflorescence slightly reduced; flowers few; calyx tube 15 to 19 cm. long, 2 mm. thick, sparingly pilose; sepals 50 to 60 mm. long, the subulate tips 5 mm. long or more; pistil and stamens included; petals 50 to 55 mm. long, deep

yellow turning purplish; capsules 30 to 40 mm. long, columnar, obtusely angled, sparingly hirsute.

Type in the U. S. National Herbarium, no. 241243, collected in the Organ Mountains, August 29, 1894, by E. O. Wooton.

ADDITIONAL SPECIMENS EXAMINED: Organ Mountains, alt. 1,860 meters, July 8, 1897, *Wooton* 114; Organ Mountains, 1881, *Vasey*; Van Pattens, June 11, 1906, *Standley*; Van Pattens, September 10, 1899, *Wooton*; Dripping Springs, August, 1898, *Cockerell*.

A beautiful plant with larger flowers than any other species of the genus. It occurs in the Organs in deep, rocky canyons, principally about the edges of pools. It has been called *O. jamesii*, but that species has much smaller flowers and abundant, appressed pubescence.

***Oenothera procera* Wooton & Standley, sp. nov.**

A slender biennial or perennial, 40 to 100 cm. high; stems simple, sparingly and loosely hirsute, also with a few inconspicuous, appressed, curled hairs; basal leaves not seen, the cauline ones elliptic-lanceolate or mostly oblanceolate, 8 to 10 cm. long, 15 mm. wide or less, acute, narrowed at the base to a slender petiole, bright green, thin, entire or faintly repand-denticulate, sparingly appressed-pubescent on both surfaces; leaves of the inflorescence considerably reduced; racemes short, few-flowered; calyx tube slender, about 25 mm. long, loosely pubescent or nearly glabrous; sepals distinct in anthesis, 15 mm. long; petals 12 to 14 mm. long, golden yellow fading purplish; pistil not exerted; capsule 20 to 25 mm. long, obtusely angled, 3 to 4 mm. thick, sparingly hirsute.

Type in the U. S. National Herbarium, no. 498579, collected along Winsor Creek in the Pecos River National Forest, July 5, 1908, by Paul C. Standley (no. 4212). Altitude 2,550 meters.

ADDITIONAL SPECIMENS EXAMINED: Mouth of Mora River, alt. 2,460 meters, July 7, 1908, *Standley* 4246; *Fendler* 218; West Fork of the Gila, alt. 2,250 meters, August 4, 1903, *Metcalf* 379; Ruidoso Creek, August 20, 1897, *Wooton*; James Canyon, August 11, 1899, *Wooton*; Beulah, August, 1899, *Cockerell*; Gilmores Ranch, alt. 2,220 meters, August 25, 1907, *Wooton & Standley*; Pajarito Park, August, 1908, *Bartlett*; Upper Pecos River, 1898, *Maltby & Coghill* 75; Gilmores Ranch, July 14, 1895, *Wooton*; White Mountain Peak, July 6, 1895, *Wooton*; Harveys Upper Ranch, alt. 2,880 meters, 1908, *Standley* 4672; Santa Fe, 1908, *Standley* 4523.

A common plant in the mountains in the Transition Zone. It grows usually on moist open slopes, but sometimes along streams. Seldom or never does it exceed a meter in height, and the stems are invariably simple. The type collection was distributed as *O. strigosa* Rydb., but that is a plant with much larger flowers and different pubescence. Part of the specimens referred to *Onagra strigosa* by Doctor Rydberg in the Flora of Colorado belong here.

***Pachylophus australis* Wooton & Standley, sp. nov.**

Acaulescent, caespitose; leaves on short, rather slender petioles, the blades 10 to 14 cm. long, narrowly oblanceolate, abruptly acute, remotely denticulate near the apex, toward the base pinnatifid into distant, triangular segments, finely cinereous on both surfaces, green; hypanthium tube 14 cm. long, about 12 mm. wide in the throat, minutely cinereous; sepals nearly linear, cinereous; petals white, obovate, 5 cm. long; mature capsules not seen, the ovaries densely appressed-pubescent.

Type in the U. S. National Herbarium, no. 690245, collected on the South Fork of Tularosa Creek, July 31, 1897, by E. O. Wooton.

Related to *P. montanus* (Nutt.) A. Nels., but with much larger flowers and a long hypanthium tube.

Pachylophus eximius (A. Gray) Wooton & Standley.

Oenothera eximia A. Gray, Mem. Amer. Acad. II. 4: 45. 1849.

Pachylophus exiguus Rydb. Colo. Agr. Exp. Sta. Bull. 100: 246. 1906.

CORNACEAE.

Garrya goldmanii Wooton & Standley, sp. nov.

A low shrub, 1 meter high or less; young branches densely covered with fine curled hair, the pubescence persisting often for several years; leaves small, 40 mm. long and 20 mm. wide or smaller, usually about 25 mm. long and 12 mm. wide, elliptic, narrowed toward the base and the mucronate apex, very thick, yellowish green, somewhat crispate, not at all conspicuously veined, pubescent on both surfaces, densely so beneath, the hairs long and only slightly curled or crinkled; margins of the leaves thickened, yellowish, muriculate; the stout petioles 5 to 7 mm. long; fruit in racemes 2 cm. long or less, sessile, subtended by lanceolate, abruptly acuminate bracts about 7 mm. long; fruit glabrous, ovoid to spherical, 6 mm. in diameter or less.

Type in the U. S. National Herbarium, no. 562308, collected on limestone ledges near Queen, New Mexico, July 31, 1909, by E. O. Wooton. Altitude about 1,770 meters.

ADDITIONAL SPECIMENS EXAMINED: NEW MEXICO—Big Hatchet Mountains, alt. 2,010 meters, 1908, *Goldman* 1319, 1318; Sheep Mountain, San Andreas Range, 1902, *Gaut* 36. TEXAS—Guadalupe Mountains, 1901, *Bailey* 452; Chisos Mountains, 1901, *Bailey*, 371.

In Coulter's Botany of Western Texas this is referred to as a narrow-leaved variety of *G. ovata* Benth. It is undoubtedly closely related to that species of central Mexico, but it differs in its lower growth, and small, narrow, more pubescent, crispate leaves. The leaves are much less conspicuously veined than in *G. ovata* and the fruit is much smaller.

ARALIACEAE.

Aralia bicrenata Wooton & Standley, sp. nov.

Somewhat branched herb about 1 meter high; stems stout, sparingly pubescent on the older parts, abundantly pubescent on the younger branches; petioles long and slender; leaflets ovate, 6 to 8 cm. long, the lower ones 3-parted, abruptly acuminate, oblique to cordate at the base, very thin, bright green, doubly crenate almost to the base, nearly glabrous above, puberulent beneath, especially along the veins; inflorescence much branched; peduncles short, 10 to 25 mm. long, puberulent; pedicels 7 to 8 mm. long, numerous; bracts linear, 1 to 2 mm. long; petals ovate, obtuse; ovary glabrous; mature fruit not seen.

Type in the U. S. National Herbarium, no. 563963, collected near Holts Ranch in the Mogollon Mountains, July 20, 1900, by E. O. Wooton.

ADDITIONAL SPECIMENS EXAMINED: Mogollon Creek, alt. 2,250 meters, July 23, 1903, *Metcalfe* 303; Las Vegas Hot Springs, August, 1901, *H. S. Barber* 151; South Bonito Creek, 2 miles above the forks, 1899, *Turner* 216; Gallinas Planting Station, 1908, *Bartlett* 301; Sierra Grande, alt. 2,600 meters, 1911, *Standley* 6136.

The plant is related to *A. pubescens* DC. and *A. humilis* Cav. (if they are separable species) of Mexico, but it has much larger and thinner leaves, doubly instead of simply crenate, the pubescence is much more sparse, and the stems are not at all woody. Our plant is also an ally of *A. racemosa*, but the form of the inflorescence is different, the leaves are not deeply cordate at the base, and they are not so conspicuously acuminate.

APIACEAE.

Phellopterus utahensis (Jones) Wooton & Standley.

Cymopterus montanus purpurascens A. Gray in Ives, Rep. Colo. Riv. 15. 1860.

Cymopterus utahensis Jones, Proc. Calif. Acad. II. 5: 684. 1895.

Cymopterus utahensis monocephalus Jones, op. cit. 685.

Phellopterus purpurascens Coult. & Rose, Contr. U. S. Nat. Herb. 7: 168. 1900.

Pseudocymopterus filicinus Wooton & Standley, sp. nov.

Roots elongated, 15 mm. thick or more; stems very densely clustered, low, 20 to 25 cm. high, sparingly branched or nearly simple, slender, glabrous; basal leaves very numerous, 20 to 25 cm. long; petioles slender, 6 to 8 cm. long; blades broadly triangular or rhombic in outline, 8 to 14 cm. long and usually almost as broad, the length of the lower divisions causing the blades to appear ternate; most of the blades thrice parted; ultimate segments linear or linear-elliptic, bright green, thin, glabrous, very numerous, crowded, short, 15 mm. long or less; principal divisions of the leaves appearing sessile because of the presence of lobes at their bases; peduncles scarcely exceeding the leaves; umbels 15 mm. wide or less, dense, the short branches often puberulent; involucls linear; flowers bright yellow.

Type in the U. S. National Herbarium, no. 564352, collected on Bear Mountain near Silver City, Grant County, June 17, 1903, by O. B. Metcalfe (no. 165). Another specimen of the same collection is mounted on sheet 560402.

ADDITIONAL SPECIMENS EXAMINED: Mangas Springs, September 1, 1897, *Metcalfe*; Holts Ranch, July 20, 1900, *Wooton*; Pinos Altos, 1891, *Nealley* 46.

A very handsome plant for the family, its leaves strongly suggesting some of the ferns. It is distinguished from our other species by the very numerous leaves of peculiar form, and by the small umbels usually but slightly exceeding the leaves.

PRIMULACEAE.

Steironema validulum Greene, sp. nov.

Stem 30 to 60 cm. high, robust, whitish and somewhat polished, densely leafy and floriferous from below the middle; leaves lanceolate or lance-oblong, acute, entire, glabrous, only the short, broad petiole fringed, and that loosely and coarsely; flowers copious, rather crowded at the ends of the branches; sepals ovate-lanceolate, not indistinctly feather-veined above the middle; segments of the corolla nearly orbicular, quite as broad as long, shortly cuspidate-acute; capsule globose, much shorter than the calyx.

Type in the U. S. National Herbarium, no. 45865, collected along Oak Creek, near Flagstaff, Arizona, in July, 1884, by J. G. Lemmon and wife. The best specimens are from northern Arizona collected by MacDougal, Lemmon, and others. One sheet of not very good specimens from McKinneys Park in the Mogollon Mountains, collected by O. B. Metcalfe, seems to represent the species in New Mexico.

OLEACEAE.

Menodora laevis Wooton & Standley, sp. nov.

A low perennial about 25 cm. high, from a thick, woody root; stems slender, woody below, very numerous, simple below, corymbosely branched above, bright green and shining, glabrous, angled; leaves obovate to lanceolate, 15 mm. long or less, obtuse or acute, contracted at the base into a short petiole, glabrous; pedicels about 5 mm. long, glabrous; tube of the calyx 1.5 mm. high, the 7 to

10 lobes linear, acute, glabrous, 5 to 6 mm. long; tube of the corolla very short, the lobes obovate, 8 or 9 mm. long, acute; capsules glabrous, 7 or 8 mm. high.

Type in the U. S. National Herbarium, no. 45767, collected in the Organ Mountains in August, 1881, by G. R. Vasey.

ADDITIONAL SPECIMENS EXAMINED: La Luz Canyon, August 27, 1901, *Wooton*; Duck Creek Flats, 1903, *Metcalf* 770.

The type was distributed as *M. scoparia* Engelm., but that has fewer, shorter calyx lobes. The species is more closely related to *M. scabra*, but differs in being glabrous throughout instead of scabrous.

GENTIANACEAE.

Dasystephana rusbyi (Greene) Wooton & Standley.

Gentiana rusbyi Greene; A. Gray, Syn. Fl. 2¹: 406. 1878.

APOCYNACEAE.

Apocynum angustifolium Wooton, sp. nov.

Stems slender, tall, much branched, the branches strongly ascending, glabrous; leaves narrowly oblong-lanceolate, 7 to 10 cm. long, 1 to 2 cm. wide, glabrous, bright green on both surfaces, acute or rather abruptly acute, mucronate, acute at the base or the lowest rounded, all at least short-petioled, the upper with petioles 5 mm. long; cymes few, densely flowered, on slender peduncles 3 to 5 cm. long; bracts small, linear-lanceolate, attenuate, somewhat scarious; calyx 1.5 mm. long or less, glabrous, the lobes lanceolate, acute; corolla greenish white, 3 to 3.5 mm. long, narrow, with short, erect lobes; follicles slender, 9 to 12 cm. long, 3 to 4 mm. in diameter, glabrous.

Type in the U. S. National Herbarium, no. 564322, collected in the Gila River bottom near Cliff, Grant County, June 13, 1903, by O. B. Metcalfe (no. 132). Altitude 1,350 meters.

ADDITIONAL SPECIMENS EXAMINED: Mimbres, alt. 1,650 meters, July 1, 1904, *Metcalf* 1070; Lower Plaza, July 25, 1900, *Wooton*; Eagle Creek, 1899, *Turner* 129.

A very distinct species of the *cannabinum* group, distinguished by its narrow, bright green leaves, nearly all of them acute at the base.

Apocynum viride Wooton & Standley, sp. nov.

Plant 1 meter high or more, with numerous erect, slender, glabrous branches; leaves narrowly elliptic-oblong, bright green, glabrous, 6 to 10 cm. long, 15 to 30 mm. wide, acute or abruptly short-acuminate, rounded or acutish at the base, on slender petioles 3 mm. long or less; cymes few, compact, 30 to 35 mm. wide, many-flowered, on slender peduncles 15 to 30 mm. long; bracts linear, thin; calyx 1 to 1.5 mm. wide, glabrous, with lanceolate, acute lobes; corolla 2 to 3 mm. long, pinkish, glabrous, with short, erect lobes.

Type in the U. S. National Herbarium, no. 499829, collected at Gilmores Ranch on Eagle Creek in the White Mountains, Lincoln County, August 25, 1907, by E. O. Wooton and Paul C. Standley (no. 3451). Altitude 2,220 meters.

ADDITIONAL SPECIMENS EXAMINED: Farmington, alt. 1,550 meters, 1911, *Standley* 6970; Cedar Hill, alt. 1,900 meters, 1911, *Standley* 8003; Las Vegas, July, 1881, *Vasey*; near Pecos, alt. 2,010 meters, 1908, *Standley* 5044; Reserve, July 9, 1906, *Wooton*; Fresno, July 21, 1899, *Wooton*; Sapello Creek, August 22, 1900, *Wooton*; Gilmores Ranch, July 27, 1901, *Wooton*.

Similar to *A. cannabinum* L., but differing in its narrow, bright green, glabrous leaves, as well as in other minor characters.

DICHONDRACEAE.

Dichondra brachypoda Wooton & Standley, sp. nov.

Perennial from a slender root; stems slender, creeping, 50 cm. long or less, seldom rooting at the nodes, villous; petioles slender, erect, 12 to 30 mm. long, villous; blades reniform, with broadly rounded lobes and a narrow sinus, emarginate, 2 to 3 cm. wide, bright green, pubescent on both surfaces, more densely so beneath; pedicels stout, 4 or 5 mm. long; sepals oblong-obovate, rounded at the apex, 3 to 4 mm. long, villous; capsules pubescent, 4.5 mm. high, much exceeding the calyx at maturity.

Type in the U. S. National Herbarium, no. 564085, collected in Filmore Canyon in the Organ Mountains, high up in deep ravines, September 23, 1906, by E. O. Wooton and Paul C. Standley. Altitude about 1,800 meters.

ADDITIONAL SPECIMENS EXAMINED: NEW MEXICO—Kingston, alt. 2,010 meters, 1904, *Metcalf* 1377; Organ Mountains, 1890, *Wooton*; Queen, alt. 1,770 meters, July 31, 1909, *Wooton*; *Mexican Boundary Survey* 1005; 1851-2, *Wright* 1620. TEXAS—1849, *Wright* 515, 516.

A most distinct species, evidently related to *D. caroliniana* Michx. That, however, has smaller leaves, much longer petioles and pedicels, and its capsules are shorter than the calyx.

POLEMONIACEAE.

Eriastrum Wooton & Standley, nom. nov.

Hugelia Benth. Edwards's Bot. Reg. 19: pl. 1622. 1833, not DC. 1830.

Gilia section *Hugelia* A. Gray, Proc. Amer. Acad. 8: 271. 1870.

Eriastrum filifolium (Nutt.) Wooton & Standley.

Gilia filifolia Nutt. Journ. Acad. Phila. n. ser. 1: 156. 1848.

Navarretia filifolia Brand in Engl. Pflanzenreich 27: 167. 1907.

Gilia brachysiphon Wooton & Standley, sp. nov.

Perennial from a usually slender root; stems stout, 15 to 50 cm. high, cinereous-tomentulose, simple or branched; leaves petiolate, pinnately parted into linear, spinulose-tipped segments, cinereous to glabrate; inflorescence thyriform, often short and somewhat congested, in age elongated, the flowers collected in small, pedunculate, close clusters; calyx 3 to 4 mm. long, villous, sparingly viscid, with lanceolate-subulate, spinescent lobes nearly as long as the tube; corolla bluish, 8 to 10 mm. long, the tube usually not at all exerted, about equaled by the oblong, apiculate lobes; stamens exerted; capsules obtuse, 4 mm. long.

Type in the U. S. National Herbarium, no. 561092, collected at Van Patten's Camp in the Organ Mountains, August 29, 1894, by E. O. Wooton. The plant is not uncommon in this range, growing on slopes near the summit, in the thin shade of yellow pines.

ADDITIONAL SPECIMENS EXAMINED: Kingston, alt. 1,980 meters, 1904, *Metcalf* 1269; near Carlisle, August 13, 1902, *Wooton*; mountains southeast of Patterson, August 16, 1900, *Wooton*; Filmore Canyon, September 20, 1908, *Wooton & Standley*; Organ Mountains, September 4, 1898, *Cockerell*, September 23, 1906, *Wooton & Standley*, in 1897, *Wooton* 440.

This is related to *G. multiflora*, but the corolla is very different, the tube in that species equaling the lobes, while in *G. brachysiphon* it is often shorter.

Gilia campylantha Wooton & Standley, sp. nov.

Perennial with numerous clustered stems from running rootstocks; stems tall, 30 cm. high, very slender, densely tomentulose; leaves numerous, pecti-

nately parted into linear, abruptly acuminate, aristate-tipped lobes, tomentose or tomentulose, petiolate; flowers numerous, in few-flowered pedunculate or sessile clusters arranged in a secund, raceme-like thyrse; pedicels short; calyx 3 mm. long, green, only slightly scarious, puberulent, cleft to the middle or lower into triangular-subulate, pungently pointed lobes; corolla white, the tube about 8 mm. long, thick, sharply bent downward just above the calyx, the lobes elliptic-oblong, obtuse, narrowed at the base into a short claw, about 4 mm. long.

Type in the U. S. National Herbarium, no. 233429, collected in the San Luis Mountains, September 11, 1893, by Dr. E. A. Mearns (no. 2242).

A remarkable species, distinguished from all the related ones by its small, white flowers and the peculiarly formed corolla tube. Otherwise it suggests *G. glomeriflora* Benth., but that has a very different calyx besides.

Gilia formosissima (Greene) Wooton & Standley.

Callisteris formosissima Greene, Leaflets 1: 160. 1905.

Batanthes formosissima Greene, op. cit. 224. 1906.

Gilia greeneana Wooton & Standley, nom. nov.

Callisteris collina Greene, Leaflets 1: 159. 1905, not *Gilia collina* Eastwood.

Batanthes collina Greene, op. cit. 224. 1906.

Gilia attenuata collina Cockerell, Univ. Mo. Stud. Sci. 2²: 197. 1911.

Gilia texana (Greene) Wooton & Standley.

Callisteris texana Greene, Leaflets 1: 160. 1905.

Batanthes texana Greene, op. cit. 224. 1906.

Gilia viscida Wooton & Standley, nom. nov.

Gilia pinnatifida Nutt.; A. Gray, Proc. Amer. Acad. 8: 276. 1870, not Moc. & Sessé, 1837.

Phlox grayi Wooton & Standley.

Phlox longifolia stansburyi forma *brevifolia* A. Gray, Proc. Amer. Acad. 8: 255. 1870.

Phlox longifolia brevifolia A. Gray, Syn. Fl. 2¹: 133. 1878, not *P. brevifolia* Baum.

This plant is distinct enough from both *P. longifolia* and *P. stansburyi* to receive specific rank; in fact, it is much more distinct from those species than are most of the members of the genus from each other. It is marked chiefly by its lower habit, more branched stems, and especially by the short, broad, rather crowded leaves. The corollas of our New Mexican specimens have a very small limb, only about 13 mm. wide and each lobe of the limb is retuse rather than rounded, as in most of our species.

Phlox tenuis Wooton & Standley, sp. nov.

Slender perennial 15 to 20 cm. high; stems numerous, erect, tortuous, finely villous, slightly glandular; internodes long; leaves linear, 35 to 65 mm. long, divaricate, acute, villous; pedicels slender, 12 to 30 mm. long, glandular-villous; calyx 12 to 14 mm. high, densely glandular-villous, the linear-subulate lobes about as long as the tube; corolla tube only slightly exceeding the calyx; corolla lobes cuneate-oblongate, 13 to 14 mm. long, 5 mm. wide, broadly rounded at the apex; fruit not seen.

Type in the U. S. National Herbarium, no. 306405, collected at Barranca, Taos County, May 26, 1897, by A. A. and E. Gertrude Heller (no. 3589). Altitude 2,070 meters.

On the same sheet with the type, and distributed under the same number, are plants of what appear to be *P. stansburyi*. The collection was distributed

under that name. Our plant, however, is very unlike *P. stansburyi*, having the corolla tube only slightly longer than the calyx instead of twice as long, while the leaves are larger and more slender, and the corolla lobes longer and narrower.

Baker's no. 60 from Cerro Summit, Colorado, is apparently the same species.

HYDROPHYLLACEAE.

***Marilaunidium foliosum* Wooton & Standley, sp. nov.**

Annual, 12 to 30 cm. high; stems with very numerous, dense, spreading branches, these rather stout, hirsute and puberulent; leaves obovate to oblanceolate or broadly oblong, very numerous especially about the inflorescence, obtuse, acute at the base, sessile, flat, glandular throughout, hispid on the upper surface; flowers very numerous, in terminal or axillary clusters, sessile or nearly so; calyx 5 or 6 mm. long, the linear lobes coarsely hirsute; corolla about 7 mm. long, purple, the very short tube much exceeded by the calyx, the lobes broad and rounded; seeds very numerous, minute, ovoid, with a thin, rugulose coat.

Type in the U. S. National Herbarium, no. 480933, collected by F. S. Earle on saltgrass flats near Roswell, August 30, 1900 (no. 531).

ADDITIONAL SPECIMENS EXAMINED: Roswell, alt. 1,140 meters, 1900, Earle 558; near Lake Arthur, August 1, 1905, Wooton; Fort Stanton, July 26, 1905, Wooton.

This was distributed as *Nama stenocarpum* A. Gray, but that is a prostrate plant with decurrent leaves and different pubescence. It is more closely related, perhaps, to *Marilaunidium hispidum*, but that, too, has more abundant pubescence, narrower leaves, and different corollas.

***Marilaunidium tenue* Wooton & Standley, sp. nov.**

Annual; stems slender, with few erect branches, 9 cm. high or less, puberulent and hirsutulous; leaves few, linear-spatulate, obtuse, 16 mm. long or less, narrowed at the base into a short petiole, hirtellous, glandular, the margins revolute; flowers few, axillary or cymulose, on slender pedicels 1 to 4 mm. long; calyx 3 mm. long in anthesis, increasing in size in age, the lobes linear, green, hirsute; corolla 4 to 5 mm. long, light blue, with a thick tube and narrow limb; capsules glabrous, two-thirds as long as the calyx; seeds few, brown, pitted.

Type in the U. S. National Herbarium, no. 498090, collected on limestone hills 3 miles south of Hillsboro, Sierra County, by O. B. Metcalfe, September 6, 1904 (no. 1291). Altitude 1,500 meters.

This was originally determined as *Conanthus demissus* (A. Gray) Heller, with which it has nothing to do. It is more closely related to *Marilaunidium angustifolium*, but is a lower, more slender plant, scarcely at all viscid, with longer corolla and much shorter calyx, and shorter floral leaves.

***Marilaunidium xylopodum* Wooton & Standley, sp. nov.**

Perennial from a very thick, woody root; stems numerous, slender, sparingly branched, ascending, 8 cm. long or less, hispid; leaves numerous, oblanceolate or oblong, acute, mostly flat, attenuate to the base, glandular, hispid; flowers few, cymulose, short-pedicellate; calyx 2.5 to 4 mm. long, with linear-subulate, hispid lobes; corolla purple, 6 or 7 mm. long, with a very thick tube not exceeding the calyx, the lobes somewhat spreading, rounded; capsule about half as long as the calyx.

Type in the U. S. National Herbarium, no. 564567, collected in crevices of limestone rocks near Queen, July 31, 1909, by E. O. Wooton. Altitude about 1,770 meters.

We have another specimen of the species collected in the same range of mountains (the Guadalupe) but across the line in Texas, in October, 1881, by Dr. V. Havard.

This differs from all our other New Mexican species in being perennial. It does not seem to be closely related to any of the perennial species found elsewhere.

***Phacelia bombycina* Wooton & Standley, sp. nov.**

Annual, 12 to 20 cm. high; stems few, stout, nearly scapose, hirsute and glandular-puberulent; basal leaves on stout petioles 4 to 5 cm. long, obtuse, pinnatifid into oblong-ovate, rounded, crenate lobes, sericeous and glandular on both surfaces; cauline leaves few or absent, petiolate, lobed; inflorescence narrow, with few branches; flowers numerous, crowded, on very short, stout pedicels; sepals oblong, obtuse, 2.5 mm. long or less, glandular-hirsute; corolla 5 to 6 mm. long, the lobes rounded, entire; stamens much exserted; styles hairy below; capsules subglobose, 2 to 2.5 mm. in diameter, hirtellous and glandular; seeds 1.5 mm. long, dark brown, finely pitted on the back.

Type in the U. S. National Herbarium, no. 45771, collected on "gravelly banks" at Mangas Springs in March or April, 1880, by H. H. Rusby (no. 276).

ADDITIONAL SPECIMENS EXAMINED: Bear Mountains, alt. 1500 meters, 1903, *Metcalf* 75.

Similar in general appearance to *P. intermedia*, but with hirsute pubescence, silky leaves, and narrower calyx lobes.

***Phacelia depauperata* Wooton & Standley, sp. nov.**

Annual, 6 cm. high or less; stems erect, slender or stout, simple or branched at the base, densely glandular-puberulent and hirsute; leaves linear-oblong in outline, 35 mm. long or less, once pinnatifid, the oblong-oval segments crenate or lobed, obtuse, scaberulous and glandular on both surfaces; inflorescence short and dense; pedicels stout, less than 1 mm. long; calyx 2 mm. long, the segments rounded-obovate, hirsute and glandular-puberulent; corolla 5 mm. long, the lobes broadly rounded, undulate-margined; stamens much exserted.

Type in the U. S. National Herbarium, no. 496292, collected on the Arroyo Ranch, near Roswell, in 1903 by David Griffiths (no. 4249).

This was determined as *P. arizonica*, but it differs from that species in its much longer flowers, the form of the calyx lobes, and the character of the pubescence.

***Phacelia tenuipes* Wooton & Standley, sp. nov.**

Annual, 15 to 20 cm. high; stems slender, with a few ascending branches above the base, hirsute and sparingly glandular; lower leaves broadly oblong, with a few small lobes near the base, the terminal part lobed and crenate, sparingly sericeous or with spreading pubescence on both surfaces and glandular, all the leaves petioled; upper leaves rather numerous, ovate, obtuse, crenate or lobed; inflorescence open, slender, few-flowered, the flowers not crowded, at least in age; pedicels slender, 2 or even 3 mm. long; calyx lobes oblong, obtuse, 2.5 mm. long, hirsute, glandular; corolla about 4 mm. long, the lobes rounded, entire; stamens well exserted; style hirsute near the base; capsules globose, shorter than the sepals, hirtellous, glandular.

Type in the U. S. National Herbarium, no. 45770, collected at Carrizalillo Spring, April 17, 1892, by Dr. E. A. Mearns (no. 91).

Related to *P. bombycina*, but a more slender plant with much longer pedicels, fewer flowers and very different leaves.

EHRETIACEAE.**Eddya gossypina** Wooton & Standley, sp. nov.

Perennial from a somewhat woody base; stems stout, prostrate, 20 cm. long, densely canescent; leaves spatulate, thick and fleshy, 8 mm. long or less, on slender petioles, obtuse, the blades hispid and short-pubescent, the petioles densely canescent; floral leaves crowded, densely white-villous; flowers few, axillary, sessile or nearly so; calyx lobes linear-lanceolate, white-villous, 3 mm. long; corolla purplish, 10 mm. long, with a spreading limb, the rounded lobes with nearly entire margins; stamens unequally inserted, unequal, the bases of the filaments much enlarged and filling the tube of the corolla; style 2-parted at the top, glabrous; mature fruit not seen.

Type in the U. S. National Herbarium, no. 690234, collected on Tortugas Mountain, September 2, 1894, by E. O. Wooton.

ADDITIONAL SPECIMENS EXAMINED: Tortugas Mountain, 1911, *Standley* 6439.

In general this resembles *E. hispidissima*, but has a white, cottony appearance very different from that species, while the corolla is much larger and the stamens are somewhat different.

BORAGINACEAE.**Lappula grisea** Wooton & Standley, sp. nov.

Biennial from a short, thick taproot; stems stout, 80 cm. high or less, simple below, canescent; basal leaves numerous, narrowly oblanceolate, obtuse, 3 to 5 cm. long; cauline leaves narrowly oblanceolate to linear-oblong, obtuse or acute, 25 to 40 mm. long, the upper sessile, the lower attenuate to a broad, winged petiole; all densely canescent on both surfaces, the hairs with large, white, bulbous bases; inflorescence sparse, with slender, loosely few-flowered, erect branches; bracts very small, lanceolate; pedicels 3 to 4 mm. long; sepals ovate, obtuse; corolla blue, small, 2.5 mm. long; nutlets small, 2.5 mm. long, the prickles as long as the body, free to the base, the back of the nutlets papillose.

Type in the U. S. National Herbarium, no. 562188, collected in James Canyon of the Sacramento Mountains, August 6, 1905, by E. O. Wooton.

ADDITIONAL SPECIMENS EXAMINED: Tularosa Creek, alt. 2040 meters, July 30, 1897, *Wooton* 252.

Apparently a recognizable species, distinguished from the related *L. floribunda* by its grayish appearance, caused chiefly by the enlarged white bases of the hairs. The pubescence, too, is more abundant, longer, stiffer, and harsher than in any of the related species.

Lappula hirsuta Wooton & Standley, sp. nov.

Biennial from a short tap-root; stems stout, erect, a meter high or less, coarsely appressed-pubescent, more or less hirsute above, simple up to the inflorescence; basal leaves narrowly spatulate, obtuse, long-petiolate, 10 cm. long or less; cauline leaves narrowly oblanceolate to oblong, 5 to 8 cm. long, acute, sessile by a rounded base, or the lower ones attenuate to a winged petiole, canescent or appressed-pubescent on both surfaces, glandular, long-ciliate; inflorescence with numerous slender, ascending branches, the racemes long and distantly flowered; bracts elliptic or lanceolate, small; pedicels 4 to 8 mm. long; sepals narrowly oblong, obtuse; corolla deep blue, 8 mm. broad, the lobes orbicular, the appendages finely papillose; marginal bristles of the nutlets separate to the base, about equaling the body, this nearly smooth on the back but minutely hirtellous.

Type in the U. S. National Herbarium, no. 306419, collected by A. A. and E. Gertrude Heller in Santa Fe Canyon, 9 miles east of Santa Fe, July 2, 1897 (no. 3793). Altitude about 2,400 meters; Transition Zone.

ADDITIONAL SPECIMENS EXAMINED: Gallinas Planting Station, 1908, *Bartlett* 302; mountains near Las Vegas, July, 1881, *Vasey*; Winsors Ranch, alt. 2,520 meters, 1908, *Standley* 4106; 1847, *Fendler* 633; Beulah, 1899, *Porter*; Water Canyon, 1897, *Herrick* 750; Upper Pecos River, September, 1904, *Bartlett*, in 1898, *Maltby & Coghill* 66; Beulah, 1899, *Helen Blake*; Mogollon Creek, alt. 2,400 meters, 1903, *Metcalf* 249.

Related to *L. floribunda*, but differing in its hirsute pubescence and larger flowers. Mr. C. V. Piper was the first to suggest¹ that this might be a distinct species. Fendler's specimens were referred by Doctor Gray² to *L. ursina*, but this has nothing to do with that species.

***Mertensia amplifolia* Wooton & Standley, sp. nov.**

Perennial from a thick rootstock; stems several, erect, stout, 25 to 35 cm. high, retrorsely appressed-pubescent, simple, or branched above the base, with loosely ascending branches above; basal leaves lance-oblong, 11 cm. long and 5 cm. wide or smaller, acutish, unequal at the base and somewhat decurrent upon the slender petiole, 9 cm. long or less; cauline leaves very numerous, the upper ones little reduced, lanceolate, sessile, or the lowest petiolate, 5 to 9 cm. long, acute, rounded at the base, all the leaves finely appressed-pubescent on both surfaces; inflorescence ample, very leafy, the branches slender, few-flowered, strigose; pedicels slender, about 10 mm. long; calyx in anthesis 5 mm. high, in age about twice as long, cleft to about the middle, the lobes triangular-lanceolate, acute, strigose; corolla 10 mm. long, the limb about 4 mm. and the tube 1.5 mm. wide, the limb and tube about equal in length, the throat with a ring of short hairs; nutlets 2 to 3 mm. long, dark brown, minutely papillose.

Type in the U. S. National Herbarium, no. 45768, collected at Glorieta, June, 1881, by G. R. Vasey. Additional material of the same collection is mounted on sheet 45769.

Our plant is related to *M. bakeri* Greene, but is larger, has larger leaves of different shape, is less pubescent, and has much smaller flowers.

***Mertensia grandis* Wooton & Standley, sp. nov.**

Perennial from a slender rootstock; stem stout, fleshy, erect or ascending, glabrous, 40 to 100 cm. high; leaves ovate to lanceolate, rather fleshy, acute, rounded at the base, 8 to 18 cm. long, the basal long-petioled, the cauline sessile, the uppermost reduced, glabrous beneath and glaucescent, scaberulous on the upper surface; inflorescence rather ample, the slender branches white-strigose; pedicels stout, 8 to 12 mm. long, strigose; calyx 4 to 5 mm. high, cleft to near the base, the lobes oblong, obtuse, glabrous or strigose, ciliate, the tube strongly strigose, the whole enlarging in age; corolla bright blue, 12 to 17 mm. long, the limb 5 to 9 mm. wide, much shorter than the tube, the latter 2.5 to 5 mm. thick, the throat with a ring of short hairs.

Type in the U. S. National Herbarium, no. 498109, collected on a shaded slope of Hillsboro Peak, in the Black Range, September 11, 1904, by O. B. Metcalfe (no. 1319). Altitude 2,550 meters.

ADDITIONAL SPECIMENS EXAMINED: Holts Ranch, July 20, 1900, *Wooton*; Mogollon Mountains, August, 1881, *Rusby* 291; Eagle Peak, August 2, 1900, *Wooton*; Mogollon Creek, alt. 2,250 meters, July 23, 1903, *Metcalf* 302.

¹ Bull. Torrey Club 29:545. 1902.

² Syn. Fl. 2:422. 1878.

Related to *M. ciliata* (Torr.) Don, but with a larger, differently formed and abundantly pubescent calyx. It is a larger plant, too, than most of our western *Mertensias*. It is related also to *M. franciscana* Heller, but the corolla and calyx are very different.

Oreocarya urticacea Wooton & Standley, sp. nov.

Perennial from a woody caudex covered by the bases of the dead leaves; stems very stout, about 30 cm. high, hispid and densely canescent, simple up to the inflorescence; basal leaves spatulate, rounded at the apex, 7 to 9 cm. long, petiolate, green but hirsute and finely canescent; cauline leaves narrowly oblanceolate, obtuse, attenuate to a winged petiole, very numerous; inflorescence a dense, narrow thyrses with numerous linear-lanceolate or linear-oblong, strongly hispid leaves, its branches densely setose-hispid with yellowish hairs; lateral glomerules of the inflorescence on peduncles 10 to 35 mm. long, the flowers in very dense clusters; calyx lobes nearly linear, 6 mm. long, densely hispid; corolla white, 5 or 6 mm. long, the tube shorter than the calyx; mature fruit not seen.

Type in the U. S. National Herbarium, no. 306425, collected at Canyoncito, Sante Fe County, June 18, 1897, by A. A. and E. Gertrude Heller (no. 3731). Altitude 2,160 meters.

ADDITIONAL SPECIMENS EXAMINED: Glorieta, June, 1881, *Vasey*; Sierra Grande, alt. 2,200 meters, 1911, *Standley* 6056.

The type collection was distributed as *O. glomerata* (Pursh) Greene, but that is a lower, rather less hispid plant with a dense, spike-like inflorescence and broader leaves. Our plant is also related to *O. perennis* (A. Nels.) Rydb., but differs from that species in about the same manner as from *O. glomerata*.

VERBENACEAE.

Verbena imbricata Wooton & Standley, sp. nov.

Erect plant, 35 cm. high, with numerous strict, herbaceous stems from the crown of a stout, woody root, sparingly hispid throughout; leaves cuneate-obovate in outline, 3 cm. long or less, pinnately 3-lobed, the middle lobe largest and pinnately toothed or lobed, decurrent below into a short petiole; flowers in crowded, bracted spikes resembling those of *V. bracteosa* but more crowded and the bracts shorter; bracts lanceolate, 5 to 10 mm. long; fruiting calyx barely 3 mm. long; corolla deep blue, about 4 mm. long, shorter than the bracts; nutlets as in *V. bracteosa*.

Type in the U. S. National Herbarium, no. 562249, collected at Farmington, August 8, 1904, by E. O. Wooton (no. 2831).

This may possibly be a hybrid between *V. bracteosa* and some erect species, but this seems improbable, since no species is found in that general region that would be likely to hybridize with *V. bracteosa* to produce such a plant as this.

MENTHACEAE.

Agastache cana (Hook.) Wooton & Standley.

Cedronella cana Hook. Curtis's Bot. Mag. pl. 4618. 1851.

Cedronella cana lanceolata A. Gray, Syn. Fl. 2¹: 462. 1878, in part.

Brittonastrum lanceolatum Heller, Muhlenbergia 1: 4. 1900.

SPECIMENS EXAMINED: Headwaters of the Pecos, August, 1905, *Bartlett*; hills near Santa Rita, October 9, 1904, *Metcalfe*; Hillsboro, alt. 1,650 meters, 1904, *Metcalfe* 1015; Organ Mountains, August, 1881, *Vasey*; Dona Ana Mountains, October 28, 1906, *Wooton & Standley*; Organ Mountains, alt. 1,660 meters,

1897, Wooton 437; San Augustine Ranch, alt. 1,740 meters, August 16, 1895 Wooton; Soledad Canyon, September 24, 1905, Wooton.

This is without doubt the plant which Hooker described and figured as *Cedronella cana*. The locality cited in Wright's field notes indicates that the type was collected in the low mountains, probably the Huecos, about 30 miles east of El Paso, possibly near the Hueco Tanks, which were then a watering place on the route leading across the plains from El Paso, the one probably followed by Wright's party. The Organ Mountains, where we first found this plant, are the next chain to the northwest, and only a little farther away than El Paso. The plant collected by G. R. Vasey and referred to by Doctor Gray in his description of *Cedronella cana lanceolata* is *C. cana* from the Organ Mountains, in all probability. This is the only Agastache in the National Herbarium collected by Vasey, and this herbarium should contain specimens of all his collections. We have not seen the Wright specimen referred to by Gray in his description of *lanceolata*, which was probably his no. 1533, collected at Santa Rita. The Rusby plant from Mangas Springs that deserves the name of *lanceolata* is *Cedronella rupestris*, an excellent species which has been collected several times since in the immediate region. The Burro Mountain plant collected by Bigelow is also that species.

Agastache greenei (Briq.) Wooton & Standley.

Brittonastrum greenei Briq. Ann. Cons. Jard. Genève 6: 157. 1902.

We do not agree with Doctor Rydberg in considering this a synonym of *A. pallidiflora* (Heller) Rydb. A rather extended series of the Arizona plant from various localities and also from western New Mexico in the Mogollon Mountains, shows that it has a green calyx and pale whitish flowers, while *A. greenei* has the calyx teeth and upper part of the tube decidedly pink or purplish tinged and the corolla also brighter colored. Besides these more conspicuous calyx differences, the corollas in *A. greenei* are noticeably longer, more arched, and wider at the throat. These differences in color and size of corolla and calyx and noticeable ones in the calyx teeth seem to be the most important diagnostic characters in a group of closely related but distinct species which have until recently been considered as belonging to two or three very variable ones.

Agastache mearnsii Wooton & Standley, sp. nov.

Herbaceous, branched perennial, about 70 cm. high, with several erect stems from the base, finely puberulent throughout; stems distinctly quadrangular, sulcate above, below almost terete; petioles mostly 10 to 12 mm. long; blades 25 to 50 mm. long, about two-thirds as broad, triangular to hastate, sometimes ovate, mostly truncate at the base, acute to abruptly short-acuminate, coarsely crenate-dentate, finely and closely puberulent beneath and pale; flowers numerous, in crowded, terminal, spike-like clusters 10 cm. long and 3 to 4 cm. wide when in full flower; peduncles and pedicels 2 or 3 mm. long, the linear-subulate bracts about 5 mm. long; calyx tubular, reddish purple, 10 to 12 mm. long, the triangular-subulate, almost equal teeth fully 2 mm. long, erect; corolla about 20 mm. long, reddish purple, somewhat arched, puberulent outside, the upper lip retuse, the lower 3-lobed; stamens 4, the longer pair exceeding the corolla; nutlets brown, scabrous at the apex.

Type in the U. S. National Herbarium, no. 233421, collected in a canyon on the east side of the San Luis Mountains in extreme southwestern New Mexico, nearly on the Mexican boundary line, September 11, 1893, by Dr. E. A. Mearns (no. 2251).

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ADDITIONAL SPECIMENS EXAMINED: Animas Valley, 1893, *Mearns* 2502; Burro Mountains, alt. 2190 meters, 1908, *Goldman* 1517; Pinos Altos Mountains, September 10, 1880, *Greene*.

This is one of the species of southern New Mexico and northern Mexico which has been passing as *Cedronella mexicana*, a much larger plant with larger flowers from some hundreds of miles farther south. It is nearest to *Brittonastrum barberi* and *B. ionocalyx* Robinson, both of which have larger corollas, the former a longer calyx and the latter a shorter one, and both much broader and relatively shorter calyx teeth. The species is named for Dr. E. A. Mearns, whose extensive collections along the Mexican boundary have added records of many little known species to the flora of New Mexico.

Agastache micrantha (A. Gray) Wooton & Standley.

Cedronella micrantha A. Gray, Proc. Amer. Acad. 8: 369. 1872.

Agastache verticillata Wooton & Standley, sp. nov.

Perennial herb, 40 to 80 cm. high, branched, puberulent throughout, green, the younger stems sulcate-quadrangular, slightly scabrous; leaves ovate-lanceolate, the blades 2 to 4 cm. long, on petioles 10 to 15 mm. long, rather thin, slightly paler beneath, the margins distantly and coarsely crenate-dentate, broadly cuneate or truncate at the base, the apex acute and somewhat attenuate in the upper leaves; flowers small for the genus, in an interrupted, verticillate spike 10 to 12 cm. long, the verticels crowded, the internodes slightly longer than the fruiting calyces; peduncles and pedicels very short, 1 to 2 mm., the linear bracts but little longer; calyx tubular, 5 to 6 mm. long, the subulate lobes about one-fourth as long, unequal, two of them shorter than the others, the tube green below, the lobes purple; corolla slender, 10 to 12 mm. long, pale, slightly, if at all, curved; nutlets smooth.

Type in the U. S. National Herbarium, no. 561455, collected in the Organ Mountains, altitude about 2,250 meters, September 23, 1906, by E. O. Wooton and Paul C. Standley.

ADDITIONAL MATERIAL EXAMINED: Organ Mountains, August, 1881, *Vasey*; Organ Mountains, August 16, 1895, *Wooton*; Filmore Canyon, October 23, 1904, *Wooton*; West Fork of the Gila, altitude 2,250 meters, 1903, *Metcalf* 348; West Fork of the Gila, August 6, 1900, *Wooton*; Old Tiptop, Organ Mountains, October 18, 1903, *Metcalf*.

This species is nearest *A. wrightii*, but is easily separated. The flowers are about twice as large, the calyx lobes are purple instead of white, and the leaves are larger and have fewer teeth. The dried calyces of the different species of the genus have different odors when pulverized. This species gives a pronounced odor of camphor.

Agastache wrightii (Greenman) Wooton & Standley.

Cedronella wrightii Greenman, Proc. Amer. Acad. 41: 244. 1905.

Brittonastrum wrightii Robinson, Proc. Amer. Acad. 43: 26. 1907.

Hedeoma pulcherrima Wooton & Standley, sp. nov.

Perennial herb, much branched, from a woody root, the stems slender, diffusely ascending, finely and sparingly puberulent throughout, about 30 cm. high; leaves opposite, elliptic-oblong, 2 cm. long or less, the largest 7 mm. wide, tapering below into a short petiole, rather thin, green, obtuse, entire; flowers large for the genus, in 1 to 5-flowered cymose clusters in the axils of the leaves, the upper internodes and leaves somewhat reduced; floral bracts linear-lanceolate, hardly longer than the short (1 to 2 mm. long) pedicels; calyx 6 to 7 mm. long, 15-ribbed, slightly constricted above the middle, sparingly hispidulous, the three upper lobes triangular-lanceolate, about 1 mm. long, the two lower ones sub-

late, about twice as long, slightly curved upward, all of them sparingly bearded in the throat; corolla bluish purple, 12 to 14 mm. long, narrowly funnelform, gaping, finely pubescent outside, the upper lip erect, retuse, the lower lip 3-lobed, the central lobe largest; stamens 2, surpassing the upper corolla lobe; nutlets oval, dark brown, smooth, acute.

Type in the U. S. National Herbarium, no. 330465, collected in the White Mountains, Lincoln County, altitude about 1,950 meters, July 30, 1897, by E. O. Wooton (no. 241).

ADDITIONAL SPECIMENS EXAMINED: Cloudcroft, June 30, 1899, *Wooton*; Tularosa Creek, August 19, 1899, August 6, 1901, *Wooton*; Toboggan, July 31, 1899, *Wooton*; Dark Canyon, 1907, *Wooton & Standley* 3480; Mescalero Reservation, July 21, 1905, *Wooton*.

The plant is most nearly related to *H. jucunda* Greene, from Durango, Mexico, and was distributed under that name, having been determined from the description alone. Ours, however, is a stouter plant, with flowers about half again as large, and very different calyx. The species seems to be on the dividing line between the two principal groups of our species: its upper calyx lobes are not foliaceous-expanded as in one group, nor narrowly subulate as in the other, but are triangular-lanceolate, and they are hispid-ciliate like those of the second group. In habit and general appearance our plant resembles *H. jucunda*, but it is a little more leafy and has larger and fewer flowers.

Salvia earlei Wooton & Standley, sp. nov.

Tall, slender, herbaceous perennial, 30 to 100 cm. high, branched above, the stems erect, sometimes 3 or 4 from a single root, finely puberulent throughout; leaves linear to narrowly oblong-lanceolate, 4 to 8 cm. long (mostly about 5 cm.) including the petiole, acute, cuneate and decurrent at the base into a petiole about 1 cm. long, entire or undulate with occasionally a few obscure teeth, glabrate but finely glandular above; flowers in terminal, interrupted, glomerate clusters, about 12 flowers in each verticil; calyx 6 to 8 mm. long, campanulate-tubular, obscurely 8 to 10-ribbed, becoming somewhat urceolate in fruit, densely white or blue tomentose with very fine short hairs, the limb short-truncate, obscurely 2-lipped, the upper lip entire, the lower with 2 minute teeth; corolla bright blue to almost violet, about twice as long as the calyx, the upper lip notched, erect, tomentose on the back, the lower lip 3-lobed, the middle lobe much the largest; style densely bearded with bluish hairs; nutlets smooth, brown.

Type in the U. S. National Herbarium, no. 382519, collected 35 miles west of Roswell, in August, 1900, by F. S. and Esther S. Earle (no. 375).

ADDITIONAL SPECIMENS EXAMINED: NEW MEXICO—Twenty miles west of Roswell, July 28, 1905, *Wooton*; South Berendo River near Roswell, June, 1899, *Tinsley*; Sixteen Spring Canyon, August 23, 1901, *Wooton*. TEXAS—Toyah Creek, 1902, *Tracy & Earle* 138; southwestern Texas, 1880, *Palmer* 1066; Frio Water Hole, Edwards County, 1895, *R. T. Hill* 36; Tom Green County, 1880, *Tweedy* 255; Baird, 1882, *Letterman* 72; Ballinger, 1889, *Nealley* 391a.

The plant has long been confused with *S. farinosa* Benth., which it resembles very closely as to its flowers, although these are smaller, but the leaves are of an entirely different character, much more like those of *S. pitcheri* Torr. The distribution area is farther west than that of the one and farther south than that of the other, in a climate much more arid than either of the others endures.

Salvia pinguifolia (Fernald) Wooton & Standley.

Salvia ballotaeiflora pinguifolia Fernald, Proc. Amer. Acad. 35: 523. 1900.

The type was collected by Wright in 1851 or 1852 (no. 1524), probably in New Mexico somewhere near the Copper mines of Santa Rita.

This is distinguished from *S. ballotaeiflora* by the very large, scarcely rugose, broad leaves, pale beneath because of the presence of abundant whitish pubescence, and by the denser and more ample inflorescence. The species has been collected at various times in southern New Mexico and southeastern Arizona.

Salvia vinacea Wooton & Standley, sp. nov.

A low, suffrutescent plant, about 30 cm. high; stems slender, sparingly tomentulose above; leaves broadly ovate, about 30 mm. long and 25 mm. wide, rather obtuse, coarsely crenate, mostly truncate at the base or slightly decurrent, glabrous above and almost so beneath but slightly puberulent, of about the same color on both surfaces; petioles slender, half as long as the blades or more; flowers in short, congested spikes, numerous; calyx ampliate in age, its lobes very broad and obtuse, the whole calyx 12 or 13 mm. long, of a deep wine color, greenish at the base, on a short, deflexed pedicel; corolla dark blue, 20 to 22 mm. long, its tube much exceeding the calyx, the upper lip oblanceolate.

Type in the U. S. National Herbarium, no. 499430, collected in the Florida Mountains at an altitude of about 1,950 meters, September 8, 1908, by E. A. Goldman (no. 1501).

ADDITIONAL SPECIMENS EXAMINED: Florida Mountains, September 7, 1908, M. E. Jones; Martins Spring, Florida Mountains, 1895, Mulford 1067.

Nearest *S. pinguifolia*, but differing in its much larger corolla with a narrower upper lip, wine colored calyx, and more congested inflorescence, and in not having its leaves conspicuously whitened beneath.

Tetraclea angustifolia Wooton & Standley, sp. nov.

Herbaceous perennial with several branching, obscurely 4-angled, ascending or spreading stems 40 to 50 cm. high from a woody root, the whole plant scabrous with short, stout, recurved, whitish hairs, these most abundant on the stems; leaves narrowly oblong, tapering into a short petiole, serrate-dentate with a few coarse teeth on each side, acute, the hairs mostly on the petioles, veins, and margins of the leaves; flowers in few-flowered axillary clusters with narrowly linear bracts; calyx campanulate, the lobes narrowly lanceolate, acuminate in flower, accrescent and persistent in fruit; corolla and stamens as in *T. coulteri* but smaller and the tube narrower; nutlets slightly more reticulate and of the same size.

Type in the U. S. National Herbarium, no. 330627, collected on the plains south of the White Sands, August 23, 1897, by E. O. Wooton (no. 403). We have one other specimen collected from the same locality, August 26, 1899, by E. O. Wooton.

This plant is more slender, taller, less pubescent and with shorter hairs, and has narrower calyx lobes, smaller corolla, and more reticulate nutlets than the only other species of the genus, *T. coulteri*. The leaves, too, are narrower and toothed.

SOLANACEAE.

Androcera novomexicana (Bartlett) Wooton & Standley.

Solanum heterodowum novomexicanum Bartlett, Proc. Amer. Acad. 44: 628. 1909.

Type collected by Fendler in New Mexico, doubtless near Santa Fe, in 1847 (no. 673). Although *Solanum heterodowum* has been reported from New Mexico at various times, it is to this species that all such specimens belong. The plant, while seldom abundant in any one locality, has a rather wide range in New Mexico, having been collected in the region about Santa Fe and as far south as Santa Rita.

SCROPHULARIACEAE.

Castilleja eremophila Wooton & Standley, sp. nov.

Perennial from a slender root, the stout, solitary stems 10 to 15 cm. high, cinereous-puberulent; a few of the lowest leaves linear-oblongeolate, the others pinnatifid, each with 1 or 2 pairs of oblong-linear, divergent or ascending, obtuse lobes, all dull green, thin, cinereous-puberulent, sessile, not conspicuously veined; flowers rather few, crowded; bracts narrow, acute, usually with several linear lateral lobes, glandular-puberulent or slightly villous; calyx 16 to 20 mm. long, about equally cleft before and behind, the lateral divisions each cleft at the summit into 2 oblong-lanceolate, acute segments, glandular and villous, scarlet at the tips; corolla about 25 mm. long, the short tube about 10 mm. and the galea 15 mm. long, the tube glabrous, greenish, the galea puberulent, yellowish green faced with scarlet, the lower lip of 2 glabrous, green, oblong-lanceolate, acute teeth about 1 mm. long.

Type in the U. S. National Herbarium, no. 687232, collected on arid, sandy mesas about the north end of the Carrizo Mountains, July 31, 1911, by Paul C. Standley (no. 7464). Additional material is mounted on sheet 686431.

The plant is somewhat like *C. chromosa* A. Nels., but is much lower and has always solitary stems; the pubescence is very different besides. It grows in the most arid situations in the Upper Sonoran Zone. No other *Castilleja* was found growing at so low an altitude, *C. integra* having a habitat most nearly approaching that of this species.

Dasystoma wrightii (A. Gray) Wooton & Standley.

Gerardia wrightii A. Gray, U. S. & Mex. Bound. Bot. 118. 1859.

Mimulus parvulus Wooton & Standley, sp. nov.

Slender annual with almost filiform, prostrate or ascending branches not more than 4 or 5 cm. long, often rooting at the nodes; stems mostly glabrous; leaves thin, 4 to 8 mm. long and fully as wide or wider, broadly rounded-ovate, obtuse, subcordate at the base, short-villous with white hairs, entire or obscurely denticulate, on slender petioles half as long as the blades or longer; pedicels axillary, very slender, exceeding the leaves, glabrous or sparingly villous; calyx turbinate or narrowly campanulate, sharply angled, 5 mm. long in fruit, in flower not much shorter, purplish, oblique at the mouth, sparingly villous with coarse, white hairs; corolla bright yellow, 8 or 9 mm. long, the slender tube more than twice as long as the calyx; capsules 2 mm. long, narrowly oblong, abruptly acute.

Type in the U. S. National Herbarium, no. 660448, collected in Rocky Canyon, Grant County, August 9, 1911, by J. M. Holzinger.

A most distinct species, very unlike any of our other southwestern ones and apparently very different from any of those from farther west or south.

Pentstemon cardinalis Wooton & Standley, sp. nov.

Perennial, forming dense clumps 40 cm. in diameter or more; stems rather slender, erect, simple, glabrous, green; basal leaves elliptic-spatulate, obtuse, long-petiolate; cauline leaves various, the lower oblong-lanceolate, obtuse, 13 cm. long or less, narrowed at the base, the upper ones oblong to triangular-ovate, acutish or acuminate, sessile by a truncate or clasping base, thin, glabrous; bracts triangular-subulate, very small; inflorescence thyrsiform, secund, loosely many-flowered, glabrous; pedicels slender, erect, conspicuous; sepals 4 mm. long, lance-ovate, acute, scarious-margined; corolla 22 to 28 mm. long, cardinal red, considerably dilated in the throat, contracted at the mouth, the upper

lobes erect, the lower deflexed, nearly orbicular, 2 or 2.5 mm. long, strongly bearded in the throat with yellow hairs; anthers echinate along the commissure.

Type in the U. S. National Herbarium, no. 563916, collected on White Mountain Peak just above the forks of Ruidoso Creek, July 6, 1895, by E. O. Wooton. Altitude about 2,400 meters.

This is somewhat, but not very closely, related to the group of *P. puniceus* and *P. wrightii*. The plants are not at all glaucous, however, and the form of the corolla is altogether different, especially in the contracted mouth.

***Pentstemon crassulus* Wooton & Standley, sp. nov.**

Perennial from slender, fleshy roots and a stout caudex; stems stout, 45 cm. high or less, simple, erect, glabrous, purplish above; basal leaves narrowly oblanceolate, short-petiolate, acute or obtuse, 10 cm. long or less; cauline leaves all sessile, narrowly oblong to triangular-lanceolate, acute or abruptly acuminate, glabrous, thick and rather fleshy; inflorescence secund, loosely few-flowered, glabrous; pedicels slender, erect; sepals 3 mm. long, broadly ovate, obtuse or abruptly short-acuminate, scarious-margined; corolla about 25 mm. long, red, much dilated in the throat and sparingly bearded, contracted at the mouth, the upper lobes erect, the lower deflexed, nearly orbicular, short, about 2 mm. long.

Type in the U. S. National Herbarium, no. 563032, collected in the Lincoln National Forest in 1903 by Fred G. Plummer.

Similar in general appearance to *P. cardinalis*, but the calyx lobes are shorter and broader and obtuse, and the leaves thick and fleshy and of different outline.

***Pentstemon neomexicanus* Wooton & Standley, sp. nov.**

Perennial from a slender, creeping rootstock; stems stout, erect, simple, 50 to 70 cm. high, glabrous; basal leaves linear-oblanceolate, acute, petiolate, 8 cm. long or less; cauline leaves oblong to linear, acutish or obtuse, 6 to 10 cm. long, thick and fleshy, glabrous, rather numerous, scarcely reduced above; leaves of the inflorescence reduced, the lowest sometimes longer than the flowers; inflorescence much elongated, thyrsiform, secund, many-flowered, glabrous; pedicels stout, short; calyx lobes obovate to oblong, 4 to 5 mm. long, truncate or obtuse, abruptly short-mucronate, erose-denticulate at the apex, scarious-margined; corolla 22 to 25 mm. long, deep bright blue, with a dilated throat and spreading limb, the lobes rounded, strongly hairy in the throat; capsules ovoid-conic, 5 or 6 mm. high.

Type in the U. S. National Herbarium, no. 561371, collected in pine woods near Gilmores Ranch on Eagle Creek in the White Mountains, altitude 2,220 meters, August 15, 1907, by E. O. Wooton and Paul C. Standley (no. 3507).

ADDITIONAL SPECIMENS EXAMINED: Capitan Mountains, 1900, *Earle* 200; James Canyon, August 5, 1899, *Wooton*; Cloudcroft, alt. 2,550 meters, 1909, *Fisher* 23; Capitan Mountains, 1903, *Plummer*; White Mountains, alt. 1,890 meters, 1897, *Wooton* 238; White Mountain Peak, August 1, 1901, *Wooton*; Gilmores Ranch, July 27, 1901, *Wooton*; Wingfields Ranch, July, 1895, *Wooton*; Mescalero Reservation, July 21, 1905, *Wooton*; Ruidoso Creek, alt. 1,980 meters, July 3, 1895, *Wooton*; Cloudcroft, June 30, 1899, *Wooton*.

A very common and handsome plant in the higher parts of the Sacramento, White, and Capitan Mountains. It is most nearly related to *P. unilateralis* Rydb., but has very different calyx lobes and a hairy instead of glabrous throat. That species is found in New Mexico only in the higher mountains near the Colorado border.

***Pentstemon oliganthus* Wooton & Standley, sp. nov.**

Stems slender, erect, simple, 20 to 30 cm. high, glabrous below, glandular above; basal leaves oblong or oval, petiolate, obtuse, 2 cm. long or less; cauline

leaves few and remote, lanceolate to narrowly oblong, acute, erect, thick, glabrous beneath, minutely puberulent above; inflorescence loosely few-flowered, its branches glandular and slightly villous; pedicels mostly slender, sometimes 1 cm. long; calyx 4 mm. high, the lobes elliptic-oblong, acute, glandular-villous; corolla 20 to 25 mm. long, the tube slightly widened upward, the spreading lobes oblong, obtuse, bearded in the throat; sterile stamen strongly bearded with yellow hairs; capsules conic-ovoid, 6 or 7 mm. high, acute.

Type in the U. S. National Herbarium, no. 259061, collected in the mountains west of Grants Station, August 1, 1892, by E. O. Wooton.

This belongs to the group of *P. confertus* and *P. procerus*, but differs decidedly from those species in its larger flowers and loose, few-flowered inflorescence.

***Pentstemon spinulosus* Wooton & Standley, sp. nov.**

Stems slender, ascending, 20 to 35 cm. high, purplish, minutely puberulent; leaves linear-ob lanceolate to linear-lanceolate, numerous, obtuse or acute, slightly reduced upward, glabrous, narrowed at the base or sessile, 5 cm. long or less; bracts linear-lanceolate, 1 to 2 cm. long; inflorescence few-flowered; pedicels short, stout; sepals 7 mm. high, the lobes lanceolate, rather abruptly acuminate, not scarious, glabrous, the tips spreading; corolla 3 cm. long, dilated in the throat, not bearded, the spreading limb 2 cm. wide; stamens included; anthers sagittate, dehiscent for half their length, finely spinulose along the sutures.

Type in the U. S. National Herbarium, no. 156865, collected in the Magdalena Mountains in June, 1881, by G. R. Vasey.

This is more closely related to *P. bridgesii* than to any of the southwestern species, but may be separated by the glabrous instead of glandular inflorescence and the much dilated corolla tube. Whether the corollas are red as in that species can not be told from the faded dried specimens.

***Scrophularia laevis* Wooton & Standley, sp. nov.**

Tall perennial, 1 meter high or more; stems slender, bright green, glabrous, erect, simple or with a few weak, spreading branches; petioles long, slender, usually half as long as the blades, these ovate or broadly lanceolate, 4 to 7 cm. long, acute, neither attenuate nor acuminate, bright green, thin, glabrous, scarcely if at all paler beneath, few, truncate or rounded and usually somewhat decurrent at the base, coarsely lacinate-dentate, the teeth triangular, acute or attenuate; inflorescence rather sparse and short, consisting of 5 or fewer pairs of few-flowered corymbs on spreading peduncles; pedicels stout, ascending, 1 to 2 cm. long, glabrous or nearly so; flowers not seen; calyx lobes triangular-lanceolate, very acute, 3 to 4 mm. high; capsules narrowly ovoid, attenuate, about 8 mm. high, terminated by the persistent filiform style 4 mm. long.

Type in the U. S. National Herbarium, no. 561409, collected on a moist, shaded slope high up on Organ Peak above Filmore Canyon, altitude about 2,400 meters, September 23, 1906, by E. O. Wooton and Paul C. Standley.

ADDITIONAL SPECIMENS EXAMINED: Old Tiptop, Organ Mountains, October 18, 1903, *Metcalf*.

On account of its slender habit, green stems, and pale leaves, and of its long petioles, this plant appears very different from the other western species. It is also distinguished from our others by its broad, short leaves and very acute calyx lobes, as well as by its almost complete lack of indument.

***Scrophularia parviflora* Wooton & Standley, sp. nov.**

Perennial, about a meter high; stems rather slender, dull green or purplish, finely and densely puberulent throughout, simple or sparingly branched; petioles short, less than one-third as long as the blades, these mostly triangular-lance-

olate, 5 to 10 cm. long, truncate to cuneate at the base and unequal, often decurrent, attenuate, coarsely laciniate-dentate, the teeth mostly triangular and not very acute, dull green, conspicuously veined, puberulent on both surfaces; inflorescence short, of about 6 pairs of corymbs or fewer, these on stout, spreading peduncles, finely glandular-puberulent; pedicels slender, 15 mm. long or less; calyx lobes short, triangular-ovate, acute or acutish; corolla 6 mm. long, dull purplish; mature capsules not seen.

Type in the U. S. National Herbarium, no. 495413, collected in the Mogollon Mountains on the West Fork of the Rio Gila, Socorro County, altitude about 2,250 meters, August 2, 1903, by O. B. Metcalfe (no. 345).

ADDITIONAL SPECIMENS EXAMINED: Graham, July 21, 1900, *Wooton*.

Related to *S. californica* Cham. & Schlecht., but with sparser inflorescence, smaller flowers, thicker and more strongly veined leaves not cordate at the base, and different pubescence. We have seen two specimens of *S. parviflora* from Arizona, the one collected by G. C. Nealley in 1891 (no. 90), no locality given, and the other from the canyon of the Blue River near Coopers Ranch, Graham County, collected by Walter Hough, July 5, 1905.

Veronica micromera Wooton & Standley, sp. nov.

Slender, stoloniferous perennial; stems slender, 10 to 20 cm. long, ascending, freely rooting at the lower nodes, succulent, glabrous; leaves small, 1 to 2 cm. long, oval or obovate, the upper scarcely reduced, mostly shorter than the internodes, obtuse, thin, entire or obscurely and remotely serrulate, all the upper sessile, some of the lower contracted into petioles 1 mm. long, or all sessile; racemes axillary, slender, 3 to 7 cm. long, glabrous; pedicels very slender, ascending, or divergent and curved upward at the tip, subtended by very small, linear bracts; sepals 3 mm. long, narrowly lanceolate or elliptic-lanceolate, glabrous, very acute, in fruit evidently exceeding the capsule; corolla nearly white, bluish, scarcely exceeding the sepals; capsules small, 3 mm. long, glabrous, broadly oval, nearly orbicular, scarcely as broad as long, rounded at the apex but not broadly so.

Type in the U. S. National Herbarium, no. 686250, collected along ditches about Shiprock, on the Navajo Reservation, July 25, 1911, by Paul C. Standley (no. 7283). Altitude 1,425 meters.

The plant is similar to *V. americana*, but is much smaller and more slender in all its parts. The leaves are almost all sessile instead of petiolate, and the sepals are longer and narrower.

BIGNONIACEAE.

Stenolobium incisum Rose & Standley, sp. nov.

A low shrub 1 meter high or less, the stems simple or very sparingly branched; leaves 17 cm. long or less, with 5 to 11 leaflets, usually with 9; leaflets linear-lanceolate, mostly about 6 cm. long and a little less than 1 cm. wide, acuminate, attenuate to the base, the uppermost sessile, the lower conspicuously petiolulate, all sharply incised-serrate with deep, salient teeth, glabrous, or sometimes sparingly puberulent beneath; flowers about 4 cm. long, on peduncles about 5 mm. long, in simple racemes, each peduncle subtended by a linear bract; calyx with 5 acute, cuspidate teeth; fruit 12 to 15 cm. long, smooth, or with numerous light colored lenticels.

Type in the U. S. National Herbarium, no. 46776, collected on hills near Chihuahua, Mexico, November 15, 1886, by C. G. Pringle (no. 960). Also collected in the same locality by the same collector, October 2, 1885 (no. 360).

ADDITIONAL SPECIMENS EXAMINED: Santa Eulalia Mountains, Chihuahua, 1885, *Wilkinson*; near Concepcion del Oro, Zacatecas, 1902, *Palmer* 389; Durango,

1896, *Palmer* 131, 507; Saltillo, 1898, *Palmer* 193; near San Juan Capistrano, Zacatecas, 1897, *Rose* 2495.

The plant occurs as far north as western Texas and southern Arizona. In New Mexico it is known only from the Dona Ana Mountains, where it was collected October 28, 1896, by Wooton & Standley.

This has always passed as *S. stans* (*Tecoma stans* L.), but is distinguished by its low stature, narrow leaflets with sharp and salient teeth, and the narrower and longer bractlets. The leaflets, too, are usually more numerous than in *S. stans*. The latter is a shrub often 3 meters high or more, or even a low tree with well-defined trunk. The proposed species is never more than a very small shrub, often not more than 60 cm. high. It grows in the driest places in the southwestern mountains, on exposed slopes among rocks.

RUBIACEAE.

Houstonia rigidiuscula (A. Gray) Wooton & Standley.

Houstonia angustifolia rigidiuscula A. Gray, Syn. Fl. 1^a: 27. 1884.

Readily distinguished from *H. angustifolia* by the lower, stouter, less erect stems, the thick, rigid leaves, and the few, more closely glomerate flowers. A common plant of western Texas and eastern New Mexico, growing on the plains and low hills of the Upper Sonoran Zone.

CAPRIFOLIACEAE.

Sambucus vestita Wooton & Standley, sp. nov.

Shrub 3 meters high or less, with numerous stout stems from a single root; young branches minutely and densely velvety-pubescent; leaflets lanceolate or narrowly so, 8 to 15 cm. long, long-attenuate, very unequal at the base and usually rounded, puberulent beneath, puberulent above along the veins, thin, rather pale green, coarsely serrate, the teeth not incurved, acute, or acutish; petioles and petiolules densely and finely pubescent; cyme broad (10 to 20 cm.), flat-topped, with numerous open, slender, pubescent branches; flowers small, 3 to 4 mm. in diameter; fruit abundant, 5 mm. in diameter, black, glaucous.

Type in the U. S. National Herbarium, no. 560944, collected by Paul C. Standley in Ice Canyon above Van Pattens Camp in the Organ Mountains, June 11, 1906.

ADDITIONAL SPECIMENS EXAMINED: West Fork of the Gila, alt. 2,250 meters, 1903, *Metcalf* 344; 4 miles west of Kingston, 1909, *Goldman* 1822; Eagle Peak, August 2, 1900, *Wooton*; San Mateo Peak, alt. 3,000 meters, 1909, *Goldman* 1740; Black Range, alt. 2,550 meters, 1904, *Metcalf* 1184; Organ Mountains, 1908, *Bailey* 1469, May 15, 1892, *Wooton*.

The plant is common in the canyons of the southwestern mountains. It is related to *S. neomexicana*, but has smaller flowers and pubescent instead of glabrous branches. In habit the two are dissimilar, for *S. neomexicana* has usually a well-developed trunk with branches, while *S. vestita* consists of a clump of mostly simple shoots.

CICHORIACEAE.

Crepis chamaephylla Wooton & Standley, sp. nov.

Perennial from a thick, fleshy root; stems glabrous, glaucous, 30 cm. high, erect or ascending, very slender, the branches ascending, nearly naked, bearing only a few small, linear, bract-like leaves; basal leaves oblanceolate, entire, acute, 9 cm. long or less, glabrous, glaucous especially beneath, thick and succu-

lent, all lying flat upon the ground, sessile, or on short, broadly winged petioles; heads few; involucre 8 mm. high, glabrous, the bracts linear-lanceolate, pale yellowish green, the few outermost much reduced; corollas deep yellow; achenes dark brown, glabrous, scarcely discoid at the summit, with copious pappus of bright white bristles 4 mm. long.

Type in the U. S. National Herbarium, no. 686386, collected at the north end of the Carrizo Mountains, July 30, 1911, by Paul C. Standley (no. 7419). The plants were common in the wet ground about a small hillside spring flowing out from among juniper and pinyon trees. Upper Sonoran Zone.

The proposed species is a very distinct one by its entire, glaucous leaves which are reflexed upon the ground instead of erect as in most of our species. The heads are comparatively small and the bracts are a clear, pale yellowish green rather than black or brownish as we find them in most species. The aspect of the plant is strikingly like that of two of the species of *Cynthia*.

Crepis mogollonica Greene, sp. nov. in herb.

Basal leaves numerous, some of them linear and entire, others narrowly linear-oblong or linear-oblongate and runcinate-pinnatifid into linear lobes, glabrous, bright green, thin, 18 to 24 cm. long; stems slender, 40 to 60 cm. high, glabrous, with few, ascending branches, bearing linear, bract-like leaves at the nodes; heads few, long-pedunculate; involucre 10 to 12 mm. high, of linear-oblong, glabrous bracts; flowers bright yellow; achenes slender, brown, 5 mm. long, shorter than the slightly sordid pappus.

Type in the U. S. National Herbarium, no. 495570, collected in the Mogollon Mountains, Socorro County, on the West Fork of the Gila, altitude 2,400 meters, August 23, 1903, by O. B. Metcalfe (no. 576).

This is related to *C. glauca*, or is of that group at least. It is distinguished from the related species by its large heads and the very long, extremely narrow leaves.

Crepis neomexicana Wootton & Standley, sp. nov.

Basal leaves in a dense cluster, about 9 cm. long, nearly sessile by winged bases, oblanceolate or oblong, deeply runcinate-pinnatifid with broadly triangular lobes, rather obtuse at the apex, thick and firm, bright green, glabrous; stems about 30 cm. high, stout, glabrous, sparingly branched, with reduced, linear, bract-like leaves at the nodes; peduncles sparingly tomentose; involucre 8 mm. high, the bracts linear, slightly attenuate upwards, glandular; flowers bright yellow; mature achenes not seen, the young ones very short, brown.

Type in the U. S. National Herbarium, no. 563743, collected on Tularosa Creek, Socorro County, July 14, 1906, by E. O. Wootton.

Similar to *C. perplexans* Rydb., but with smaller heads and very thick, broad, deeply lobed leaves.

Ptiloria bigelovii (A. Gray) Wootton & Standley.

Hemiptilium bigelovii A. Gray, U. S. & Mex. Bound. Bot. 105. 1859.

CARDUACEAE.

Coelestina sclerophylla Wootton & Standley, sp. nov.

Slender, rigid perennial, about 35 cm. high, with numerous puberulent, nearly simple stems from a suffrutescent base; leaves opposite, numerous, lanceolate to ovate or somewhat deltoid, 25 to 40 mm. long, thick and rigid, acute or attenuate, attenuate or acute at the base, coarsely crenate, puberulent on both

surfaces, glandular-dotted beneath, all on slender petioles 7 mm. long or less; inflorescence of few, clustered heads terminating long, naked branches; heads campanulate, 7 mm. high, on short, glandular or puberulent peduncles; bracts linear, appressed, attenuate, puberulent, striate; flowers but little exceeding the bracts; achenes 3 mm. long, 5-angled, glabrous; pappus a short, obtusely toothed, glabrous crown.

Type in the U. S. National Herbarium, no. 232780, collected in Guadalupe Canyon, Sonora, August 27, 1893, by E. C. Merton (no. 2031). Also on Cajon Creek in Chihuahua along the New Mexico line, August 16, 1892, *Mearns* 700. Guadalupe Canyon extends into New Mexico, and doubtless the plant occurs on the north as well as on the south side of the boundary.

Doctor Gray reported this plant from this same region as *Ageratum corymbosum* Zucc., but the northern plant is very unlike true *corymbosa*, which occurs much farther south. It differs especially in the form of the leaves and in the pubescence and inflorescence.

***Kuhnia chlorolepis* Wooton & Standley, sp. nov.**

Perennial with numerous stems from a thick, woody root; stems slender, erect, 30 to 50 cm. high, simple up to the inflorescence, there abundantly branched, densely puberulent; upper leaves linear, the lower lanceolate or lance-linear, all obtuse, densely puberulent, sessile, 3-nerved, glandular-dotted on the lower surface; heads numerous, on long, slender peduncles, large, 15 mm. high; bracts firm, green tinged with purple, linear-oblong, broad, the outer short and acute, the inner obtuse or acuminate, finely pubescent, conspicuously striate, in several series, the outer ones gradually and successively shorter; corolla lobes oblong-lanceolate, rather long; achenes pubescent, 6 mm. long, finely striate; pappus 6 mm. long, whitish, copper colored at the base.

Type in the U. S. National Herbarium, no. 560399, collected at Mangas Springs, June 2, 1903, by O. B. Metcalfe (no. 104).

ADDITIONAL SPECIMENS EXAMINED: Gila River bottom near Cliff, alt. 1,350 meters, 1903, *Metcalfe* 152; 1851-2, *Wright* 1394 and 1132 (in part); Alamo Viejo, 1892, *Mearns* 138; *Mexican Boundary Survey* 458 (in part).

This is most nearly related, perhaps, to *K. gooddingii* A. Nels., but that has smaller heads and densely glandular bracts. In that species, too, the bracts are much thinner and not green.

***Coleosanthus chenopodinus* Greene, sp. nov. in herb.**

Small, much-branched shrub; stems stout, with exfoliating bark, puberulent below, glandular above, densely branched; leaves small, ovate or lanceolate, 35 mm. long or less, rather thick and succulent, glabrous or nearly so, acute, rounded or cuneate at the base, somewhat serrate; heads paniculate, large, about 12 mm. long, on slender, leafy, densely viscid peduncles 2 to 4 cm. long; outer bracts often foliaceous, lanceolate, the others lanceolate to oblong-linear, conspicuously nerved, glandular-viscid, acute, or the inner obtuse; achenes faintly strigose.

Type in the U. S. National Herbarium, no. 495728, collected in the Gila River bottom near Cliff, Grant County, September 22, 1903, by O. B. Metcalfe (no. 776). Altitude 1,350 meters.

A peculiar species, somewhat related to *C. floribundus*, but with very long peduncles, larger heads, and peculiarly succulent leaves.

***Coleosanthus venosus* Wooton & Standley, sp. nov.**

Low perennial, 50 cm. high or less, with several stems from a woody root; stems slender, simple below, sparingly branched above, cinereous-puberulent; leaves narrowly oblong to linear, obtuse, sessile, entire or obscurely serrate,

thick, conspicuously veined, canescent, 55 mm. long or less; heads few, racemose or narrowly paniculate, 10 to 12-flowered, 10 to 12 mm. high; peduncles slender, bearing 1 to 3 heads, 10 to 35 mm. long; bracts much imbricated in several series, the outer orbicular to broadly oblong or ovate, obtuse or emarginate and mucronate, cinereous, the inner lanceolate, acute, cillolate, all prominently striate; achenes equally striate, strigose, brown, with firm, white, scaberulous pappus.

Type in the U. S. National Herbarium, no. 495629, collected at Mangas Springs, September 5, 1903, by O. B. Metcalfe (no. 653). Altitude 1450 meters.

ADDITIONAL SPECIMENS EXAMINED: 1851, *Wright* 1135; Burro Mountains, September, 1880, *Rusby*; San Luis Mountains, 1893, *Mearns* 2211 and 2234.

The plant also occurs in southern Arizona and northern Chihuahua. In the Synoptical Flora it was listed as *Brickellia oliganthes* (Less.) A. Gray, but that name was applied originally to a plant from much farther south in Mexico. *C. venosus* differs in having much narrower, sessile, more pubescent leaves, as well as different inflorescence, bracts, and pubescence. Doctor Gray at various times remarked that the plant from New Mexico and Arizona was different from that of Mexico, but probably he had not sufficient Mexican material to warrant separation of the two.

***Grindelia neomexicana* Wooton & Standley, sp. nov.**

Erect biennial or perennial, 50 cm. high or less; stems slender, sparingly branched from the base but abundantly branched above, the branches erect, leafy throughout, glabrous; cauline leaves narrowly oblong, or oblong-lanceolate, 45 mm. long and 10 mm. wide or less, sessile, obtuse or acute, glabrous, sharply and evenly serrate, rarely entire; heads few, large, 15 mm. wide and 12 mm. high or smaller; rays numerous, showy, stiff, 15 mm. long, narrowly spatulate, obtuse; bracts many, elongated-linear, the outermost thick and green throughout, with lax, slightly spreading tips, the innermost wide, scarcely if at all viscid; heads subtended by 1 or 2 linear or linear-lanceolate, bract-like leaves; achenes light brown, faintly striate, the pappus smooth or sparingly and very faintly barbellate.

Type in the U. S. National Herbarium, no. 561099, collected in the mountains north of Santa Rita, August 23, 1900, by E. O. Wooton.

ADDITIONAL SPECIMENS EXAMINED: Mountains southeast of Patterson, August 16, 1900, *Wooton*; G O S Ranch, 1911, *Holzinger*.

We have seen no other New Mexican plant with involucre bracts like those of this species. They are unusually numerous, narrow, green, and only slightly spreading, none of them being recurved.

***Grindelia pinnatifida* Wooton & Standley, sp. nov.**

Perennial or biennial, 30 to 45 cm. high, with numerous stout stems from each root, these simple below but with numerous erect, slender, corymbose branches above; stems glabrous, striate, reddish above; lower leaves long-petiolate, laciniate-pinnatifid, the segments irregularly dentate, oblong, acutish; upper leaves linear-oblong, laciniate-serrate, sessile by clasping bases, all glabrous or nearly so, conspicuously glandular-punctate; heads solitary at the ends of the branches, depressed-hemispheric, 15 to 17 mm. in diameter; bracts linear, with flat, green, slightly reflexed tips, densely viscid; immature achenes glabrous; pappus bristles smooth.

Type in the U. S. National Herbarium, no. 685628, collected on open slopes about Chama, altitude about 2,400 meters, July 9, 1911, by Paul C. Standley (no. 6606).

The plant was very abundant about Chama, in the Transition Zone. It differs from all our other species in its evidently pinnatifid lower leaves. The

truly basal ones were not secured, but doubtless they are even more deeply divided than the lower cauline ones.

***Grindelia setulifera* Wooton & Standley, sp. nov.**

Stems slender, with numerous erect branches, leafy throughout, glabrous, reddish; cauline leaves oblanceolate, 25 mm. long or less, obtuse, sessile, with numerous setose teeth, the teeth toward the apex usually broader; heads numerous, mostly 10 to 12 mm. broad, subtended by 1 or 2 oblanceolate, bract-like leaves; outer bracts lanceolate, acute, thick and green at the tips, the inner mostly oblong, acute or abruptly acuminate, thin, straw colored, scarcely at all viscid; all the bracts erect and appressed; rays numerous, narrowly spatulate, obtuse, about 10 mm. long; achenes brown, glabrous, about 3 mm. long.

Type in the U. S. National Herbarium, no. 45772, collected on high summits of the Mogollon Mountains, September, 1881, by Dr. H. H. Rusby (no. 206).

This was originally determined as *G. arizonica*, but it differs from that species in its much smaller heads and very different leaves. The bracts, too, are not alike in the two species.

***Chrysopsis cryptocephala* Wooton & Standley, sp. nov. •**

Perennial with several stems from a slender, woody root; stems very slender, 30 to 40 cm. high, erect, glandular-puberulent, sometimes sparingly hirtellous above, simple, with rather few leaves; leaves sessile, oblong to lanceolate or ovate, obtuse, often abruptly acuminate and mucronate, 25 mm. long or less, green, thin, minutely glandular, scaberulous, especially on the upper surface; heads mostly solitary at the ends of the simple stems, sometimes corymbose, about 1 cm. broad, almost hidden by the numerous, thin, broad, often ciliate, ovate, acute, bract-like leaves; rays numerous, pale yellow, 8 or 9 mm. long.

Type in the U. S. National Herbarium, no. 563739, collected by E. O. Wooton in section 23 of the V Pasture in the White Mountains, July 23, 1905.

ADDITIONAL SPECIMENS EXAMINED: Gavilan Creek, August 19, 1897, *Wooton* 512.

This formed a part of Doctor Greene's *C. fulcrata*, as originally described, but it is very different from the type of that species. It is most like *C. rest-nolens* A. Nels., but has broader, fewer heads, different leaves, and very different bracts.

***Chrysopsis nitidula* Wooton & Standley, sp. nov.**

Perennial with several stems from a slender root; stems slender, erect, 20 to 35 cm. high, finely and rather sparingly sericeous, leafy; leaves oblanceolate, or the uppermost lanceolate, obtuse or acutish, sessile, the lower tapering to the base, finely sericeous, the leaf as a whole appearing green and remarkably soft and smooth; heads 1 to several, on slender, erect peduncles, subtended by a few elliptic to oblanceolate, thin, bract-like leaves; disk about 1 cm. broad, the bracts linear-lanceolate, acute, sericeous; rays numerous, bright yellow, 10 to 12 mm. long; achenes compressed, sericeous.

Type in the U. S. National Herbarium, no. 495550, collected by O. B. Metcalfe in the Mogollon Mountains on the West Fork of the Gila, at an altitude of about 2,250 meters, August 20, 1903 (no. 552).

ADDITIONAL SPECIMENS EXAMINED: North of Ramah, July 25, 1906, *Wooton*; Middle Fork of the Gila, August 5, 1900, *Wooton*.

This is very unlike any of our other species, being strongly marked by its peculiar pubescence and long rays.

***Chrysopsis senilis* Wooton & Standley, sp. nov.**

Stout perennial with several stems from each root; stems simple below, corymbosely branched above, the branches ascending, densely villous throughout, very leafy, the leaves mostly longer than the internodes; leaves sessile, oblong or

oblong-lanceolate, obtuse, often abruptly short-acuminate, thick, canescent; heads crowded, 3 to 8 at the end of each branch, about 1 cm. broad, subtended by numerous ovate to elliptic, thin, bract-like leaves, these long-ciliate; involucre bracts thin and membranous, linear or linear-lanceolate, in several series, acute, canescent; the very short peduncles densely white-villous; rays numerous, dull yellow, about 9 mm. long; achenes compressed, densely villous. Type in the U. S. National Herbarium, no. 330713, collected in the Organ Mountains at an altitude of 1,440 meters, September 1, 1897, by E. O. Wooton (no. 509).

ADDITIONAL SPECIMENS EXAMINED: Pena Blanca, October 21, 1906, *Wooton & Standley*; San Augustine Ranch, September 1, 1897, *Wooton*; 1851, *Wright*; Organ Mountains, September 4, 1898, *Cockerell*; Van Pattens, September 10, 1899, *Wooton*.

This is related to *C. fulcrata* Greene, which grows in the same range of mountains, but it has abundant, long, white pubescence, while in that species the pubescence is short and not conspicuously white. *C. senilis*, too, has mostly grayish, narrower leaves and there are several heads clustered at the ends of each branch, while in *C. fulcrata* the heads are usually solitary.

Sideranthus laevis Wooton & Standley, sp. nov.

Perennial from a thick, woody root; stems slender, much branched, erect, the branches ascending, bright green, glabrous; leaves linear or linear-oblong, bright green, glabrous, entire or sparingly serrate, the teeth low and inconspicuous; heads few, solitary, 8 or 9 mm. broad, on slender peduncles; bracts linear or linear-lanceolate, acute, glabrous or sparingly puberulent; rays pale yellow, 4 mm. long; achenes small, densely sericeous, the pappus evidently barbellate.

Type in the U. S. National Herbarium, no. 564582, collected on gypsum hills near Lakewood, August 6, 1909, by E. O. Wooton.

From its lack of pubescence this might be confused with *S. glaberrimus* Rydb., but in appearance the two are really very unlike. Our plant is much more slender, is much branched, and has fewer heads and narrow, shallowly toothed leaves, and the whole plant is of a bright green, while the stems and foliage of *S. glaberrimus* are dull and somewhat glaucous.

Sideranthus viscidus Wooton & Standley, sp. nov.

Stems stout, branched, ascending or spreading, densely glandular-puberulent, 50 cm. high or less; cauline leaves thick, numerous, oblong, obtuse, sessile, coarsely serrate, the teeth not spinulose, densely viscid; heads few, on slender peduncles, campanulate, about 12 mm. broad; bracts linear, with evident green tips, glandular-puberulent; rays few, short, not more than 5 mm. long; achenes nearly 3 mm. long, densely sericeous, with tawny pappus 5 or 6 mm. long.

Type in the U. S. National Herbarium, no. 690240, collected near Hope, August 3, 1905, by E. O. Wooton.

ADDITIONAL SPECIMENS EXAMINED: Dayton, October 3, 1907, *E. S. Wigsdale*.

Very different from our other species in the form of its leaves and in its densely viscid pubescence.

Isocoma oxylepis Wooton & Standley, sp. nov.

Perennial, about 30 cm. high, with numerous stems from a thick, woody root; stems slender, glabrous, densely leafy, erect, ending in a corymbose inflorescence; leaves linear, acute, glabrous or scaberulous, 4 cm. long or less, weak and spreading or reflexed; heads very numerous, all on slender peduncles 1 cm. long or shorter; involucre narrowly campanulate, about 4 mm. high; bracts glabrous or nearly so, lanceolate or oblong-lanceolate, acute; throat of

the corolla but slightly inflated, the lobes lanceolate, acute; achenes densely sericeous.

Type in the U. S. National Herbarium, no. 233968, collected near White Water, Chihuahua, September 11, 1893, by Dr. E. A. Mearns (no. 2288).

ADDITIONAL SPECIMENS EXAMINED: Dog Spring, New Mexico, September 22, 1893, *Mearns* 2407.

This is a very striking species, distinguished by its numerous, very narrow, long, and weak leaves, the many pedunculate heads, and the acute bracts.

Isocoma wrightii (A. Gray) Wooton & Standley.

Linosyris wrightii A. Gray, Pl. Wright. 1: 95. 1852.

Bigelovia wrightii A. Gray, Proc. Amer. Acad. 8: 639. 1873.

This has been confused with *L. heterophylla*, but is amply distinct in its narrow leaves and slenderly pedunculate heads. Both species occur in New Mexico.

Chrysothamnus baileyi Wooton & Standley, sp. nov.

Low, densely branched shrub; older branches covered with rough, dark gray bark, the younger ones straw colored, slender, puberulent, angled, densely leafy; leaves erect or appressed, linear or linear-oblong, 15 mm. long or less, abruptly acuminate, sharp-pointed, thick, dull pale green, minutely ciliolate with short, stout hairs, otherwise glabrous, sessile; heads numerous, clustered at the ends of the branches, turbinate to cylindric, not strongly angled; involucre 10 mm. high or less, the numerous bracts ovate to oblong or lanceolate, thin, glabrous, abruptly acuminate, mostly bristle-pointed; achenes glabrous, striate; pappus yellowish, 8 to 10 mm. long.

Type in the U. S. National Herbarium, no. 443565, collected at the north end of the Guadalupe Mountains, September 4, 1902, by Vernon Bailey (no. 498).

ADDITIONAL SPECIMENS EXAMINED: White Mountains, alt. 1,620 meters, 1897, *Wooton* 508; Buchanan, August 12, 1909, *Wooton*.

This is similar in general appearance to *C. pulchellus*. That species does not have ciliolate leaves and has much larger heads and longer pappus.

Solidago arizonica (A. Gray) Wooton & Standley.

Solidago canadensis arizonica A. Gray, Proc. Amer. Acad. 17: 197. 1882.

Stems stout, usually simple, 1 meter high or often more, striate, finely and densely cinereous-puberulent; leaves very numerous, often crowded, elliptic to elliptic-lanceolate or oblanceolate, 7 to 18 cm. long, acute, attenuate at the base to a broad, margined petiole or sessile, sharply serrate or often only obscurely and remotely serrate, bright green, evidently triple-veined, copiously scabrous on both surfaces; inflorescence a broad, pyramidal panicle, 25 cm. long and as broad or smaller, all the branches recurved-ascending, slender, densely puberulent, sparsely viscid; pedicels slender, erect or ascending, 5 to 7 mm. long; heads campanulate, about 5 mm. high, with very numerous flowers and short, narrow, inconspicuous rays; achenes short, loosely pubescent, less than half as long as the white, scabrous pappus.

Although first described from Arizona, this plant is a common and showy species of southern New Mexico. It has always been associated with *S. canadensis*, but seems remarkably distinct from that species, especially by its very large heads.

Solidago howellii Wooton & Standley, sp. nov.

Stems low and stout, 40 cm. high or less, purplish below, densely canescent; basal leaves not seen; cauline leaves narrowly elliptic to oblanceolate or linear-ob lanceolate, 25 to 75 mm. long, acute, or the lower obtuse, very thick and stiff, tapering at the base, mostly entire, prominently 3-nerved, densely scabrous-

canescent on both surfaces; inflorescence pyramidal or narrow, 10 to 15 cm. long, all the branches recurved, densely canescent; leaves of the inflorescence elliptic to ovate-lanceolate or linear-lanceolate, acute; pedicels 3 to 5 mm. long; heads 5 to 7 mm. high; involucre bracts oblong, obtuse, straw colored, glabrous or nearly so; rays 2 to 2.5 mm. long, pale yellow; achenes conspicuously strigose.

Type in the U. S. National Herbarium, no. 495104, collected on the Sierra Grande, August 15, 1903, by A. H. Howell (no. 219).

ADDITIONAL SPECIMENS EXAMINED: Clayton, 1891, *Carleton* 393; Sierra Grande, 1903, *Howell* 236, 237; Trinchera Pass, September 7, 1903, *Howell* 190; Folsom, 1903, *Howell* 162; Capitan Mountains, 1903, *Gaut* 91; Sierra Grande, altitude 2,300 meters, 1911, *Standley* 6097; Nara Visa, 1911, *Fisher* 204.

This is related to *S. radula*, but has larger heads and 3-nerved cauline leaves. The plant, too, is not bright green, but dull yellowish or grayish, because of the more abundant pubescence of the various parts. It is also related to *S. mollis* Bartl., but has very different leaves.

The plant is abundant upon the lower slopes of the Sierra Grande, growing among the volcanic rocks.

Solidago neomexicana (A. Gray) Wooton & Standley.

Solidago multiradiata neomexicana A. Gray, Proc. Amer. Acad. 17: 191. 1882.

Stems stout, erect, 50 to 60 cm. high, purplish, striate, nearly glabrous below, above viscid-puberulent; basal leaves not seen, the cauline ones oblanceolate, 5 to 10 cm. long, acute, pale green, narrowed at the base into broadly winged petioles, glabrous, finely and inconspicuously reticulate-veined, never triple-veined; inflorescence rather loosely thyrsoid, often with loose axillary clusters, viscid-puberulent; peduncles short, stout, 2 to 4 mm. long; heads large, 7 mm. high, campanulate, with numerous disk and ray flowers; bracts unequally imbricated, narrowly oblong, obscurely puberulent, acute; achenes about 2 mm. long, terete or nearly so, stout, densely appressed-pubescent, about half as long as the copious pappus.

The type was collected by Rusby, in September, 1881, on high, rocky summits of the Mogollon Mountains of New Mexico. The plant seems not to have been found by any other collector.

Solidago tenuissima Wooton & Standley, sp. nov.

Stems slender, glabrous, pale, about 1 meter high or a little less, simple; basal leaves linear-ob lanceolate, acute, entire or with a few remote, low teeth, 10 to 20 cm. long; cauline leaves linear-ob lanceolate, the uppermost nearly linear, glabrous, bright green, conspicuously veined but never triple-nerved, acute, long-attenuate to the base, 5 to 15 cm. long, usually entire or the lower remotely serrate, the leaves rather numerous on the stems, spreading or inclined to be ascending; inflorescence a narrow panicle with few ascending branches, often a few pedunculate racemes in the axils of the leaves, the whole very narrow and slender, 10 cm. long or less and less than 5 cm. wide; branches of the inflorescence and pedicels puberulent, the latter 3 to 5 mm. long; bracts linear, 5 mm. long or less; heads rather numerous, 3.5 or 4 mm. high; involucre bracts oblong-lanceolate, obtuse, ciliolate at the apex, glabrous or sparingly puberulent; rays small, 1.5 mm. long.

Type in the U. S. National Herbarium, no. 591665, collected in Guadalupe Canyon near Cloverdale, July 15, 1892, by Dr. E. A. Mearns (no. 466).

ADDITIONAL SPECIMENS EXAMINED: Head of Guadalupe Canyon near Cloverdale, July 15, 1892, *Mearns* 473; along streams, Mogollon Mountains, July, 1881, *Rusby* 227.

Doctor Rusby's specimens were distributed as *S. missouriensis*, and our species belongs to the group of which that species is a member. It is related

to *S. glaberrima*, but is a taller, much more slender plant, with very narrow leaves and a different, narrow inflorescence.

***Petradoria graminea* Wooton & Standley, sp. nov.**

Tufted perennial from a thick, woody caudex, low, 10 to 15 cm. high; old leaves persistent at the base in a dense mass, grayish; leaves linear, rigid, sharp-pointed, 1-nerved, 3 to 5 cm. long, glabrous, dilated at the base, very numerous; corymbs with few cylindric heads 6 to 7 mm. high; bracts acute to abruptly acuminate or obtuse, smooth, stramineous; flowers usually 5; achenes brown, glabrous.

Type in the U. S. National Herbarium, no. 45773, collected in northwestern New Mexico, July 14, 1883, by C. C. Marsh (no. 209).

ADDITIONAL SPECIMENS EXAMINED: South of Gallup, 1904, *Wooton* 2560; Gallup, 1897, *Herrick* 816; Tunitcha Mountains, 1911, *Standley* 7777.

A species of different aspect from *P. pumila* because of the very numerous, short, grass-like leaves and smaller stature. In general appearance the plants suggest some of the narrow-leaved species of *Arenaria*.

***Leptilon integrifolium* Wooton & Standley, sp. nov.**

Annual or possibly biennial, 20 to 40 cm. high; stems stout, much branched at the base or above, glandular-villous and arachnoid; leaves numerous, oblong, obtuse, entire or rarely with a few teeth, sessile by a clasping base, villous; heads rather few, racemose, subtended by small lanceolate leaves, on slender peduncles 1 to 3 cm. long, 6 to 8 mm. broad; bracts green, lanceolate, acute, villous and arachnoid; rays very short, nearly obsolete, white; achenes small, glabrous, the fine, nearly white pappus 3 mm. long.

Type in the U. S. National Herbarium, no. 495594, collected on the West Fork of the Gila in the Mogollon Mountains, altitude about 2,100 meters, August 28, 1903, by O. B. Metcalfe (no. 610).

ADDITIONAL SPECIMENS EXAMINED: Mineral Creek, alt. 2,250 meters, 1904, *Metcalfe* 1419; White Mountains, alt. 2,100 meters, 1897, *Wooton* 356; East Las Vegas, September 24, 1907, *S. Y. Parnay*; Gilmores Ranch, alt. 2,220 meters, 1907, *Wooton & Standley* 3698.

Similar to *L. subdecurrens*, but that has all its leaves prominently toothed, its heads short-pedunculate, its stem less branched, and its pubescence rather different.

***Erigeron deminutus* Wooton & Standley, sp. nov.**

Perennial with creeping rootstocks; stems stout, 30 cm. high or less, simple, canescent; basal leaves spatulate, oblanceolate, obtuse or acutish, 6 cm. long or less; cauline leaves oblanceolate to oblong-lanceolate, acutish, sessile, thick, canescent, the upper much reduced; peduncles 1 to 5, long, stout, canescent and sparingly glandular; disk 10 to 12 mm. wide; bracts in about 2 series, linear, acute, appressed, densely canescent; rays pale purplish, narrow, about 100, 7 to 8 mm. long; achenes strigose, brown, the pappus in 2 series.

Type in the U. S. National Herbarium, no. 690244, collected north of Ramah, July 25, 1906, by E. O. Wooton.

ADDITIONAL SPECIMENS EXAMINED: Mountains west of Grants Station, alt. 1,800 meters, August 2, 1892, *Wooton*.

A species of the *glabellus* group, readily distinguished by its thick, canescent leaves.

***Erigeron eastwoodiae* Wooton & Standley, sp. nov.**

Low annual, 10 to 14 cm. high, with very numerous spreading, slender branches arising from or near the base; stems much branched, smooth, sparingly cinereous, the tips of the hairs all directed upward; leaves linear or

linear-oblongate, obtuse, 20 cm. long or less, the uppermost shorter and narrower, cinereous but not densely so; heads small, about 7 mm. wide; peduncles very slender, terminating the branches, mostly naked; involucre bracts in about 2 series, green, thin, nearly linear, slightly glandular, sparingly hirsute, abruptly acute; rays 25 to 30, pale purple, 3 mm. long; achenes slender, conspicuously compressed, nearly glabrous; pappus deciduous, uniseriate, of few weak, white bristles.

Type in the U. S. National Herbarium, no. 687233, collected on dry hills at the north end of the Carrizo Mountains, July 30, 1911, by Paul C. Standley (no. 7433).

ADDITIONAL SPECIMENS EXAMINED: Shiprock, alt. 1,425 meters, 1911, *Standley* 7275.

The plant was first collected by Miss Alice Eastwood along the San Juan River in southeastern Utah, July 12, 1895. Probably it is what is reported as *E. bellidiastrum* in Rydberg's Flora of Colorado, said to come from McElmo Canyon. It is nearly related to that species, but is a very low, diffusely branched plant, very unlike *E. bellidiastrum* in habit. The rays are brighter colored and the leaves shorter and narrower.

***Erigeron gilensis* Wooton & Standley, sp. nov.**

Biennial or possibly only annual, 35 cm. high, branched from the base; stems several, slender, erect, with numerous leaves, copiously strigose, the pubescence near the base mostly spreading; leaves oblanceolate to narrowly oblong or linear-lanceolate, the lower obtuse, the upper acute, sessile or attenuate to the base, sparingly strigose on both surfaces; heads few, on slender, erect peduncles, the disk 8 or 9 mm. wide; bracts linear, acute or attenuate, villous, slightly viscid; rays numerous, about 100, lavender, linear, 5 mm. long.

Type in the U. S. National Herbarium, no. 690243, collected on the North Fork of the Rio Gila, August 4, 1900, by E. O. Wooton.

This is related to *Erigeron divergens*, but the pubescence is mostly appressed instead of spreading, and the plant is greener, more slender, lower, and less branched.

***Erigeron rudis* Wooton & Standley, sp. nov.**

Perennial from a stout, creeping, branched rootstock, 4 or 5 stems or more in each clump; stems erect, a meter high or less, stout, striate, hirsute throughout, usually simple below; radical leaves oblanceolate to spatulate, acute or obtuse, entire, 12 cm. long and 14 mm. wide or smaller, 3-nerved, bright green, scabrate or glabrate, long-petiolate; cauline leaves lanceolate or oblong-lanceolate, 6 cm. long and 2 cm. wide or smaller, very numerous, the plants appearing densely leafy, the leaves little reduced above, acute, sessile by broad, somewhat clasping bases, scabrous on both surfaces, ciliate; peduncles stout, short, villous, glandular, ascending; heads 3 to 8, the disk about 15 mm. wide and 7 mm. high; rays numerous, very narrow, light purple, about 12 mm. long; bracts linear, appressed, glandular-puberulent, in about 2 series; achenes strigose, the pappus in 2 series.

Type in the U. S. National Herbarium, no. 330495, collected in the White Mountains, Lincoln County, August 1, 1897, by E. O. Wooton (no. 270). Altitude 2,100 meters.

ADDITIONAL SPECIMENS EXAMINED: Burro Mountains, alt. 2,100 meters, 1906, *Blumer* 1831; Luna, July 28, 1900, *Wooton*; West Fork of the Gila, August 6, 1900, *Wooton*; Middle Fork of the Gila, August 5, 1900, *Wooton*; 1851, *Wright* 1165; Wheelers Ranch, July 11, 1906, *Wooton*; Graham, July 21, 1900, *Wooton*; Gilmores Ranch, July 14, 1895, *Wooton*; Capitan Mountains, 1900, *Earle* 397; Capitan Mountains, alt. 2,100 meters, 1900, *Earle* 196.

One of the most abundant species in the mountains of southern New Mexico; a tall, coarse plant, usually growing along streams. It has passed as *Erigeron macranthus*, but has different pubescence and is a stouter, more leafy plant.

Erigeron semirasus Wooton & Standley, sp. nov.

Perennial from a slender rootstock; stems usually slender, erect, densely leafy, 60 cm. high or less, mostly glabrous below, above puberulent and somewhat glandular, reddish; basal leaves oblanceolate-spatulate; lower cauline leaves oblanceolate, the upper lanceolate or lance-ovate and but little reduced, acute, the uppermost sessile by clasping bases, scabrous, not ciliate, bright green, thick, entire; peduncles few, short, stout, ascending, nearly concealed by the leaves; disk about 12 mm. broad; bracts in 2 series, linear, acute, glandular-puberulent; rays purple, narrow, numerous, 10 mm. long; achenes strigose, the pappus in 2 series.

Type in the U. S. National Herbarium, no. 495395, collected in the Mogollon Mountains on Mogollon Creek, July 23, 1903, by O. B. Metcalfe (no. 320). Altitude 2,400 meters.

ADDITIONAL SPECIMENS EXAMINED: Mountains near Las Vegas, July, 1881, Vasey; 1847, Fendler 376; Harveys Upper Ranch, alt. 2,880 meters, 1908, Standley 4606; Beulah, August, 1899, Cockerell; Beulah, 1899, Porter; Upper Pecos, 1904, Bartlett 123.

Erigeron senilis Wooton & Standley, sp. nov.

Biennial or a short lived perennial from a slender root; stems branched from near the base, usually simple for about 2 cm. then branched, the branches very slender, 30 cm. long or less, prostrate or ascending, densely hirsute at the base, above strigose; basal leaves spatulate-obovate, obtuse, long-petiolate; cauline leaves rather distant, spatulate-obovate to oblanceolate, thin, bright green, considerably reduced toward the extremities of the branches, abruptly acuminate or acutish, strigose; heads 10 to 12 mm. in diameter, on long, slender, sparingly strigose peduncles; bracts nearly equal, linear, acute, hirsute; rays numerous, pale purplish, very narrow, 4 to 5 mm. long; achenes glabrous, stramineous, the pappus in a single series.

Type in the U. S. National Herbarium, no. 560777, collected in a canyon above Van Pattens Camp in the Organ Mountains, June 9, 1906, by Paul C. Standley.

ADDITIONAL SPECIMENS EXAMINED: Organ Mountains, alt. 1,650 meters, August 29, 1894, Wooton.

In habit this is much like *E. flagellaris*, but the stems have different pubescence and the leaves are much broader, less reduced toward the extremities, and more obtuse. The method of branching, too, is different from that of *E. flagellaris*.

Erigeron bakeri Wooton & Standley, sp. nov.

Perennial from a slender rootstock; stems stout, erect, 45 cm. high or less, simple up to the inflorescence, glabrous near the base, elsewhere finely and densely soft-pubescent; basal leaves oblanceolate, acute, 20 cm. long or less, long-petiolate; cauline leaves oblanceolate below to lanceolate or elliptic-oblong above, acute or acuminate, numerous, thin, sparingly appressed-pubescent, bright green; peduncles stout, 10 cm. long or less, soft-pubescent with fine, dark hairs, bearing a few small leaves; disk 12 to 14 mm. wide; bracts in about 2 series, linear, acute, appressed, canescent; rays purplish, narrow, numerous, 7 or 8 mm. long; achenes strigose, the pappus in 2 series.

Type in the U. S. National Herbarium, no. 369203, collected near Chama, September 9, 1899, by C. F. Baker (no. 678).

ADDITIONAL SPECIMENS EXAMINED: Chama, 1899, *Baker*; Chama, alt. 2,400 meters, 1911, *Standley* 6744; Dulce, alt. 2,400 meters, 1911, *Standley* 8088 and 8179.

This is another species of the *macranthus* group, apparently, with pubescence very different from that of the related species. The plant is common about Chama and Dulce, growing in the moist meadows along the small streams.

Erigeron tonsus Wooton & Standley, sp. nov.

Biennial or a short-lived perennial, from a slender, short root; stems very slender, flagelliform, spreading and forming dense mats, 20 cm. long or less, glabrous or with a few scattered, appressed hairs, bright green; basal leaves narrowly oblanceolate-spatulate, 6 cm. long or less, abruptly acuminate or acutish, attenuate to a slender petiole, entire; cauline leaves linear-oblanceolate to nearly linear, much reduced upward, numerous, acutish or acuminate, sessile, bright green, glabrous or thinly strigose; heads small, about 5 mm. broad, on long, naked, nearly glabrous, slender peduncles; bracts nearly equal, linear, acute, purplish, strigose; rays very narrow, about 50, 2.5 mm. long.

Type in the U. S. National Herbarium, no. 690241, collected near the N Bar Ranch, August 2, 1900, by E. O. Wooton.

ADDITIONAL SPECIMENS EXAMINED: Luna Valley, July 27, 1900, *Wooton*; north of Ramah, July 25, 1906, *Wooton*.

This is clearly related to *Erigeron flagellaris*, resembling that species in habit, but it is nearly glabrous and has smaller heads and more brightly colored rays.

Eschenbachia tenuisecta (A. Gray) Wooton & Standley.

Conyza coulteri tenuisecta A. Gray, Syn. Fl. 1²: 221. 1884.

Very distinct from *E. coulteri* in its smaller and more numerous heads, and in its bipinnately parted leaves with very narrow segments. In *E. coulteri* the leaves are mostly entire, but sometimes toothed or shallowly pinnatifid.

Herrickia Wooton & Standley, gen. nov.

Perennial herb with alternate, thick, rigid, toothed, sessile leaves; stems branched; heads solitary at the ends of the slender, leafy branches; rays purple; disk flowers perfect, tubular, yellow drying purplish, with short, narrowly ovate lobes; ray flowers pistillate; bracts of the involucre in several series, about equal, conspicuously keeled, with green, foliaceous tips and spinescent points, the outer bracts foliaceous and changing gradually into the proper leaves; receptacle convex, naked; style appendages lanceolate, acute; achenes compressed, striate, glabrous; pappus simple, of numerous stout, simple, nearly equal, strongly barbellate bristles.

The genus is named for the late Dr. C. L. Herrick, an enthusiastic and distinguished scientist, for several years president of the University of New Mexico. Although chiefly interested in geology, he made large collections of plants in many parts of the State.

Our plant seems not to agree with any of the published asteraceous genera. Doctor Gray, doubtless, would have placed it in the genus *Aster*, but to-day none would hold it congeneric with the typical representatives of that group. It is related to *Xylorrhiza*. The plants composing that genus, however, are mostly scapiform and have large heads with very different involucre and pubescent achenes. The rigid, spinulose teeth of the leaves of *Herrickia* are very characteristic. They give the plant a strange, xerophytic aspect strikingly like that of *Perezia nana*.

Herrickia horrida Wooton & Standley, sp. nov.

PLATE 50.

Perennial with numerous slender, branched stems from a somewhat woody root; stems 30 cm. high or less, wiry, hirsute, glandular; leaves thick and



HERRICKIA HORRIDA WOOTON & STANDLEY.

rigid, sessile, oblong or oblong-ovate, 20 to 45 mm. long, obtuse or acutish, subcordate or clasping, conspicuously veined, coarsely spinulose-serrate, puberulent; involucre about 1 cm. high, the bracts linear-lanceolate to oblanceolate, glandular, spinulose-tipped; rays rather broad, 8 mm. long; achenes 3 to 4 mm. long; pappus tawny, 6 mm. long.

Type in the U. S. National Herbarium, no. 690258, collected at Baldy, August 14, 1910, by E. O. Wooton. The plant was first collected at Raton, August 22, 1897, by Dr. C. L. Herrick (no. 762). Specimens not yet in flower were gathered on the sides of Goat Mountain at Raton, June 22, 1911, by Paul C. Standley (no. 6330). The plants are very abundant about Raton, growing in the canyons on the sides of the mountains in oak chaparral.

EXPLANATION OF PLATE 50.—Part of type specimen. Slightly less than natural size.

Aster hydrophilus Greene, sp. nov. in herb.

Perennial or biennial; stems simple, bright green, 30 to 40 cm. high, stout, glabrous up to the inflorescence; cauline leaves linear or very narrowly linear-lanceolate, 6 cm. long or less, 3 to 4 mm. wide, attenuate, acute, sessile by a broad base, bright green, rather succulent, glabrous, with only the single midvein; heads few, 4 to 8, large, about 12 mm. wide; peduncles stout, ascending, 4 to 6 mm. long, densely glandular-puberulent, each bearing several small, reduced, bract-like, lanceolate, acute, glandular leaves about 3 mm. long; involucre bracts irregularly imbricated, the outer successively shorter, green, oblong-linear, acute, densely glandular-puberulent; rays numerous, 10 to 12 mm. long, nearly 2 mm. wide, spreading; achenes strigose, the pappus of numerous slender, tawny, obscurely scaberulous bristles.

Type in the U. S. National Herbarium, no. 498171, collected along the edge of Berendo Creek at the south end of the Black Range, Sierra County, September 22, 1904, by O. B. Metcalfe (no. 1393). Altitude 1,500 meters.

Similar to *A. pauciflorus*, but with much larger heads and greener herbage.

Aster neomexicanus Wooton & Standley, sp. nov.

Stems tall, up to 1 meter high, glabrous, smooth, green, sparingly branched below or simple; leaves thick and rather fleshy, green, glabrous, few and inconspicuous, linear or linear-lanceolate, 8 cm. long or less, acute; inflorescence corymbosely much branched, the slender branches ascending, glabrous; heads solitary at the ends of the branches, 6 to 8 mm. high; peduncles with numerous linear-lanceolate, bract-like leaves; involucre bracts glabrous, in several series, green but with scarious margins; rays purple, narrow, 4 mm. long or less; achenes olive gray, striate, nearly glabrous.

Type in the U. S. National Herbarium, no. 382479, collected at Roswell in August, 1900, by F. S. and Esther S. Earle (no. 327). Altitude about 1,140 meters.

ADDITIONAL SPECIMENS EXAMINED: Near Lake Arthur, August 1, 1905, *Wooton*; Roswell, August 28, 1902, *Cockerell*.

In general appearance the plants resemble *A. pauciflorus*, but that is usually a smaller plant and has strongly glandular peduncles and involucre.

Machaeranthera amplifolia Wooton & Standley, sp. nov.

Biennial or perhaps perennial, 70 cm. high or lower; stems slender, sparingly paniculate-branched above, the branches ascending, almost glabrous below, puberulent above, the hairs very fine and short, occasionally one of them gland-tipped, but the stems scarcely viscid; leaves bright green, the basal ones broadly spatulate, 40 mm. long and 25 mm. wide or less, broadly obtuse, narrowed at the base to a long, slender, winged petiole, the petiole as well as the base of

the leaf ciliate; leaves with coarse, shallow, rather obtuse teeth; upper leaves oblong-obovate or narrowly oval, sessile, often by clasping bases, serrate, obtuse, obscurely puberulent or glabrous; heads solitary at the ends of the branches, 15 mm. broad and 12 mm. high, with numerous narrow, violet rays 2 cm. long; bracts linear, acute or acuminate, some of them with subulate tips, green for two-thirds their length, puberulent, only slightly glandular, the tips spreading, the lowest bracts reflexed; achenes straw-colored, glabrous.

Type in the U. S. National Herbarium, no. 562446, collected high up in Filmore Canyon of the Organ Mountains, September 23, 1906, by E. O. Wooton and Paul C. Standley.

ADDITIONAL SPECIMENS EXAMINED: Filmore Canyon, October 23, 1904, October 29, 1904, *Wooton*; Old Tiptop, Organ Mountains, October 18, 1903, *Metcalf*.

A very handsome plant with large heads and showy, bright-colored rays. It is related to *M. asteroides*, but the leaves are very different, likewise the pubescence.

Machaeranthera angustifolia Wooton & Standley, sp. nov.

Stems reddish, slender, erect, 80 cm. high or less, simple below, corymbosely branched above, cinereous; leaves linear-oblong to linear-oblongate, entire, densely scabrous, especially beneath, 1-nerved, acute, sessile by slightly narrowed bases, the uppermost leaves reduced; heads few, hemispheric, 15 mm. wide and 10 mm. high or smaller, with numerous bluish-purple rays; bracts unequal, thick, green above for half their length or more, linear-subulate, their tips squarrose, rather densely glandular near the tips; achenes almost or quite glabrous.

Type in the U. S. National Herbarium, no. 45774, collected in New Mexico, probably in the Sandia Mountains, in 1853, by J. M. Bigelow. Another sheet of the same collection, which we have examined, is in the Gray Herbarium.

ADDITIONAL SPECIMENS EXAMINED: Bear Canyon, Sandia Mountains, September 24, 1897, *Herrick*; Dulce, alt. 2,200 meters, 1911, *Standley* 8124; Pecos, 1904, *Bartlett* 105; north of Glorieta, alt. 2,220 meters, 1908, *Standley* 5217, 5265; Tunitcha Mountains, 1911, *Standley* 7765, 7620.

Machaeranthera aquifolia Greene, sp. nov. in herb.

Stems very slender, erect, 80 cm. high or less, sparingly branched near the base, the branches simple up to the loosely paniculate inflorescence, sparingly scabrous, abundantly glandular; leaves linear-oblong, acute or nearly obtuse, thin, sparingly spinulose-dentate, sessile by scarcely narrowed bases, somewhat scabrous, bright green, the uppermost reduced; heads few, hemispheric, 14 mm. broad and 10 mm. high or smaller; bracts very unequal, green for half their length, with spreading tips, linear-subulate, the outermost reflexed, finely glandular-puberulent; achenes scaberulous.

Type in the U. S. National Herbarium, no. 495763, collected at the Gila Hot Springs in the Mogollon Mountains, Socorro County, August 26, 1903, by O. B. Metcalfe (no. 856). Altitude 1,950 meters.

ADDITIONAL SPECIMENS EXAMINED: Hop Canyon, 1895, *Herrick* 628; Magdalena Mountains, 1895, *Herrick* 616; Grand Canyon of the Gila, August 19, 1900, *Wooton*; Mangas Springs, alt. 1,430 meters, 1903, *Metcalf* 715; East Canyon, 1911, *Holzinger*; Gilmores Ranch, July 25, 1901, *Wooton*.

The plant occurs in Arizona as well. The specimens from the Magdalena Mountains are stouter and have more heads than the typical form.

Machaeranthera centaureoides Greene, sp. nov. in herb.

Stems 70 cm. high or less, stout, green, simple below, corymbosely branched above, the branches ascending, glabrous below, rather densely scabrous and

glandular above, the pubescence especially abundant on the branches of the inflorescence; lower leaves firm and thick, oblong-linear, 11 cm. long or less, 15 mm. wide or narrower, acute, bright green, mostly glabrous, closely and sharply spinulose-dentate, sessile by narrow bases, the uppermost leaves sessile by broad, clasping bases, some of the leaves almost entire, obtuse; heads few, 14 mm. wide and 12 mm. high or smaller, hemispheric, with numerous narrow, violet rays; bracts linear-subulate, green for two-thirds their length, the tips all spreading and some of the lowest bracts reflexed, unequal, densely and coarsely viscid-pubescent; achenes almost or quite glabrous.

Type in the U. S. National Herbarium, no. 495484, collected in the Mogollon Mountains on the Middle Fork of the Rio Gila, Socorro County, August 9, 1903, by O. B. Metcalfe (no. 440). Altitude about 2,250 meters.

ADDITIONAL SPECIMENS EXAMINED: West Fork of the Gila, August 25, 1903, *Metcalfe*; Luna, July 28, 1900, *Wooton*.

Similar to *M. asteroides*, but distinguished by its stouter stems and narrow, thick leaves, and especially by the coarse, glandular pubescence

***Machaeranthera pygmaea* (A. Gray) Wooton & Standley.**

Machaeranthera tanacetifolia pygmaea A. Gray, Pl. Wright. 2: 74. 1853.

Aster tanacetifolius pygmaeus A. Gray, Syn. Fl. 1²: 206. 1884.

***Machaeranthera simplex* Wooton & Standley, sp. nov.**

Perennial or biennial from a thick, somewhat woody root; stems several, clustered, very slender and wiry, erect, 40 cm. high or less, simple or bearing 2 or 3 heads on short peduncles, reddish, glabrous below, sparingly cinereous above; leaves thin, green, oblanceolate to oblong-lanceolate, acute, tapering to the base, coarsely salient-serrate, nearly glabrous except on the ciliate margins and villous veins; heads about 12 mm. broad; bracts linear, with long, linear, spreading, green tips, cinereous, nowhere glandular; rays narrow, 8 to 10 mm. long.

Type in the U. S. National Herbarium, no. 382533, collected in the Capitan Mountains at an altitude of 2,100 to 2,250 meters, August 31, 1900, by F. S. and Esther S. Earle (no. 390).

This is near *M. asteroides*, but differs in having thin, oblanceolate, nearly glabrous leaves, few heads, and very slender, simple stems.

***Aphanostephus perennis* Wooton & Standley, sp. nov.**

Slender perennial; stems wiry, erect, 30 cm. high or less, much branched, the branches ascending, rough-puberulent or hispidulous; leaves all linear, entire, bright green, 15 mm. long or less, cinereo-scaberulous; heads few, 8 or 9 mm. broad, on slender peduncles; bracts numerous, much imbricated, elliptic-lanceolate, acute, puberulent; rays rather few, pinkish; achenes dark brown, nearly terete, almost glabrous.

Type in the U. S. National Herbarium, no. 564549, collected at Knowles, July 29, 1909, by E. O. Wooton.

This may be readily distinguished from our other species by its perennial root, wiry stems, narrow leaves, and harsh pubescence.

***Dicranocarpus dicranocarpus* (A. Gray) Wooton & Standley.**

Heterospermum dicranocarpum A. Gray, Pl. Wright. 1: 109. 1852.

Dicranocarpus parviflorus A. Gray, Mem. Amer. Acad. n. ser. 5: 322. 1854.

Wootonia parviflora Greene, Bull. Torrey Club 25: 122. 1898.

There is no doubt that the genera *Dicranocarpus* and *Wootonia* are the same, as suggested long since by Mrs. Brandegee and Mr. M. E. Jones. The types of the two genera came from the same general region, from localities probably not more than 100 miles apart. It is interesting to find that both are

included in Dalla Torre and Harms's *Genera Siphonogamarum*, but with an interval of just one hundred genera between the two!

***Gymnolomia brevifolia* Greene, sp. nov. in herb.**

Perennial; stems 50 to 60 cm. high, slender, brownish, with sparse, short, appressed, grayish pubescence; leaves ovate, rhombic-ovate, or elliptic, or the lowest oblanceolate, 20 to 40 mm. long, 10 to 20 mm. wide, acute, entire or obscurely serrate, the upper on short, winged petioles, the lowest on more slender petioles 10 mm. long, appressed-pubescent, scaberulous above, bright yellowish green; heads 10 mm. in diameter; bracts lanceolate, acuminate, canescent; rays showy, bright yellow; achenes obovate, glabrous, dark brown, without pappus.

Type in the U. S. National Herbarium, no. 495518, collected in the Mogollon Mountains on the West Fork of the Rio Gila, altitude 3,300 meters, August 15, 1903, by O. B. Metcalfe (no. 511).

Evidently this is closely related to *G. multiflora*, but not more so than is *G. longifolia*. It is distinguished especially by its broad and remarkably short leaves. It seems to grow at a far higher altitude than most of our species of the genus.

***Helianthus canus* (Britton) Wooton & Standley.**

Helianthus petiolaris canescens A. Gray, Pl. Wright. 1: 108. 1852, not *H. canescens* Michx.

Helianthus petiolaris canus Britton, Mem. Torrey Club 5: 334. 1894.

This seems to be worthy of specific rank. It is nearest *H. petiolaris*, but in general appearance is very different, chiefly because of the abundant white pubescence on leaves and stems. The pubescence of the peduncles is of long, spreading hairs, while in *H. petiolaris* it consists of short, appressed ones.

***Helianthus neomexicanus* Wooton & Standley, sp. nov.**

Tall, branched perennial; stems comparatively slender, reddish, hispid or hispidulous up to the inflorescence; leaves all except the uppermost opposite, on slender petioles one-fourth to one-third as long as the blades, these ovate-lanceolate, thick, 8 to 15 cm. long, 6 cm. wide or less, rounded or narrowed and acute at the base, attenuate or long-acuminate at the apex, sparingly serrate with low teeth, scabrous on the upper surface, beneath soft-villous; heads rather few, the disk 15 mm. broad, on long, slender, densely canescent peduncles; bracts lanceolate, with long, abruptly acuminate, spreading tips, ciliate below the middle, scaberulous on the back, 13 mm. long or less; achenes not seen.

Type in the U. S. National Herbarium, no. 563826, collected at Mangas Springs, August 19, 1902, by E. O. Wooton.

It is not certain that this is a perennial plant, but in its various characteristics it agrees better with the perennial than the annual species. We have only the upper branches.

The pubescence of the lower surface of the leaves is very different from that found in any of our other New Mexican species, exactly matching that of the southeastern *Helianthus tomentosus* Michx.

***Verbesina oreophila* Wooton & Standley, sp. nov.**

Tall plant, probably perennial, 1 meter high or more; stems erect, stout, not winged, minutely puberulent; leaf blades triangular-lanceolate to deltoid-ovate, 8 to 11 cm. long, 7 cm. broad or less, acute, narrowed at the base to a short, slender petiole, coarsely serrate, scaberulous on the upper surface, beneath soft-pubescent; heads numerous, about 12 mm. in diameter, loosely cymose, on slender, naked peduncles; bracts oblanceolate, linear-oblong or lanceolate,

acute, 5 mm. long or less, appressed-pubescent; rays bright yellow, conspicuous, obovate-spatulate; achenes 5 mm. long, cuneate-obovate, brown, glabrous, closely invested by the palea.

Type in the U. S. National Herbarium, no. 563951, collected at Cloudercroft, in the Sacramento Mountains, August 24, 1899, by E. O. Wooton.

A species of the section *Verbesinaria*, but very unlike anything listed for the section by Robinson and Greenman in their revision of the genus.¹ It has larger heads than most members of the section.

Thymophylla hartwegi (A. Gray) Wooton & Standley.

Hymenatherum berlandieri Benth. Pl. Hartw. 18. 1839, not DC.

Hymenatherum hartwegi A. Gray, Pl. Wright. 1: 117. 1852.

Thymophylla neomexicana (A. Gray) Wooton & Standley.

Adenophyllum wrightii A. Gray, Pl. Wright. 2: 92. 1853, not *Hymenatherum wrightii* A. Gray, 1849.

Hymenatherum neomexicanum A. Gray, Proc. Amer. Acad. 19: 40. 1883.

Thymophylla thurberi (A. Gray) Wooton & Standley.

Hymenatherum thurberi A. Gray, Proc. Amer. Acad. 19: 41. 1883.

Hymenopappus fisheri Wooton & Standley, sp. nov.

Probably biennial, from a long, slender root; stems several, erect, stout, 30 to 40 cm. high or more, leafy, the leaves gradually reduced toward the top; basal leaves not seen; cauline ones large, once pinnatifid into narrowly oblong to broadly linear, obtuse segments, densely arachnoid beneath, above sparingly woolly when young, but soon glabrate and bright green; heads numerous, corymbose, about 8 mm. in diameter, on slender peduncles; bracts sparingly tomentose, obovate, 5 mm. long, with thin, yellow, scarious tips; corolla bright yellow, glandular, the lanceolate lobes about equaling the campanulate throat; achenes dark brown, nearly naked on the faces, densely villous-ciliate on the angles; pappus conspicuous, about equaling the diameter of the achene at the summit.

Type in the U. S. National Herbarium, no. 564948, collected near Nara Visa, in clay and sandy soil, September 8, 1910, by Mr. Geo. L. Fisher (no. 16). Also collected at Nara Visa, June 12, 1911, *Fisher* 177.

The plant is suggestive of *H. artemisiaefolius* DC., but the bracts lack the very broad, white margins of that species, the leaf segments are narrower, and the corollas are bright yellow instead of nearly white.

Hymenopappus nudatus Wooton & Standley, sp. nov.

Perennial, 30 to 50 cm. high, with several stems clustered at the top of a thick, black root; leaves practically all basal, 10 cm. long, twice pinnate into linear divisions, densely arachnoid, the petioles very densely so, their bases covered with long, white wool; stems scapose, densely arachnoid, bearing but 1 or 2 much reduced leaves; heads few, 1 to 5, large, 12 to 15 mm. broad, on long, stout peduncles; bracts 8 mm. long or less, unequal, obovate or oblong, with scarious stramineous tips, densely arachnoid; corolla pale yellow, the oblong-ovate, obtuse lobes not more than one-third as long as the tube; achenes densely silky-villous with tawny hairs; pappus of prominent scales nearly 2 mm. long.

Type in the U. S. National Herbarium, no. 495226, collected in the Burro Mountains, Grant County, altitude 1,650 meters, June 6, 1903, by O. B. Metcalfe (no. 107).

ADDITIONAL SPECIMENS EXAMINED: West of Patterson, June 21, 1892, *Wooton*; Cactus Flat, July 5, 1906, *Wooton*; near Santa Rita, 1877, *Greene*; Silver City, June 2, 1880, *Greene*.

The type collection was originally determined as *H. luteus* Nutt., but that is a smaller plant with smaller heads and more leafy stems. Our plant suggests *H. arenosus*, but that, too, has smaller heads and lower, more leafy stems.

Picradeniopsis dealbata (A. Gray) Wooton & Standley.

Bahia dealbata A. Gray, Mem. Amer. Acad. n. ser. 4: 99. 1849.

Bahia absinthifolia dealbata A. Gray, Pl. Wright. 1: 121. 1852.

Hymenoxys brachyactis Wooton & Standley, sp. nov.

Perennial or possibly biennial, from a thick tap-root; stems solitary, very stout, simple at the base, with a few erect, corymbose branches above; basal leaves long-petiolate, once or twice pinnatifid into numerous narrowly linear segments; cauline leaves very numerous, all once or twice pinnatifid into linear or filiform divisions, the lower leaves with very numerous divisions, the upper with but few; heads numerous, 6 mm. in diameter, on short, slender, glabrous peduncles; involucre glabrous, 5 mm. high, the outer bracts lanceolate, acute, strongly keeled, united for nearly half their length, the inner ones very obtuse, short-acuminate, tomentose on the margins; rays pale yellow, cuneate-obovate, much shorter than the involucral bracts, usually not more than half as long; disk flowers bright yellow, sparingly glandular; achenes villous with pale tawny hairs; paleæ of the pappus long-attenuate, two-thirds as long as the disk corollas.

Type in the U. S. National Herbarium, no. 690242, collected near East View, August 4, 1906, by E. O. Wooton.

The plant has the size and habit of *H. rusbyi*, but it has very different leaves and heads. Its most striking characteristics are its tall, stout, simple stems, its finely divided Artemisia-like foliage, and the numerous small, angled heads.

Hymenoxys cockerellii Wooton & Standley, nom. nov.

Hymenoxys chrysanthemoides justa Cockerell, Bull. Torrey Club 31: 503. 1904.

This seems to be a distinct species, differing conspicuously enough from *H. chrysanthemoides*, as originally pointed out by Professor Cockerell. Ordinarily, in raising a subspecies to specific rank we should not think of changing the subspecific name unless it were preoccupied. There is, however, so far as we know, no precedent for the use of a preposition as a specific name, nor do we think it desirable or even permissible that one be established.

Hymenoxys mearnsii (Cockerell) Wooton & Standley.

Hymenoxys chrysanthemoides mearnsii Cockerell, Bull. Torrey Club 31: 506. 1904.

A common species of southern New Mexico, ranging from the southwest corner as far east as the Pecos Valley. It is the smallest of our annual forms.

Tetranneuris formosa Greene, sp. nov. in herb.

Perennial from a thick root; caudices cespitose, thickened; basal leaves oblanceolate-spatulate, 60 cm. long and 9 mm. broad or smaller, obtuse, green, sparingly silky-pubescent on both surfaces, glandular-punctate; peduncles about 20 cm. long, slender, bearing 2 or 3 small leaves near the base, rarely branching, pubescent with few loosely appressed hairs; heads large, the involucre 12 mm. broad and 7 or 8 mm. high; bracts oblong, obtuse, densely silky-villous; rays large, extending 15 mm. beyond the involucre, 7 or 8 mm. broad, with 3 rounded teeth at the apex, conspicuously veined; achenes villous; paleæ of the pappus ovate, with long, abruptly acuminate tips.

Type in the U. S. National Herbarium, no. 498042, collected on dry hills near Kingston, Sierra County, at an altitude of 1,980 meters, August 22, 1904, by O. B. Metcalfe (no. 1235).

A specimen collected in the Magdalena Mountains in June, 1881, by G. R. Vasey appears to be the same, although it has more densely pubescent leaves and stems.

The species is related to *T. leptoclada*, but has very much longer rays and larger heads and is a taller plant. The pappus scales are broader and not so acute.

***Tetranneuris pygmaea* (Torr. & Gray) Wooton & Standley.**

Actinella depressa pygmaea Torr. & Gray, Mem. Amer. Acad. n. ser. 4: 100. 1849.

The type came from the Raton Mountains of New Mexico. We have specimens from the Sandia Mountains that we take to be the same plant. It is similar to *T. depressa*, but the leaves are densely sericeous instead of villous, the heads are not nearly so large as in that species, and the rays are shorter than the involucre instead of equaling it.

***Artemisia albula* Wooton, nom. nov.**

Artemisia microcephala Wooton, Bull. Torrey Club 25: 455. 1898, not Hillebr. 1888.

***Artemisia petrophila* Wooton & Standley, sp. nov.**

Low shrub, 30 to 40 cm. high, the lower branches spreading, bearing numerous very slender, mostly simple, erect ones; stems densely tomentose; the lower leaves, i. e., those of the older thicker branches, cuneate, 2 to 3 cm. long, densely white-sericeous, tridentate at the apex, the teeth oblong or oblong-lanceolate, obtuse; leaves of the upper slender branches oblanceolate to linear-oblong, entire, obtuse or acutish, white-sericeous, rather distant, never crowded; inflorescence of very narrow panicles, the lateral branches not more than 2 cm. long, slender; heads homogamous, few-flowered, solitary or in small clusters, sessile or pedunculate, the peduncles soon recurved; involucre campanulate, 2.5 mm. broad, the bracts few, in about two series, oblong, obtuse, densely tomentose.

Type in the U. S. National Herbarium, no. 686323, collected on a dry sandstone mesa at the north end of the Carrizo Mountains, July 28, 1911, by Paul C. Standley (no. 7355).

ADDITIONAL SPECIMENS EXAMINED: NEW MEXICO—Dry hills near Farmington, alt. 1,650 meters, July 17, 1911, *Standley* 7084. ARIZONA—Moki Reservation, 1896, *Hough* 58.

This low shrub is similar to *Artemisia tridentata*, especially in herbarium specimens. Even here, however, it may be distinguished by its broader inflorescence, recurved peduncles, campanulate heads, and rather distant, mostly entire leaves. In the field the two are very unlike. *A. tridentata* is a densely branched shrub usually a meter high, growing on the plains, while this is a low plant with slender, open, never dense branches, growing on the hills, usually among rocks.

***Senecio metcalfei* Greene, sp. nov. in herb.**

Perennial, multicapitous, from a rather stout, ascending, somewhat woody rootstock; stems scapiform, 20 cm. high or mostly less, stout, glabrous or with very scanty tomentum; leaves numerous, erect or somewhat spreading, less than half as long as the stem, rather thick and firm, dull green, oblanceolate or narrowly spatulate, obtuse, mostly entire or some with 2 or 3 low, inconspicuous teeth, glabrous except the very youngest, these with a scanty tomentum, narrowed at the base into a petiole as long as the blade or shorter; leaf blades 45 mm. long and 15 mm. wide or smaller; stems almost naked but with a few much reduced leaves; heads few, on short peduncles, campanulate, mostly about 9 mm. long or smaller; peduncles mostly naked; bracts linear or linear-

lanceolate, acute, 6 mm. long or less, light green; rays oblong, rather bright yellow, 6 mm. long and 3 mm. wide or smaller; achenes striate, glabrous.

Type in the U. S. National Herbarium, no. 497842, collected on open slopes on Hillsboro Peak, at the south end of the Black Range, May 27, 1904, by O. B. Metcalfe (no. 938). Altitude 3,060 meters.

Most closely related, perhaps, to *S. pentodontus*, but with very different leaves and pubescence.

Senecio remifolius Wooton & Standley, sp. nov.

Perennial, multicapitose, from a rather stout, creeping or ascending rootstock; stems scapiform, 25 cm. high or lower, glabrous, slender; basal leaves linear-ob lanceolate, glabrous, or with an obscure and very sparse tomentum visible only under a lens, about 60 mm. long and 8 mm. wide, obtuse, entire or with 3 or sometimes a few more shallow teeth, thick and fleshy, deep green, gradually tapering at the base into a slender petiole as long as the blade or longer; lower cauline leaves like the basal ones but smaller; upper ones linear, sessile by a somewhat widened base; stems sometimes with an obscure tomentum in places; branches of the inflorescence several, ascending, each bearing 1 to 3 rather long-pedunculate heads, these campanulate, about 12 mm. high; peduncles naked or with a few bractlets; involucrel bracts 10 to 12, linear-lanceolate, acute, with membranous margins, about 7 mm. long; rays oblong, pale yellow, 10 mm. long and 2.5 mm. wide or smaller; achenes striate, ciliolate along the angles.

Type in the U. S. National Herbarium, no. 690231, collected along Willow Creek, August 8, 1900, by E. O. Wooton.

Similar to the preceding but with different leaves, heads, and achenes.

Senecio sacramentanus Wooton & Standley, sp. nov.

Erect from a cluster of rather fleshy roots, 70 cm. high or less; stems mostly simple below but paniculately branched above, sparingly tomentose below, densely so above, the pubescence densest about the nodes; leaves lanceolate to triangular-lanceolate, 14 cm. long or less and 5 cm. wide or narrower, abruptly acuminate, coarsely salient-dentate, tapering, truncate, or cordate at the base, sparingly puberulent beneath, glabrous above, bright green, thin; petioles of the lowest leaves 7 cm. long, slender, dilated and clasping at the base, those of the upper leaves shorter and winged, the uppermost leaves sessile and often clasping by a broad base; stems leafy throughout, the upper leaves considerably smaller than the others; inflorescence much branched, of paniculate racemes; heads very numerous, small, 10 mm. long and 9 mm. wide or less, rather narrowly campanulate, nodding; bracts about 8, rather broadly oblanceolate, acute, with membranous, light-colored margins; heads subtended by 2 or 3 short, filiform bracts; rays none; achenes light chestnut colored, striate, with abundant soft, barbellate pappus.

Type in the U. S. National Herbarium, no. 690237, collected in the vicinity of Cloudcroft, near the summit of the Sacramento Mountains, altitude about 2620 meters, August 15, 1901, by E. O. Wooton.

ADDITIONAL SPECIMENS EXAMINED: Cloudcroft, August 24, 1901, *Wooton*; James Canyon, August 11, 1899, *Wooton*.

This is as nearly related to *S. pudicus* as to any species, but its foliage is very different. In that species the leaves are linear to oblanceolate, tapering to the base, and nearly entire. In *S. sacramentanus* the leaves vary from cordate-ovate to oblong-lanceolate, are coarsely serrate, and are mostly truncate to abruptly contracted at the base. The general appearance of the two is so unlike that at first glance one would not suspect the relationship between them.

***Carduus gilensis* Wooton & Standley, sp. nov.**

Tall, sparingly branched biennial with slender, striate, villous stems; basal leaves oblanceolate, about 40 cm. long, acute, conspicuously lobed, the lobes dentate, the few teeth tipped with slender spines, glabrous on the lower surfaces, puberulent above; upper cauline leaves oblong or triangular-lanceolate, acute, clasping at the base, shallowly lobed, the lobes and their principal teeth with numerous long, slender, salient spines; heads usually solitary at the ends of the branches, campanulate, about 3 cm. broad or more and of the same height, subtended by many narrowly linear-lanceolate, spiny, bract-like leaves; outer bracts foliaceous, linear-lanceolate, with elongated tips, often arachnoid on the margins, pectinate with very numerous spiny teeth; inner bracts broader, scaberulous, little or not at all dilated at the tips and lacinate; corollas greenish yellow.

Type in the U. S. National Herbarium, no. 495440, collected in the Mogollon Mountains on the West Fork of the Rio Gila, Socorro County, altitude 2250 meters, August 4, 1903, by O. B. Metcalfe (no. 377).

This, like *C. inornatus*, was determined as *C. parryi*. It is of that group, but is distinguished by its large, mostly solitary heads, as well as by its unusually large and thin leaves, and the very numerous foliaceous bracts.

***Carduus inornatus* Wooton & Standley, sp. nov.**

Tall biennial about 1 meter high with a stout stem, this simple below, above with a few ascending branches; stems striate, sparingly arachnoid, densely so on the younger parts, nearly glabrous in age; basal leaves not seen; lower cauline leaves linear-lanceolate, 10 to 18 cm. long, 17 mm. wide or less, with few remote, triangular, spine-tipped teeth, the margins beset with fine spines, glabrous beneath except on the midvein, sparingly villous there as well as on the upper surface with long, weak, white hairs; upper cauline leaves lanceolate or oblong, acute or attenuate, sessile and clasping at the base, the auricles rounded, the margins irregular and bearing numerous slender, yellow spines; heads few, occasionally solitary at the ends of the branches but usually in clusters of about 3, pedunculate, campanulate, 25 mm. long and 20 mm. broad or smaller, subtended by numerous spiny, reduced, bract-like leaves; bracts of the involucre in several series, successively shorter outward, the outer linear-lanceolate with long-attenuate tips, mostly glabrous on the back, rarely slightly arachnoid, spine-tipped, the margins bearing many weak, yellow spines; inner bracts broader, scaberulous, most of them abruptly dilated at the tips into a lanceolate or oval, often lacinate, spine-tipped portion; corollas yellow; achenes obovate, compressed, brownish, 4 to 5 mm. long, the pappus about 10 mm. long.

Type in the U. S. National Herbarium, no 561013, collected in the Sacramento Mountains near Cloudcroft, August 24, 1901, by E. O. Wooton.

Originally this collection was determined as *C. parryi*, and it is nearer to that than to any other species. It differs in having fewer heads and slightly if at all arachnoid bracts with pectinately spiny margins and less dilated tips. The leaves, too, are not nearly as spiny as in that species, and only the innermost bracts have dilated tips, while in *C. parryi* almost all have them.

***Carduus pallidus* Wooton & Standley, sp. nov.**

Tall biennial, 1 to 2 meters high, with simple, very leafy stems sparingly branched about the inflorescence; stems stout, arachnoid above, becoming glabrate below, striate; lower cauline leaves lanceolate, acute, attenuate to the base, irregularly serrate-dentate, the teeth tipped with short, weak spines; upper cauline leaves narrowly oblong to triangular-lanceolate, clasping at the base, with rounded auricles, acute irregularly dentate or shallowly lobed, the

margins spine-tipped, the blades glabrous beneath, above sparingly white-villous, lanate along the midrib; inflorescence of rather few heads, these racemose in age, crowded when young, on short, stout peduncles or sometimes sessile, subtended by reduced, very spiny leaves; heads campanulate, 3 cm. high and as broad or smaller; bracts linear, none of them with dilated tips, the outer arachnoid on the backs and margins, tipped with a long, slender spine and usually bearing 2 or more slender lateral spines just below the tip; inner bracts lanceolate, thick and firm, scaberulous, with slender, flat, weak tips; corollas greenish yellow; achenes oblong-obovate, dark brown, glabrous and shining.

Type in the U. S. National Herbarium, no. 498699, collected in the Pecos River National Forest near Winsors Ranch, altitude 2520 meters, July 16, 1908, by Paul C. Standley (no. 4357).

ADDITIONAL SPECIMENS EXAMINED: Tunitcha Mountains, 1911, *Standley* 7533; Chama, alt. 2400 meters, 1911, *Standley* 6763; mountains west of Las Vegas, 1881, *Vasey*; Baldy, August 14, 1910, *Wooton*; Gilmores Ranch, alt. 2220 meters, 1907, *Wooton & Standley* 3491; Gilmores Ranch, July 14, 1895, *Wooton*; James Canyon, August 3, 1899, *Wooton*.

A common species in the higher mountains of New Mexico, occurring chiefly in the Transition Zone, although frequently extending farther up. It grows usually in swamps or marshes along the edges of mountain streams, sometimes in shaded thickets, frequently in open meadows. It is a tall, coarse plant, with pale yellowish stems and foliage. Commonly this has passed as *Carduus parryi*. Apparently no one has ever questioned this determination, yet examination of herbarium material reveals the fact that true *parryi* does not occur in New Mexico. That species differs from ours in its small heads, more spiny leaves, and the conspicuously dilated bracts.

***Carduus vinaceus* Wooton & Standley, sp. nov.**

Tall biennial, 1 to 2 meters high, with very numerous ascending branches; stems brownish purple, striate, slender, glabrous; basal leaves glabrous, green, 30 to 50 cm. long, 20 cm. wide or less, elliptic-oblong in outline, pinnatifid nearly to the midrib, the segments overlapping, laciniately lobed, the lobes oblong-lanceolate, acute, the teeth tipped with short, slender, yellowish spines; heads very numerous, naked, campanulate; bracts in numerous series, narrowly lanceolate, with long, flat, weak, spreading tips, deep reddish purple throughout, glabrous on the back, scarcely keeled, ciliate or puberulent on the margins, tipped with short, slender, yellowish spines; inner bracts with long, slender, twisted tips; whole head 5 cm. in diameter and 4 cm. high or smaller; corolla lobes long and narrow, purplish; achenes obovate, brown, glabrous, with tawny, plumose pappus 15 to 20 mm. long.

Type in the U. S. National Herbarium, no. 690246, collected in the Sacramento Mountains near Fresno, July 12, 1899, by E. O. Wooton.

No other North American species of which we have seen either specimens or description is at all like this in the form of the involucre. Some of the Mexican species suggest our plant but not very closely. When growing it is a handsome large plant with very numerous, purplish heads and dark stems, these contrasting with its glabrous, bright green foliage.

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