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- I. The True Mertensias of Western North America
- II. Revision of the Genus *Oreocarya*
- III. Notes on Certain Borraginaceae

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III. NOTES ON CERTAIN BORRAGINACEAE

✓ **Lappula bella**, spec. nov., perennis, circa 6 dm. alta; caulibus adpresse retrorso-strigillosis; foliis internodiis longioribus caulinis inferioribus oblanceolatis circa 10 cm. longis 1–2 cm. latis apice acutis vel obtusis, basi in petiolum attenuatis, utrinque adpresse strigillosis et margine eciliatis, caulinis superioribus sessilibus oblongis vel ovatis basi haud angustatis; inflorescentia ut apud *L. diffusam*; corollis verisimiliter albis 10–15 mm. latis; corollae appendiculis pubescentibus non latioribus quam longis; nuculae facie dorsali 6 mm. longa; aculeis permultis (24–30), anguste subulatis basi non confluentibus. — CALIFORNIA: common on open slopes, Dorleska, in the Salmon Mts. of Trinity County, altitude 2000 m., July 21, 1909, *H. M. Hall*, no. 8599 (TYPE, Gray Herb.).

Dr. Hall referred this plant to *L. diffusa*, noting on the label the “pure white flowers” and “pubescent appendages.” Piper has shown, *Bull. Torr. Club* xxix. 535 (1902), the specific value of these characters elsewhere in the genus. Furthermore there are in this case other differences of importance. In *L. diffusa* the blue corollas are only 8–10 mm. broad and their glabrous appendages are distinctly broader than long; the dorsal faces of the nutlets are only 4–5 mm. long and the prickles are uniformly fewer (9–14), much more strongly widened, and more or less joined, at the base. The pubescence on the petioles and the lower part of the stems is looser and more spreading than in *L. bella*. *L. subdecumbens* of the Rocky Mts. has white flowers and pubescent appendages but otherwise is not so nearly related to *L. bella* as is *L. diffusa*. The latter has not been found farther south than northern Nevada, its range being from Montana to Nevada and Eastern Oregon to Alberta and British Columbia, and so is far removed geographically.

✓ **Lappula pustulata**, spec. nov., *L. pinetorum* peraffinis sed cum pilis haud patentibus papilloso-strigillosa; foliis radicalibus spatulatis circa 5 cm. longis 1–1.5 cm. latis basi in petiolum circa 2 cm. longum attenuatis, caulinis oblongo-lanceolatis apice fere obtusis, basi cuneatis 2–4 cm. longis 5–12 mm. latis; floribus ut apud *L. pinetorum*; nuculis magis muriculatis. — MEXICO: sixty miles south of Guadalupe y Calvo, Chihuahua, Aug. 1898, *E. W. Nelson*, no. 4792 (in U. S. Nat. Herb.); hills west of Chihuahua, Oct. 23, 1885, *Pringle*, no. 563 (TYPE, Gray Herb.)

L. pinetorum Greene has also been collected in Chihuahua (*E. W. Nelson*, no. 6137) and this number, like the New Mexican and Arizonan material has soft, not at all papillose, spreading pubescence (especially on the petioles) and decidedly acute leaves. In *L. pustulata* the bases of the hairs are enlarged so as to give the leaf-surface the appearance of being covered with white pustules. Both species are relatives of *L. floribunda* (Lehm.) Greene which, like *L. pinetorum*, has not been reported from Mexico, but seems to be represented there by *E. W. Nelson's* no. 4764 from Durango. The specimen is in full fruit but it is doubtful if flowering material will prove it distinct. In all probability sooner or later other Lappulas of the southwestern United States will be found south of the Mexican boundary.

✓ **Lappula brachystyla** (Gray), comb. nov. *Echinospermum brachycentrum* Ledeb., var. *brachystylum* Gray, Proc. Am. Acad. xxi. 413 (1886). Annua tenuis erecta villosa et adpresse strigillosa, parce ramosa circa 2 dm. alta; foliis oblongis 8–12 mm. longis, radicalibus in petiolum attenuatis ceteris sessilibus; racemis foliaceo-bracteatis; pedicellis fructiferis calyce brevioribus; corolla minuta; stylo breve nuculis non longiore; nuculis tuberculatis facie dorsali convexis vix 2 mm. longis margine inflexo minute aculeato-glochidiatis vel aculeis obsoletis. — BRITISH COLUMBIA: Spence's Bridge, Thompson River, May 29, 1885, *James Fletcher*, no. 1553.

Dr. Gray wrote (l. c.) "Our plant accords well with Ledebour's figure (Ic. Fl. Ross. iv. t. 302) except that the style is not exerted beyond the apex of the nutlets." In view of the distribution of *L. Redowskii* Lehm., var. *occidentalis* (Wats.) Rydb., which appears to be more common in Siberia than the species itself, it would not be surprising to find another Asiatic species of this group in the far Northwest. However *L. brachystyla* is a distinct species although it is more closely related to a plant of northern Asia than to any of our Lappulas. Lipsky has shown, Act. Hort. Petrop. xxvi. 553 (1910), that Ledebour included two species in his *Echinospermum brachycentrum*, i. e. his type and *E. rupestre* Schrenk. The drawing of the fruit in Ledebour's figure (l. c.) is of the latter species. In fruiting characters our plant is very near to *L. microcarpa* (Ledeb.) Gürke which, according to Lipsky, l. c., Ledebour confused in his herbarium with *E. rupestre*. In my judgment *L. microcarpa* is the nearest relative of *L. brachystyla*; but the pubescence of the former is mostly appressed on the stem and branches and the style

is long. The Asian species of this group are very closely related and the nomenclature is involved. Lipsky proposes a new species (*E. polymorphum*) apparently without regard for any rules of priority, which he uses for a veritable waste-basket species. However, since our plant has one very evident character (the short style) which separates it from *all* of the Asian forms, it seems best to regard it as a species.

Amblynotopsis, gen. nov. Nuculae erectae, basi ad gynobasin depresso-pyramidatam adfixae ut apud *Allocaryam* ovatae dorso rotundatae fere semper asperatae nec rugosae nec carinatae nec angulatae. Calyx 5-partitus, lobis angustis vel latiusculis, fructifer immutatus vel parum auctus, plus minusve patens, persistens. Corolla et stamina *Cryptanthae*. — Herbae vel plus minusve suffruticentes mexicanae saepius diffusae humiles vel modice elatae canescenti-strigosae etiam interdum hispidae nunquam papyros herbarii violaceo colore tingentes. Folia alterna, angusta. Racemi simplices vel ramosi; flores parvi pedicellati; pedicellis fructiferis omnino non incrassatis. — Affinis videtur *Allocaryae* sed habitu fere *Heliotropii*. *Krynitzkia* § *Amblynotus* Gray, Proc. Am. Acad. xx. 264 (1885) pro parte, vix *Eritrichium* § *Amblynotus* A. DC. Prod. x. 128 (1846).

✓ **Amblynotopsis heliotropioides** (A. DC.), comb. nov. *Antiphytum heliotropioides* A. DC. Prod. x. 122 (1846). *Eritrichium heliotropioides* Torr. Bot. Mex. Bound. 140 (1859). *Krynitzkia heliotropioides* Gray, Proc. Am. Acad. xx. 265 (1885). *Cryptantha heliotropioides* Loes. in Fedde, Rep. Spec. Nov. xii. 243 (1913). (TYPE of *Amblynotopsis*).

✓ **Amblynotopsis floribunda** (Torr.), comb. nov. *Eritrichium floribundum* Torr. l. c. *Antiphytum floribundum* Gray, l. c. x. 55 (1875). *Krynitzkia floribunda* Gray, l. c.

Amblynotopsis Parryi (Wats.), comb. nov. *Antiphytum Parryi* Wats. Proc. Am. Acad. xviii. 122 (1883). *Krynitzkia Parryi* Gray, l. c.

Amblynotopsis peninsularis (Rose), comb. nov. *Krynitzkia peninsularis* Rose, Contrib. U. S. Nat. Herb. i. 85 (1890).

It is necessary in accordance with the now almost universally accepted generic limitations in this family, as outlined by Dr. Greene in Pitt. i. 8 et seq., to set aside this natural group of species as a genus, allowing them to stand on a par with the other genera carved from the obviously heterogeneous group, *Krynitzkia*. Considered generically, then, these species stand intermediate between the genera *Allocarya* and *Plagiobothrys*. From *Cryptantha* (the proper name for the restricted *Krynitzkia*), to which one of them has been referred, they are most at variance, not only in habit, but,

what is more important, in the attachment of the nutlets. In that genus the nutlets are affixed by the ventral groove for at least one third or even their entire length to an elevated gynobase. The groove may be closed or open, but it is in every sense of the word, a groove. In *Amblynotopsis* the ventral face is sharply carinate since the nutlets are attached by an infra-medial or basal scar to a low gynobase, quite as in *Allocarya*. However, in the latter genus, the nutlets are dorsally carinate, the pedicels are turbinate-thickened and the habit (*Allocarya* is composed of low spreading herbs) is totally different. In *Plabiobothrys* (the other, but more remote, ally), the nutlets are not only carinate but also rugose and their attachment is more nearly medial. The herbage imparts a violet stain to paper and the species are at variance in habit with the group we are considering. But the gynobase and the ventral keel of the nutlets suggest a close relationship after all, to *Amblynotopsis*.

When Dr. Gray revised *Krynitzkia* in the Proc. Am. Acad. xx. 264 (1885) he treated the three species of *Amblynotopsis* then described, together with *Allocarya lithocarya* Greene and *Krynitzkia obovata* (Ledeb.) Gray, under the subgeneric name *Amblynotus*, a name given sectionally by DeCandolle, for one species of *Eritrichium*, i. e., *E. obovatum* (Ledeb.) DC. And indeed, it is surprising how closely this plant simulates the genus *Amblynotopsis* in all fruiting and floral characters. But there the similarity ends. Habitally it is radically different. Moreover, from a geographical point of view, it is extremely improbable that this plant of northern Asia is congeneric with its Mexican allies. Although its relationship is not entirely obvious, it seems quite possible that some day it must be accorded generic rank. Accordingly I have not thought it advisable to take up the sectional name for the American plants but have chosen a new name that indicates their apparent relationship to the Asiatic species.

Amblynotopsis durangensis, spec. nov. Radix ignota; caulibus strictis circa 7 dm. altis parce strigosis; foliis fere linearibus sessilibus apice acutis basi attenuatis utrinque strigillosis 4–10 cm. longis 4–5 mm. latis; superioribus bracteiformibus; racemis axillaribus 1.5–2 cm. longis: corollae faucibus nudis: calycis fructiferi laciniis ovato-lanceolatis acutis vel fere acuminatis 7–8 mm. longis: nuculis laevibus vel solum minute muriculatis. — MEXICO: road between San Julian and Ceno Prieto, Sept. 9, 1898, *E. W. Nelson*, no. 4960 (TYPE, U. S. Nat. Herb.).

Species representing perfectly the generic characters and nearest to *A. floribunda*, from which it may be distinguished by its lack of spreading pubescence, its greener hue, its long narrow leaves and the much longer fruiting calyx. In *A. floribunda* the mature calyx is rarely 5 mm. long. *A. durangensis* comes the nearest to having smooth nutlets of any of the species, their surfaces being very slightly if at all roughened.

✓ **CRYPTANTHA LEIOCARPA** (F. & M.) Greene, var. **hispidissima** (Greene), comb. nov. *C. hispidissima* Greene, Pitt. i. 118 (1887). *C. pumila* Heller, Muhl. ii. 242 (1906). Pubescence widely spreading, hispid. — CALIFORNIA: Lemmon's Ranch, June, 1887, *Lemmon*, no. 4606; Smith Creek, Santa Clara Co, May 30, 1907, *Heller*, no. 8588; Bodega Bay, Sonoma Co., May 27, 1902, *Heller*, no. 5615; Mt. Tamalpais, Marin Co., June 12, 1906, *Heller*, no. 8403; foothills west of Los Gatos, Santa Clara Co., May 27, 1904, *Heller*, no. 7458; island of Santa Cruz, April, 1888, *Brandege*; Salinas River, July, 1885, *M. K. Curran*; *Kellogg* (no data); Linda Vista, San Diego Co., July 6, 1915, *Macbride & Payson*.

Greene founded his species on three specimens in which the appressed strigose hairs that characterize *C. leiocarpa* are almost entirely replaced by a hispid spreading pubescence. The flowers, too, are slightly larger. Since then, however, specimens have been found which exhibit these characters in varying degrees. A specific instance is Mr. Heller's number 8403, the type of his *C. pumila*. He distinguishes it (l. c.) from Greene's species by its "smaller corolla and smaller calyx, the segments not 'long-attenuate'." One has only to examine a few specimens in order to become convinced that such characters are too variable to possess any specific value. In *Muhlenbergia*, ii. 315 (1907) he refers to *C. pumila* his number 8588 and remarks: "Mrs. Brandege considers this a mere state of *C. leiocarpa* but two plants differing so in habitat and appearance cannot possibly be the same." Unfortunately this specimen is distinctly strigose-canescens as well as hispid. Altogether it seems best to regard these plants which have the pubescence, at least in part, hispid-spreading as representing a recognizable variety.

✓ **Cryptantha Grayi** (Vasey & Rose), comb. nov. *Krynitzkia Grayi* Vasey & Rose, Proc. U. S. Nat. Mus. xi. 536 (1888).

Apparently nearest *C. angustifolia* (Torr.) Greene but obviously very distinct. Vasey and Rose do not cite a type but their descrip-

tion is included among a list of plants collected by Dr. Palmer at Lagoon Head. Our specimen, however, which purports to be a part of the type material, is *Palmer* no. 801 from San Quentin.

✓ *Cryptantha holoptera* (Gray), comb. nov. *Eritrichium holopterum* Gray, Proc. Am. Acad. xii. 81 (1877). *Krynitzkia holopterum* Gray, l. c. xx. 276 (1885). *Oreocarya holoptera* Greene, Pitt. i. 58 (1887).

When Dr. Gray described this species he compared it with *C. muricata* and *C. leiocarpa*, both typical *Cryptanthas*. Later (l. c.) he placed it between *C. pterocarya* and *O. setosissima*, and it is in *C. pterocarya* that it finds its nearest relative. Just why Dr. Greene made it a part of *Oreocarya* is not apparent. It is true that its nutlets are winged after the manner of those of *O. setosissima* but in that plant the pedicels are firmly persistent, in perfect accord with the generic character. Moreover, the plant is an *Oreocarya* in aspect, as noticed by Dr. Gray. These facts are not true of *C. holoptera*. Its pedicels are rather readily deciduous and its aspect is exactly that of a *Cryptantha*. The proper disposition of this plant must strengthen *Oreocarya* immeasurably because *Oreocarya* has very little besides aspect to keep it out of *Cryptantha* (a fact realized by its author, l. c. 115). Nevertheless, these genera are always so readily recognized in the field that no one who knows them there would think of uniting them.

✓ *CRYPTANTHA PTEROCARYA* (Torr.) Greene, var. *cycloptera* (Greene), comb. nov. *Cryptantha cycloptera* Greene, Pitt. i. 120 (1887). COLORADO: Grand Junction, May, 1892, *Alice Eastwood*. UTAH: southern Utah, 1874, *Parry*. NEW MEXICO: 1851-1852, *Wright*, no. 1570; rocky hillside, Nutt Mt., Sierra Co., May 11, 1905, *Metcalf*, no. 1573. ARIZONA: Lowell, May, 1884, *W. F. Parish*, no. 167; near Camp Lowell, April, 1881, *Pringle*, no. 366; Verde River, April 6, 1867, *Dr. Smart*, no. 132; hills near Tucson, April 15, 1884. CALIFORNIA: Surprise Canyon, Panamint Mts., April 21, 1891, *Coville & Funston*, no. 720.

When Dr. Greene described this plant, Bull. Calif. Acad. i. 207 (1885), he accredited it with three characteristics, "nutlets all winged; wings . . . continuous across the base [of the nutlet]; ventral face not muricate." Dr. Gray, commenting in the Synoptical Flora upon these characters, wrote that they "do not hold out." But more recently Mr. Coville, after collecting both species in the Death Valley, wrote (Contrib. Nat. Herb. iv. 165), that he "had not found a satisfactory series of intergrades" and accord-

ingly he considered *C. cycloptera* a good species. However, a study of the ample material in the Gray Herbarium seems to prove conclusively that it is, at best, only a geographical variety of *C. pterocarya*. In the first place, the ventral face of the nutlets may or may not be smooth in either of the proposed species. Secondly, all of the nutlets may be winged and yet the wings not extend across the base, as for example in the plants collected at Grand Junction, Colorado, by Alice Eastwood. When one considers the fact that the ventral faces of these winged nutlets are rough, one is puzzled as to whether the plants are more nearly related to *C. pterocarya* or to *C. cycloptera*. However, it must be noted that it is only the southwestern material that can be referred to *C. cycloptera*. It seems advisable, therefore, to consider *C. cycloptera* as a variety of *C. pterocarya* and to include in this variety all specimens that have four winged nutlets, irrespective of whether the wing extends across the base. Although the species ranges from Washington to Utah and southern California, the variety apparently largely replaces it, in the interior of the Southwest.

Cryptantha filiformifolia, spec. nov., humilis, 5–10 cm. alta, non vel vix ramosa cum pilis patentibus hispida; foliis fere filiformibus 0.5–3 cm. longis raro 1 mm. latis; cymis brevibus circa 1.5 cm. longis 2–3-radiatis, spicis fructiferis densifloris; floribus minimis; calycis fructiferi laciniis 1 mm. longis; nuculis (4) ovato-trigonis circa 5 mm. longis dorso muriculatis, sulco ventrali albido fere ad apicem dilatato et excavato. — MEXICO: Alamos, Sonora, March 26–April 8, 1890, *Palmer*, no. 397 (TYPE, Gray Herb.), and Feb. 2, 1899, *Goldman*, no. 308 (U. S. Nat. Herb.); Cape St. Lucas, etc., Lower California, Aug. 1859–Jan. 1860, *L. J. Xantus*, no. 76; Guaymas, 1890, *Palmer*, no. 169 ? (immature).

Vasey and Rose, in their report on Palmer's collections from La Paz, Lower California, *Contrib. U. S. Nat. Herb.* i. 73 (1890), refer his no. 111 from that station to *Krynitzkia micromeres* Gray, with the remark "This differs somewhat from the northern forms of this species but it seems to be the same as Xantus's no. 76, made a part of this species by Gray." I have not seen Dr. Palmer's specimen but it is evidently *C. filiformifolia*. Xantus's specimen is only a scrap and it is not surprising that Dr. Gray referred it to his species; but he based his description on the Californian material. In 1891 Dr. Rose (l. c. 107) listed what I have taken as the type of my species as *K. micromeres* Gray without other comment than,

“very common on sandy bottoms.” With these several collections before me, however, the plant is seen to be nicely distinct from the Californian species *C. micromeres*. The most striking differences are its uniformly small size, almost filiform leaves, congested fruiting calyces and different nutlets. The groove is so dilated that it occupies the larger part of the ventral face of the nutlet. The nutlets suggest those of *C. Grayi* (Vasey & Rose) Macbr. but that species has conspicuous flowers and is otherwise different. *C. filiformifolia* does not seem to have crossed the mountains of Lower California to the West nor the Sierra Madre of Mexico to the east.

CRYPTANTHA MICROMERES (Gray) Greene, var. **cryptochaeta**, var. nov., hispida et adpresse strigoso-canescens; nuculis vix muriculatis vel scabridis. — LOWER CALIFORNIA: San Jose del Cabo, March–June, 1897, *A. W. Anthony*, no. 347 (TYPE, Gray Herb.).

The variety, because of the appressed hairs beneath the spreading hispid ones, is not green like the typical form of the species. In Anthony's specimen the branches of the inflorescence are not nearly so widely divaricate as in typical material and the calyces are less densely setose. However, ample collections are needed to prove the value of these apparent differences. Accordingly it seems better not to give the plant of Lower California specific rank at this time.

Cryptantha seorsa, spec. nov., humilis adpresse strigilosa et minute hispida a basi ipsa ramosa et florens; foliis caulinis inferioribus lineari-lanceolatis 2–2.5 cm. longis 1.5–2 mm. latis, superioribus ovatis acutis 1–2 cm. longis e basi 3–5 mm. latis supra papilloso-hispidis; cymis saepius 2–3-radiatis, spicis densifloris; calycis fructiferi laciniis linearibus 4–5 mm. longis basi ad apicem aequabiliter setoso-hispidis; nuculis (4) nitidulis 1.5 mm. longis ovatis acutis, dorso vix tuberculatis angulis lateralibus acutis faciebus ventralibus planis, sulco fere ad apicem aperto e basi furcato. — CALIFORNIA: Needles, May 6, 1884, *Jones*, no. 3841 (TYPE, Gray Herb.).

This seems to be very different from any described species and apparently is nearest *C. intermedia* (Gray) Greene, but the acutely angled nutlets with flat ventral surface forbid its reference to any of the members of that group. These nutlet-characters suggest the group that contains *C. oxygona* (Gray) Greene and *C. ramosissima* Greene, but the plant is obviously not related to these species.

C. AFFINIS (Gray) Greene. To the synonymy of this species may be added *C. geminata* Greene, Pitt. i. 119 (1887). The characters

Greene gives, particularly the character of the groove near the edge of the nutlet, are salient features of the type of *C. affinis*. *C. confusa* Rydb. Bull. Torr. Club xxxvi. 679 (1909) seems to be separable only by the use of superficial and arbitrary characters. The variation in leaf-breadth appears to be merely a condition and the same may be true of the slightly higher attachment of the nutlets.

C. RAMULOSISSIMA A. Nels. Eryth. vii. 68 (1899). This species is near *C. Torreyana* (Gray) Greene, but the habit and pubescence are different, the nutlets are more slender, and the areola is open instead of closed. But *C. flexuosa* A. Nels. in Coulter & Nelson, N. Man. Rocky Mt. Bot. 416 (1909), is *C. Torreyana* (Gray) Greene, var. *calycosa* (Gray) Greene (*C. calycosa* (Gray) Rydb.). The variety is more common than the typical form with which it merges. *C. incana* Greene, Leaflets i. 79 (1904), is apparently a specimen of *C. Torreyana* which is more canescent than usual.

C. MICROSTACHYS Greene. *C. Clevelandi* Greene, Pitt. i. 117 (1887), is not to be distinguished.

C. HILLMANII Nels. & Kenn. Proc. Biol. Soc. Wash. xix. 157 (1906), has been referred to *C. Watsoni* (Gray) Greene by Dr. Rydberg, Bull. Torr. Club xl. 481 (1913). This is an error, which may have been prompted by the distribution from the Rocky Mountain Herbarium of specimens determined as *C. Hillmanii*, when they really belong to *C. Watsoni*. The former species is characterized by a large solitary nutlet and is nearest *C. Suksdorffii* Greenm. *C. Watsoni*, on the other hand, matures four small nutlets and is related to *C. Torreyana*. Its stems and calyces are much more bristly than those of *C. Hillmanii*. Since these species have been confused it seems desirable to cite representative collections. Specimens in the Gray Herbarium of *C. Watsoni*: IDAHO: sandy slopes, New Plymouth, Canyon Co., May 21, 1910, Macbride, no. 81. WYOMING: Point of Rocks, June 15, 1898, Aven Nelson, no. 4736; Centennial Hills, July 16, 1895, Aven Nelson, no. 1684. UTAH: Wasatch Mountains, July, 1869, Watson, no. 858. NEVADA: Mount Grant, Mineral Co., July 2, 1913, Heller, no. 10,905, and Goldfield, July 16, 1913, no. 10,970 in part. OREGON: clay banks, Malheur Butte, Malheur Co., May 12, 1896, Leiberg, no. 2041 in part. Specimens of *C. Hillmanii*. IDAHO: Snake Plains, 1893, Palmer, no. 72, Henderson, no. 2561 (no other data). COLO-

RADO: dry mesa among junipers, Nucla, June 4, 1914, *Edwin Payson*, no. 395. ARIZONA: Grand Canyon, June 28, 1898, *MacDougal*, no. 184.

C. OXYGONA (Gray) Greene is either little known or very rare. The type came from "hills bordering the Mohave Desert," and on April 28, 1905, Mr. Heller secured it at McKittrick, Kern County. Unfortunately he distributed it (under his number 7789) as *C. cycloptera* Greene. One plant of this number in the Gray Herbarium is *C. intermedia* (Gray) Greene, but the rest of the collection is very typical *C. oxygona*. The discovery of a new station for this unusual species is of interest.

C. AMBIGUA (Gray) Greene. *C. simulans* Greene, Pitt. v. 54 (1902) is merely a tall specimen of this species. The nutlets are broadly ovate, dull, and are roughened with papillae of two sizes, — the really diagnostic characters of *C. ambigua*. *C. multicaulis* A. Nels. Bot. Gaz. xxx. 183 (1900) is closely allied to *C. ambigua* but is clearly distinct by its more compact habit and glossy, sparsely muriculate fruit. Its range in the Coulter & Nelson Rocky Mt. Bot. is given as "Wyoming and probably southward into Colorado." In reality specimens indicate that it is not infrequent from Montana to Nevada and north to Washington. *C. trifurca* Eastw. Bull. Torr. Club. xxxii. 203 (1905) is nearer *C. multicaulis* than *C. ambigua*, and is probably confined to extreme northern California and southwestern Oregon, an area noted for species peculiar to it.

C. SCOPARIA A. Nels. Bot. Gaz. liv. 144 (1912) is another member of this group and is to be distinguished from *C. multicaulis* by its narrowly conical nutlets with narrow open groove and scarcely forked basal areola. A specimen which has long proven troublesome to students is to be referred to this species. It is W. N. Suksdorf's no. 405, collected June 8, 1884, on plains, at Morgan's Ferry on the Yakima River, southeastern Washington. The original label bears the name *Krynitzkia angustifolia*?, in Dr. Gray's hand. This has a line drawn through it and on a slip bearing the abbreviation "Syn. Fl.," Dr. Gray wrote, "K. Fendleri." It was on the basis of this specimen that in the Syn. Fl. ii. pt. 1, Suppl. 424 (1886) he extended the range "northwestward to the borders of Washington Territory." Then Piper, in Contrib. U. S. Nat. Herb. xi. 485 (1906), wrote: "Suksdorf's specimen, on the basis of which *C. Fendleri* is included in his list [of the plants of Washington],

seems to be *C. ambigua*." However, the specimen represents perfectly *C. scoparia*, heretofore known only from the plains of western Idaho. This extension of range is not surprising as it simulates the ranges of many other plants, such as *Astragalus Spaldingii* Gray and *Oreocarya spiculifera* Piper.

C. INTERMEDIA (Gray) Greene. *C. echinella* Greene, Pitt. i. 115 (1887), should be referred to this species.

C. RAMOSA (Lehm.) Greene has an exact synonym in *Krynitzkia mexicana* Brandegee, Zoe v. 182 (1904), which was wrongly compared with the very different *C. pusilla* (T. & G.) Greene.

CRYPTANTHA KELSEYANA Greene, Pitt. ii. 232 (1892). This species was described by Greene (l. c.) from one collection, made by him August 6, 1889 at Elliston, Montana. He compared it with *C. Pattersonii*. In 1900 Dr. Rydberg (Mem. N. Y. Bot. Gard. i. 332) referred two other collections to *C. Kelseyana* and, continuing Greene's comparison, wrote, "three [nutlets] are gray, ovate, acuminate, and sparsely tuberculate, the fourth much smaller, red and smooth." This statement agrees in substance with Greene's original description but it does not coincide with the facts as they are illustrated in the Montana specimens. Actually the fourth nutlet is the largest, the species, in this respect, agreeing perfectly with *C. crassisepala*. I have talked with Dr. Rydberg in regard to this discrepancy in the description and he informs me that he is certain that Greene's characterization is incorrect, the error being due, probably, either to the immaturity or the poor development of the original specimen. I had also reached this conclusion because specimens invariably have the fourth and smooth nutlet the largest, and in the twenty-five years elapsing since the discovery of *C. Kelseyana* no plant answering to the original description has been found. Thus interpreted, the species is nearest *C. crassisepala*. It differs in the acute and narrower nutlets, the groove open toward the base and there forked but not excavated; and in the sepals which are not connivent over the mature fruit but open, the midrib only slightly thickened. Since collections representing *C. Kelseyana* have often been confused with *C. crassisepala*, *C. Pattersonii*, *C. ambigua*, or *C. multicaulis*, it seems worth while to cite the following material of the New York Botanical Garden (N. Y.) and the Gray Herbarium (Gr.).

SASKATCHEWAN: 1858, *E. Bourgeau* (Gr.). ASSINIBOIA: Medicine Hat, June 2, 1894, *Macoun*, no. 5803 (N. Y.). MONTANA: Virginia City, June 25-30, *G. N. Allen* (N. Y.); Melrose, July 6, 1895, *C. L. Shear*, no. 3218 (N. Y.). WYOMING: Pole Creek, Albany County, June 28, 1895, *Aven Nelson*, no. 1335 (N. Y.); Powder River, Natrona County, June 27, 1910, *Aven Nelson*, nos. 9415, 9377a (Gr.); open woods near the river, Fort Steele, Carbon County, June 16, 1907, *Aven Nelson*, no. 9049 (Gr.); Laramie, Albany County, July 7, 1894, & June 12, 1900, *Aven Nelson*, nos. 412, 7280 (Gr.); Natrona County, July 5 & 10, 1901, *Goodding*, nos. 197 & 234 (Gr.). COLORADO: mountain sides near Georgetown, August, 1885, *H. N. Patterson* (Gr.); Walsenburg, June 5, 1900, *Rydberg & Vreeland*, no. 5699 (N. Y.); Platte River, Evans, May 30, 1910, *E. L. Johnston*, no. 628 (N. Y.). UTAH: deep sand, Ogden, June 23, 1902, *Goodding*, no. 1176 (Gr.).

ERITRICHIMUM. Mr. F. W. Wight in his treatment of the American species of this genus, Bull. Torr. Club xxix. 407 (1902), fails to indicate clearly the relationship of our plants to those of Asia and Europe, although he states that there has been "much misapprehension, in regard to some of them, at least." It may be noted that the only constant difference between the European plant, *E. nanum* (All.) Schrad. and *E. elongatum* (Rydb.) Wight, its American representative, concerns the fruit. The nutlets of the European plant have a distinct spreading border or flange (whether entire or toothed); this is lacking in ours, the edges of the dorsal face being slightly elevated as a rather sharp ridge, — or in some species the edges bear a row of teeth. I have seen no indication in our plants that the presence or the absence of these teeth is not a constant, and therefore a good specific, character. *E. elongatum* and *E. argenteum* Wight include most of the material referred to *E. nanum*, var. *aretioides* by Gray, Syn. Fl. ii. pt. 1, 190 (1886). I am unable to see that *E. Chamissonis* A. DC. is distinct from true *E. aretioides* (Cham.) A. DC. The vegetative characters that Mr. Wight relies upon to separate them break down completely in any considerable series of specimens. The real relationship of *E. aretioides* is with *E. villosum* (Ledeb.) Bunge of Siberia. That species has very similar fruits; and it agrees with all the American species in lacking the border to the nutlet which characterizes the European plant, *E. nanum*.

✓ *Amsinckia Lemmonii*, spec. nov., planta ut apud *A. tessellatam* sed corolla infundibuliformi 15-18 mm. longa, tubo calyce 2-3-plo

longiore, faucibus ampliatis, limbo 5–7 mm. longo; staminibus aut faucibus aut tubo corollae insertis; stylo quam calyce rufidulo-hispido paullo vel multo longiore; nuculis eis *A. tessellatae* similis sed vix 3 mm. longis et vix rugosis. — CALIFORNIA: Lemmon's Ranch, San Luis Obispo Co., June, 1887, *Lemmon*, no. 4593 (TYPE, Gray Herb.); San Luis Obispo and Monterey Cos., April 15–May 10, 1899, *L. Jared*, no. 4.

According to Kuhn, *Bot. Ztg.* xxv. 67 (1867), species of *Amsinckia* are dimorphous. Darwin, *Different Forms of Flowers*, 110 (1877), denied that this is the case, there being simply a large amount of variation in the length of the styles and the insertion of the stamens. But Dr. Gray, *Syn. Fl.* ii. pt. 1. 197 (1886), wrote "Flowers in most species all heterogene-dimorphous, at least in the insertion of the stamens." However this may be, an examination of a large number of specimens of *A. tessellata* Gray, the closest ally of *A. Lemmonii*, has shown no sign of such variation (or heterostylism) so that the characteristic seems to be peculiar only to certain species, and therefore may be considered valuable for purposes of classification. *A. Lemmonii* is a case in point, since, in contrast to *A. tessellata*, it possesses this variation. In Jared's specimen the stamens are inserted low in the tube and the style is long; corollas of Lemmon's specimens have the stamens at the throat and the style short, but both specimens obviously represent only one species because they are otherwise identical. However, the recognition of *A. Lemmonii* as a species does not depend on the validity of this character, for it is strikingly distinct from *A. tessellata* in its large corolla which gives it the aspect of the remotely related *A. grandiflora* or *A. spectabilis*. Although it has the distinctive tessellated nutlets of its nearest relative, they are much narrower than those of that species in proportion to their length. Miss Alice Eastwood, when studying at the Gray Herbarium, wrote on the sheet of the Jared specimen "n. sp." She has kindly given me permission to describe it, and, since the discovery that the Lemmon specimen belonged with it, she has expressed pleasure over my choice of name.

Myosotis Colensoi (Kirk), comb. nov. *Exarrhena Colensoi* Kirk, *Trans. N. Z. Inst.* xxvii. 351 (1894), excluding North Island specimen. *Myosotis decora* Kirk acc. to Cheeseman, *Man, N. Z. Fl.* 462 (1906).

Because Kirk took specimens of *M. saxosa* Hook. f. of North Island to be referable to his species, Cheeseman (l. c.) discarded Kirk's name. But Kirk's description is evidently drawn from the South Island plants, since it does not apply at all to *M. saxosa* but is essentially correct for *M. decora*. The salient character is the short filaments and long anthers, and the description reads "anthers very large, sessile, or nearly so." Since Kirk did not cite a type, his name must surely be retained for the plant he describes, *i. e.* the plant of South Island, even though he regarded as the same a specimen from North Island, which is *M. saxosa*. Accordingly I am making the necessary transfer, *M. decora* having been merely an herbarium name until published by Cheeseman. The species is represented in the Gray Herbarium by a specimen which comes from the Upper Waimakarisi, Canturbury, *Kirk*, and is a co-type of *M. decora*.

374 **Mertensia Meyeriana**, spec. nov., flexuosa 2-3 dm. alta; caulibus gracilibus paullo hirtellis; foliis alternis costa media prominente margine adpresse ciliatis, supra brevissime scabrido-pubescentibus, subtus glabris paullo pallidioribus viridibus; foliis caulinis inferioribus petiolatis 1-2.5 cm. longis 12 mm. latis, basi cuneatis, petiolis subalatis margine obscure ciliatis; foliis superioribus paullo reductis oblongo-lanceolatis subacutis; floribus apice caulis circa 5 subumbellatis; corolla coerulea; pedicellis 4-6 mm. longis strigillosis; calyce 5-partito lobis anguste lanceolatis acutis ciliatis et plus minusve strigillosis 2 mm. longis, post anthesin 3-4 mm. longis costa media prominente; corolla 10-14 mm. longa, tubo limbum subaequante intus glabro; corollae appendiculis glabris obcordatis; stylo 13-16 mm. longo exserto. — CHINA: Zairansk, western Mongolia, May 20, 1911, *F. N. Meyer*, no. 727 (TYPE, Gray Herb.).

Apparently nearest *M. dahurica* (Fisch.) G. Don, which, however, has linear-lanceolate leaves and very different pubescence. It also may be compared to *M. stylosa* (Fisch.) A. DC., from which it is even more distinct especially in the merely subacute leaves and not at all villous pubescence. Specimens of these species are in the Gray Herbarium. The few Asiatic species described since the publication of DeCandolle's Prodrômus all belong to other groups. Among American Mertensias, *M. Meyeriana* suggests, in aspect, some of the *Lanceolatae*, but the long, exserted style is distinctive. Mr. F. N. Meyer during the past nine years has collected in eastern Asia for the United States government, and although he has been primarily interested in plants possessing economic value with a

view toward their introduction into America, he has secured, also, valuable collections of the general flora of the regions he has traversed. It is a pleasure to commemorate his work in naming this attractive *Mertensia M. Meyeriana*.

Mertensia asiatica (Takeda), comb. nov. *M. maritima* (L.) S. F. Gray, subsp. *asiatica* Takeda, Journ. Bot. xlix. 222 (1911). — Japan and eastern Asia north to Kamchatka. — JAPAN: Saghalien, 1861, *Glehn*; Rebun, Kitami, Aug. 15, 1887, *S. Hori*; Ishikari, Yezo, Sept. 10, 1903, *Shintaro Arimoto*; Isoya, Yezo, July, 1883, *S. Takewbu*; Nambu, Nippan, 1865, *Maximowicz*; circa Hakodate, Yezo, 1861, *Dr. Albrecht*; Cape Sangar, 1853–1856, *J. Small*. CHINA: Coast of Manchuria, Coast Province, 1859, *C. Wilford*, no. 1090. KAMCHATKA: 1853–1856, *Mr. Boggs* (this collection in part only).

Takeda, l. c., has indicated the distinctive characters of this segregate of *M. maritima*. However, his description of the floral parts does not wholly coincide with my own observations. It reads: "corolla magna, plus 10 mm. longa. . . . Stamina anthero 2 mm. longo, filamentis aequanti. Stylus inclusus, 8 mm. longus, staminibus superans." An examination of the material cited has given the following data. Corolla 8–10 mm. long; filaments nearly equalling to twice longer than the anthers; style often slightly exserted, 7–9.5 mm. long. The same class of information for *M. maritima* is: corolla 4–6 mm. long; filaments about three times as long as the anthers; style 4–4.5 mm. long, shorter than the stamens. The long style and large corolla are constant characters of all the specimens seen from Japan and adjacent Asia, while the much smaller corolla and shorter style are features of material from Europe, America, and Northeastern Siberia. If it were not for the facts that in all specimens here included in *M. asiatica* the stamens are inserted near the top of the corolla-tube just as in *M. maritima* and that the style is uniformly longer than the stamens, one would be inclined to regard the latter character as a dimorphic phenomenon since dimorphism in some form is not rare in the family. *Mertensia alpina*, for instance, exhibits a sort of dimorphism, but specimens from the same region show both long and short styles in correlation with low and high stamen-insertion. Moreover, in the English edition of Knuth's Handbook of Flower Pollination, iii. 138 (1909), we learn that in *M. maritima* "the anthers being at the same level as the stigma automatic self-polli-

nation regularly takes place." This could never happen in the Japanese plant because the stigma (as already indicated) is always raised above the anthers, thus necessitating cross-pollination. All this accords with Knuth's conclusion (l. c. 115), constructed from the observations of many students, that borraginaceous genera with conspicuous flowers "receive such a large number of visits that automatic self-pollination" is excluded. On the other hand, the small scantily nectar-secreting flowers are very rarely visited by insects and almost always pollinate themselves." And Knuth lists no visitors to *M. maritima* although Ekstam and other students of the subject have observed the plants in the field. In all probability *M. asiatica*, so evidently adapted to cross-pollination is visited by insects, and possibly by one or more species with a coordinating range, an interesting point for future observers to determine. Finally, the plant of the Far East in general has more rounded leaves, larger fruiting calyx and more commonly nodding pedicels. The pedicels are often even somewhat contorted in age. Thus this form of the Orient seems to be a species technically and geographically removed from *M. maritima* of northeastern Siberia, northern Europe and northern America.

LITHOSPERMUM RUDERALE Dougl. ex Lehm. Pug. 2, 28 (1830).
L. pilosum Nutt. Journ. Acad. Phil. vii. 43 (1834). *L. lanceolatum*
 Rydb. Mem. N. Y. Bot. Gard. i. 333 (1900). *L. ruderale* Dougl.,
 var. *lanceolatum* (Rydb.) A. Nels. Bot. Gaz. lii. 272 (1911).

This plant varies somewhat in the shape of the leaves (linear-lanceolate to lanceolate), the degree of hispidity, especially on the stem, and the size of the nutlets, which may be more or less distinctly bordered at the base with a spreading flange. The original description (based on material in flower) calls for linear leaves and hirsute stem; and Rydberg segregated his *L. lanceolatum* primarily on its lanceolate leaves while Nuttall (l. c. 44) distinguished his *L. Torreyi* on its merely strigose stem. Rydberg also credits his species with having "smaller flowers, larger nutlets and less hispidity." Examination of much material must convince one that Piper's reduction of *L. lanceolatum*, Contrib. U. S. Nat. Herb. xi. 486 (1906), was justifiable, because the variations noted by Rydberg are seen to be present in every degree, and, as suggested by Aven Nelson (l. c.) are obviously largely the result of environment and therefore of an individual rather than of a specific nature.

Incidentally I might mention that besides this great leaf-variation among different clumps of plants, the leaves seem to grow proportionately broader so that, although they may be quite linear while the plant is in flower, by the time it is in fruit they are distinctly of a lanceolate type. The variation in the character of the pubescence on the stem, however, is much better marked, and furthermore, as Rydberg indicates in his *Flora of Colorado*, 292 (1906), the plants with merely strigose stems have somewhat shorter corollas and are confined to the central Rocky Mountain region. This is *L. Torreyi* of Nuttall, but, since intermediates are frequent, it may become

L. RUDERALE Dougl., var. **Torreyi** (Nutt.), comb. nov. *L. Torreyi* Nutt. Journ. Acad. Phil. vii. 44 (1834).

There is yet another way in which this species varies and that is in the size of the nutlets and the prominence of a flange, or collar-like constriction, around the base. This character was observed by Aven Nelson (l. c.) in a specimen from Idaho and he wrongly applied Rydberg's name, being misled, in part, by the large nutlets attributed to that plant. Although the nutlets of all specimens show a tendency to be constricted at the base, and although they vary from 3 to about 6 mm. long, the plants from southwestern Idaho and eastern Oregon to western Nevada exhibit these characteristics in such a pronounced degree (as well described by Nelson, l. c.) that they seem to merit recognition as a variety, and may bear the name

L. RUDERALE Dougl., var. **macropermum**, nom. nov. *L. ruderale* Dougl., var. *lanceolatum* A. Nels. Bot. Gaz. lii. 272 (1911) as to description and specimens cited, not *L. lanceolatum* Rydb. Mem. N. Y. Bot. Gard. i. 333 (1900).

LITHOSPERMUM CALCICOLA Robinson, Proc. Am. Acad. xxvii. 182 (1892). *L. Conzattii* Greenm. Field Col. Mus. Bot. Ser. ii. 239 (1912) appears to be only a young state of *L. calcicola*. Greenman wrote (l. c.), "it differs in having larger flowers and smooth nutlets." These are characters which are known to vary greatly in American species, for instance in the *L. angustifolium* group, where the nutlets may be quite smooth or distinctly pitted on the same plant. Although the type of *L. calcicola* has pitted nutlets, some specimens which agree perfectly otherwise, even to having small flowers, have smooth nutlets, as no. 5381 of Purpus from San Luis

Potosi. The size of the flowers is likewise a variable factor in this genus and frequently the earlier flowers are larger than those which appear after fruit has formed. However this may be in the case of *L. Conzattii*, it agrees in all other respects with *L. calcicola*, so that its reduction argues for a better understanding of the latter, which originally was based on a single collection. Thus interpreted, *L. calcicola* seems to be not uncommon from San Luis Potosi to Oaxaca.

✓ *LITHOSPERMUM STRICTUM* Lehm., var. **calycosum**, var. nov., foliis caulinis oblongis circa 5 mm. latis; calycibus fructiferis elongatis 10–15 mm. longis. — MEXICO: Guanajuato, June, 1907, *A. Dugès*, no. 5 (TYPE, Gray Herb.); San Luis Potosi, 1878, *Parry & Palmer* no. 622; near San Miguelito, San Luis Potosi, 1876, *Schaffner*, no. 728; Ixmiquipan, Hidalgo, July, 1905, *Purpus*, no. 1403.

Like the typical form except for the broader leaves and the accrescent sepals, but the leaves vary from narrowly linear to oblong in the species, the variety merely representing the extreme form, and the sepal-development, although not an unusual phenomenon in many plants, often, as here, seems worthy of note.

Lithospermum obovatum, spec. nov., herbaceum hispidum strictum 1.5–2.5 dm. altum; foliis radicalibus latissimis obovato-spathulatis supra dense subadpresse papilloso-hispidis subtus villosihirsutis 4–5 cm. longis 1.5–2.5 cm. latis conspicue pinnativeniis; caulinis oblongis circa 16 mm. longis 4 mm. latis superioribus vix reductis; inflorescentia ut apud *L. cobrense*; corolla (ut videtur aurantiaca) circa 2 cm. longa, tubo 10–14 mm. longo extus villoso, intus glabro vel pubescente faucibus glandulari-granulosis cum incisuris 5 definitis corollae lobis oppositis; limbi lobis rotundatis minute crenulatis; calycis lobis fere linearibus circa 5 mm. longis; nuculis ignotis. — MEXICO: Quebrada Honda, Durango, May 20 & 21, 1906, *Palmer*, no. 216 (TYPE, Gray Herb.).

A species technically very near *L. cobrense* Greene, but seemingly distinct by virtue of the broad basal leaves, shorter cauline leaves, denser pubescence and larger flowers. The scalloped margin of the gland-covered surface of the throat is sharply defined in this plant while in *L. cobrense* the scallops are not at all definite. Striking in the aspect of *L. obovatum* are the remarkable basal leaves.

Macrotomia densiflora (Ledeb.), comb. nov. *M. cephalotes* (DC.) Boiss. Fl. Orient. iv. 612 (1879). *Arnebia cephalotes* DC. Prod. x. 96 (1846). *Lithospermum densiflorum* Ledeb. in Bull. Sci. Petersb.

ii. 312 (1837). *Arnebia densiflora* Ledeb. Fl. Ross. iii. 140 (1846–51). Apparently this beautiful plant has never been properly christened. Its large golden flowers must excite the admiration of those who know it in the field.

ECHIUM MICRANTHUM Schousboë, Vextr. Maroko 75 (1800). De Coincy, Journ. de Bot. xvi. 229–231 (1902), in his detailed discussion of the group has given convincing evidence that *E. sabulicolum* Pomel and *E. decipiens* Pomel, Nouv. Mat. Fl. Atl. i. 90 & 91 (1874) are mere variants of his *E. confusum*, l. c. xiv. 298 (1900); also that *E. micranthum* Schousboë (l. c.) “est probablement la forme femelle de l’*E. confusum*,” l. c. xv. 312 (1901), and again, “Les formes femelles à petites corolles et à étamines paraissent aussi fréquentes dans la variété *decipiens* que dans le type. C’est alors le *micranthum*,” l. c. xvi. 231 (1902). This variation from the normal hermaphrodite flowers is a well-known phenomenon in *Echium vulgare*, cf. Knuth Handb. Fl. Poll. iii. 133 (1909); and de Coincy has also discussed its occurrence, Bull. Herb. Boiss. ser. II. i. 190 (1901). Reference to the original description of *E. micranthum*, however, shows that Schousboë must have had perfect flowers at hand; and it seems to me that his plant was, in all probability, the maritime form described by Pomel, Nouv. Mat. Fl. Atlan. i. 91 (1874), as *E. sabulicolum* which de Coincy, Journ. de Bot. xvi. 229 (1902), considers as “une forme” of his *E. confusum* “mais il ne paraît pas opportun d’établir ici une variété qui n’aurait que des limites par trop incertaines.” But he makes the combination *E. confusum* Coincy, var. *decipiens* (Pomel) Coincy (l. c. 230), distinguishing the variety principally by its annual duration and simple erect stem. However, this is contrary to the International Rules, according to which the earliest specific name must be retained. Therefore I am making the necessary combinations; and since I agree with de Coincy on the relationships of the variants of this plant, as completely delineated by him (l. c.), it has seemed unnecessary to repeat them here.

ECHIUM MICRANTHUM Schousboë, var. **confusum** (Coincy), comb. nov. *E. confusum* Coincy, Journ. de Bot. xiv. 298 (1900).

ECHIUM MICRANTHUM Schousboë, var. **decipiens** (Pomel), comb. nov. *E. decipiens* Pomel, Nouv. Mat. Fl. Atlan. i. 91 (1874). *E. confusum* Coincy, var. *decipiens* (Pomel) Coincy, Journ. de Bot. xvi. 230 (1902).

ONOSMA CINEREUM Schreb., var. *stellulatum* (Waldst. & Kit.), comb. nov. *O. stellulatum* Waldst. & Kit. Pl. rar. Hung. ii. 189 (1805); Coste, Fl. Fr. ii. 590 (1903); Brand, Koch's Syn. Deutsch. u. Schweiz. Fl. iii. 1995 (1907). *O. helveticum* Boiss. Diagn. Ser. 1. xi. 111 (1849). *O. echioides* L., var. *stellulatum* (Schreb.) Fiori in Fiori & Paoletti, Fl. It. ii. 364 (1902).

O. cinereum Schreb. Nov. Act. Nat. Cur. iii. 474 (1767) is the earliest designation for this variable and much-named species. For a nearly complete synonymy see Boissier, Fl. Orient. iv. 201-202 (1875). Boissier, apparently overlooking Schreber's name, maintained in specific rank *O. stellulatum* Waldst. & Kit., the form with green often plane leaves and spreading pubescence, and treated as varieties of it the plants with more or less cinereous narrow leaves with revolute margins. However, since *cinereum* is the older specific name, it must be retained for the species. Fiori (l. c.) treats both *O. cinereum* and *O. stellulatum* as varieties of *O. echioides* and Brand (l. c.) writes "Die . . . Arten sind schwer zu unterscheiden und nicht scharf abgegrenzt. Möglicherweise sind es nur Formen einer einzigen Art." Undoubtedly the species tend to merge through the variety *stellulatum* but in general they are distinct enough so that it seems conducive to clearness to keep both species as Boissier, Gürke, Brand, and others have done. In my opinion, however, Fiori is right in his treatment of the several segregates of *O. echioides* that have been proposed, since they all agree with it in having the tuberculate bases of the hairs glabrous. But *O. cinereum* and its relatives are typically well-marked by the stellate-pubescent tuberculate bases of the hairs. Fiori's diagnoses of the typical form and the var. *stellulatum* are good.