CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY

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I. A REVISION OF THE NORTH AMERICAN SPECIES OF AMSINCKIA

By J. Francis Macbride

The genus *Amsinckia* reaches its greatest development in California, but several species are indigenous to Oregon and Washington, one has been described from Mexico and one or more are known from western South America as far south as Patagonia. The range of one species apparently extends from northern Idaho and adjacent Washington to Arizona and California but most species are confined, at least as to their indigenous occurrence, to much smaller areas. Several, however, have greatly extended their natural ranges by spreading as weeds. Indeed the weedy character of *Amsinckia* is most pronounced. I have observed species in California and Idaho that, by reason of their aggressiveness, have been able to take possession, as it were, of places laid waste of the indigenous vegetation. There *Amsinckia*, in the most severe colluctation with other native and, more especially, introduced plants that frequent areas where the natural equilibrium of species has been disturbed, has been able, not only to hold its own but often even to flourish at the evident expense or destruction of less aggressive types. One species is a frequent weed in the grain fields of eastern Washington (cf. Piper and Beattie, Fl. of S. E. Wash. 209) and of Idaho, and one or more species have gained a foothold on the Atlantic coast (cf. Taylor, Fl. of New York and Vicinity, 522, and Macbride, Rhodora xviii. 23). But the distribution of *Amsinckia* as a weed is not confined to the United States. I have seen specimens from Australia and as long ago as 1895 Hansen in Bot. Tidss. xix. 302 recorded two species as adventive in Denmark. Moreover Dr. Thellung has written me that "certaines espèces de ce genre se trouvent ça et la adventices en Europe, introduites probablement avec des blés américains; mais il m'a presque toujours été impossible, faute d'un travail d'ensemble, de les determiner exactement et sûrement."

The need of a general revision of the Amsinckias of North America will be apparent when it is stated that no complete treatment has appeared since that by Dr. Gray in the Synoptical Flora ii. pt. 1, 197 (1886) where he recognized only six species and two varieties, practically all that had been proposed at that time. Since then, however, over a dozen species have been described, mostly from California, and although some of these are apparently not valid this study has disclosed five more plants which seem to require characterization. As a result twenty-one species are recognized, three times as many as were recorded in 1886. The justification of this augmentation will be questioned, especially since species in this group have been proverbially difficult of discrimination. However, it is believed that this state of affairs has been induced, at least partly, by the lack of a comprehensive treatment in which the chief characters are brought into contrast. Nevertheless it must be conceded that characters which admit of clean-cut statement are all too few. The ready response of all the species to every change in ecological conditions makes it difficult to determine the reliable diagnostic characters. However I have become convinced that shape of leaves, size of corolla and nature of pubescence are features that are of the utmost importance, in spite of their supposed susceptibility to environment, for the discrimination of species. In view of the fact that fruit-characters are unusually important in the delineation of the components of many boraginaceous genera it might be expected that they would serve as a means of discriminating species in this genus but with few exceptions the variations in the character of the nutlets have not proved stable nor definite enough to warrant their use in classification. Altogether *Amsinckia* is the most perplexing group I have studied and I can only hope that this effort to define its natural components may lead to careful field-work by some one who may then be in a position to prove or correct my interpretation. It is conceivable, with the better understanding gained from field-observation of specific limitations within the group, that it will be found to consist of many more species than the twenty-one here recognized. I feel, however, that in a genus in which the species lend themselves so readily to many diverse environments and are subject, consequently, to the stimulus for great variation, specific lines must not be drawn very fine lest the classification become artificial and thus fail to serve a useful purpose.

I have had the privilege of studying the specimens of *Amsinckia* belonging to the Rocky Mountain Herbarium of the University of Wyoming which collection proved to contain a number of valuable sheets not represented at the Gray Herbarium. In citing these I have indicated them by the abbreviation "R. Mt. Herb." It was also my good fortune during a brief visit at the Missouri Botanical Garden to have the opportunity of examining there the collection in this group a portion of which was loaned to me for further study. These specimens are indicated by the abbreviation "Mo. Bot. Gard."

Key to the Species

a. Nutlets at maturity smooth and polished *b.*
  b. Corolla about 10 mm. long; scar not median.
    Nutlets 4–4.5 mm. long, sharply triquetrous; scar not obvious ..... 1. *A. vernicosa.*
    Nutlets 5 mm. long or longer, not at all triquetrous; scar linear, prominent ..... 2. *A. carinata.*
  b. Corolla 12–15 mm. long; scar of nutlet nearly median ..... 3. *A. spectabilis.*
a. Nutlets more or less roughened, dull or somewhat lustrous *c.*
  c. Nutlets crustaceous, tessellate or tessellate-rugose.
    Corolla 15–18 mm. long; nutlets scarcely 3 mm. long and scarcely rugose ..... 4. *A. Lemmonii.*
    Corolla about 10 mm. long; nutlets 3.5–4 mm. long, usually more or less rugose ..... 5. *A. tessellata.*
  c. Nutlets variously roughened but never tessellate nor tessellate-rugose *d.*
    d. Leaves distinctly denticulate, often more or less repand; coastal species somewhat decumbent at base, or sometimes procumbent *e.*
      e. Nutlets deltoid with flattish back, faintly rugulose and granulate ..... 6. *A. lycopsoides.*
      e. Nutlets ovate-trigonous, distinctly roughened *f.*
        f. Racemes bracteate throughout; insular species. 7. *A. St. Nicolai.*
        f. Racemes ebracteate or the lowest flowers bracted; continental species *g.*
          g. Sepals bearded on the margins with long white hairs ..... 8. *A. barbata.*
          g. Sepals not bearded on the margins with long white hairs *h.*
            h. Mature nutlets black or dark brown, 1–1.5 mm. long, granulate and sharply muricate, indistinctly rugulose ..... 9. *A. intermedia.*
            h. Mature nutlets usually paler in color, over 2 mm. long, muriculate and more or less distinctly rugulose.
              Corolla-limb flaring; nutlets irregularly rugulose ..... 17. *A. Douglasiana.*
              Corolla nearly tubular, the limb narrow; nutlets usually with strongly developed transverse rugae ..... 10. *A. Menziesii.*

d. Leaves entire; species of dry soils, mostly confined to hilly regions of the interior; stems normally erect *i.*

i. Corolla small, rarely over 6 mm. long, the tube often included in the calyx, the limb narrow, usually but slightly wider than the tube or rarely the corolla larger (7–11 mm. long) and then the lower and middle cauline leaves distinctly oblong *j.*

j. Leaves lanceolate or ovate-lanceolate; stems more or less hispid, usually not at all strigose; fruiting-calyx 4–10 mm. long, usually only 5 mm. long.

Fruiting calyx about 5 mm. long; inflorescence terminal or the racemes all from the upper axils . . . . . 10. *A. Menziesii.*

Fruiting calyx about 10 mm. long; racemes from the lower as well as the upper axils . . 11. *A. idahoensis.*

j. Leaves, except the uppermost, oblong or oblong-linear; stems, even at base, distinctly strigose as well as hispid (except in silicicolous plants); fruiting calyx usually long (6–10 mm.).

Corolla bright- or golden-yellow, 5–11 mm. long, the tube distinctly exserted from the calyx; stems hispid, only slightly strigose 12. *A. arenaria.*

Corolla very pale-yellow, nearly white, 5–6 mm. long, the tube included or slightly exserted from the calyx; stems very strigose as well as hispid . . . . . 13. *A. parviflora.*

i. Corolla conspicuous, usually 10–17 mm. long, sometimes shorter but then always with exserted tube and the leaves not oblong; leaves usually ovate-lanceolate, lanceolate or linear-lanceolate; species natives of California *k.*

k. Corolla about 10 mm. long, the tube usually less than two times as long as the calyx *l.*

l. Nutlets never truly echinate but sometimes sharply muricate, especially on the dorsal carination *m.*

m. Pubescence of calyx (including the few bristles) appressed; leaves usually oblong or oblong-lanceolate . . . . . 14. *A. campestris.*

m. Pubescence of calyx consisting of widely spreading setae (usually reddish) and fine appressed hairs; leaves usually ovate-lanceolate *n.*

n. Stems with no bristly hairs but cinereous to the base with a fine subappressed pubescence . . . . . 15. *A. obvallata.*

n. Stems more or less bristly (sometimes glabrous toward the base) *o.*

o. Nutlets less than 3 mm. long; fruiting calyx 4–8 mm. long *p.*

p. Stems and branches subdecumbent with ascending tips; introduced state of . . . . . 9. *A. intermedia.*

p. Stems and branches strictly erect. *q.*

q. Stem toward the inflorescence and the upper leaves cinereous; nutlets covered with blunt tubercles 16. *A. lunaris.*

q. Stem and leaves not at all cinereous: nutlets muriculate and more or less irregularly rugose.
Corolla-limb 5 mm. or less broad; tube 5–7 mm. long; species of the coastal hills from central California southward . . . 17. *A. Douglasiana.*
Corolla-limb flaring, 6-8 mm. broad; tube 8–10 mm. long; species of north-central California . . . . . 20. *A. valens.*
o. Nutlets about 4 mm. long; fruiting calyx 10 mm. or more long . . . . . 18. *A. intactilis.*
l. Nutlets echinate with soft slender prickles . . . . 23. *A. echinata.*
k. Corolla about 15 mm. (13–17) long, the tube two to three times as long as the calyx *r*.
r. Calyx bristly with spreading hairs *s*.
s. Nutlets muriculate and sharply carinate or rugose; pubescence in part appressed-strigose.
Lower cauline leaves linear-oblong or linear-lanceolate, acute or acuminate, less than 10 cm. long; slender plants rarely 4 dm. high . . . . . 19. *A. Eastwoodae.*
Lower cauline leaves oblong-lanceolate, obtusish or acute, 10 cm. or more long; stout plants, 5–10 dm. high . . . . . 20. *A. valens.*
s. Nutlets granular, not sharply carinate nor rugose; pubescence hispid, spreading . . . . 21. *A. inepta.*
r. Calyx villous and hispidulous, the hairs mostly appressed . . . . . 22. *A. microcarpa.*

1. A. VERNICOSA Hook. & Arn. Bot. Beech. Voy. 370 (1840). *A. carnosa* Jones, Contrib. W. Bot. viii. 35 (1898). — CALIFORNIA: White Mts., San Luis Obispo Co., May 2, 1896, *Eastwood*; near Calico, San Bernardino Co., 1884, *Lemmon*, no. 3139; Sunset, Kern Co., April 20, 1905, *Heller*, no. 7722; 1883, *Douglas; Coulter*, no. 496; Sheperd's Cañon, Inyo Co., April 30, 1897, *Jones* (Mo. Bot. Gard.); Loma Paloma, San Rafael Mts., May 20, 1907, *Hall*, no. 7840 (Mo. Bot. Gard.).

2. A. CARINATA Nels. & Macbr. Bot. Gaz. lxii. 145 (1916). — OREGON: Malheur Valley, near Harper Ranch, June 10, 1896, *Leiberg*, no. 2234.

3. A. SPECTABILIS F. & M. Ind. Sem. Hort. Petrop. 26 (1836). *A. vernicosa* Hook. & Arn., var. *grandiflora* Gray in Brewer & Wats. Bot. Cal. i. 525 (1876). *A. grandiflora* Kleeb ex Gray, l. c.; Jepson, Fl. W. Middle Cal. ed. 2, 350 (1911). — CALIFORNIA: Antioch, Contra Costa Co., April 16, 1869, *Kellogg & Harford*; also May, 1883, *Kellogg*.

Greene, Bot. San Fran. Bay Reg. 263, attributes this plant to the "hills east of the Livermore Valley," Alameda County as well as to the vicinity of Antioch. Fischer and Meyer, l. c., give the

habitat as " circa coloniam ruthenorum Ross in portu Bodega." The species has not been found at Bodega but since the ecological conditions are the same as at Antioch, less than a hundred miles away, it may occur there and have been overlooked. On the other hand there is no proof that the plant was found originally in the *immediate* vicinity of Bodega. Therefore the attempt to apply Fischer and Meyer's name to the relatively small-flowered plant common at Bodega is, it would seem, uncalled for. Their description reads, " corolla aurea, limbo 6 lin. in diametro " and " Species pulchritudine florum insignis atque distinctissima," a characterization applicable to but one *Amsinckia* of the region, *A. grandiflora*. The adoption of the name *A. spectabilis* for this plant results in the resurrection of the appropriate name *A. Douglasiana* A. DC. for the coastal species long known as *A. spectabilis*.

4. A. LEMMONII Macbr. Contrib. Gray Herb. xlviii. 50 (1916). — CALIFORNIA: Lemmon's Ranch, San Luis Obispo Co., June, 1887, *Lemmon*, no. 4593; San Luis Obispo and Monterey Cos., April 15–May 10, 1899, *Jared*, no. 4.

5. A. TESSELLATA Gray, Proc. Am. Acad. x. 54 (1875). *A. collina* Greene, Man. Bay-Region 263 (1894). *A. pustulata* Heller, Muhl. ii. 243 (1906). *A. tessellata* Gray, var. *macrosepala* Jones, Contrib. W. Bot. xii. 58 (1908). — South-central Washington and northern Idaho to western Arizona and the southern half of California. — IDAHO: very common on the Lewiston hills, May 19, 1894, *Henderson*, no. 2812; New Plymouth, Canyon Co., May 20, 1910, *Macbride*, no. 76; Lewiston, 1896, *Heller*, no. 3021 (Mo. Bot. Gard.); near Boise, June 15, 1892, *Mulford* (Mo. Bot. Gard.); Weiser, Washington Co. April 18, 1900, *Jones*, no. 6480 (Mo. Bot. Gard.). NEVADA: East Humboldt Mts., July, 1865, *Watson*, no. 846; Goldfield, Esmeralda Co., July 16, 1913, *Heller*, no. 10968; Meadow Valley Wash, April 28, 1902, *Goodding*, no. 638; Eagle Valley, Ormsby Co., June 10, 1902, *Baker*, no. 1045; near Carson City, 1865, *Anderson*. UTAH: Black Rock on Salt Lake, June 28, 1910, *Englemann*. ARIZONA: Grand Cañon, May, 1885, *Gray*; Yucca, Mohave Co., March 12, 1912, *Wooton*; Maricopa, Pinal Co., Feb., May, 1885, *Gray*. CALIFORNIA: Argus Mts., Inyo Co., April–Sept., 1897, *Purpus*, no. 5441; Needles, March 20, 1915, *Parish*, no. 9627; Mojave Desert, May 15, 1882, *Pringle*; sand hills west of Laws, Inyo Co., May 8, 1906, *Heller*, no. 8204 (duplicate of *A. pustulata*); near Mt. Diablo, 1860–62, *Brewer*, no. 1119; Kramer, San Bernardino Co., April 13, 1905, *Heller*, no. 7670; between Earlinart and Delano, Tulare Co., March 26, 1914, *Eastwood*, no. 3953. OREGON: Lexington, Morrow Co., May 2, 1894,

Leiberg, no. 11. WASHINGTON: Pasco, Franklin Co., May 29, 1899, *Piper*, no. 2971; North Yakima, May, 1892, *Henderson*, no. 2558; Waitsburg, May 17, 1897, *Horner*, no. R146B365; Sprague, June, *Sandberg & Leiberg* (R. Mt. Herb.).

The very characteristic nutlets readily distinguish this widely distributed species. As in all species the leaves show considerable variation in breadth and the pubescence of the inflorescence is sometimes tawny, sometimes pale in color in individuals from the same locality. A variation in the character of the surface of the nutlets would appear to be of greater moment but it, like the foregoing variations, occurs in every degree. In the original collection the tessellated nutlet-surface was broken somewhat by a few irregular elevations. Often these are so numerous and continuous that they form transverse rugae; again these corrugations are lacking and the surface resembles exactly a pavement (well illustrated by *Purpus*, no. 5441). The variety *macrosepala* Jones is the form with accrescent sepals.

6. A. LYCOPSOIDES Lehm. ex F. & M. Ind. Sem. Hort. Petrop. 26 (1836). *A. lycopsoides* Lehm., var. *bracteosa* Gray, Syn. Fl. ii. pt. I. 198 (1886). *Lithospermum lycopsoides* Lehm. Pug. ii. 28 (1830); Hook. Fl. Bor. Am. ii. 89 (1838). — Coastal region, northwestern Washington. — WASHINGTON: Puget Sound, *Suckley*; 1854, *Cooper*; sandy beach near Fairhaven, Whatcom Co., July 8, 1890, *Suksdorf*, no. 996; Olympic Mts., Clallam Co., June, 1900, *Elmer*, no. 2754 (Mo. Bot. Gard.).

7. A. ST. NICOLAI Eastw. Proc. Cal. Acad. ser. 3, i. 109 t. 8, fig. 7 (1898). — California: sands, San Nicolas Island, April, 1901, *Blanche Trask*, no. 58.

The apparent validity of this unfortunately named species is a strong argument for the incorporation in all rules of nomenclature of a law invalidating this and similar pseudo-binomials.

8. A. BARBATA Greene, Eryth. ii. 192 (1894). — Vancouver Island; introduced in New England. — BRITISH COLUMBIA: Cameron Lake, July 15, 1887, *Macoun*. CONNECTICUT: Southington, May 29, 1895, *Andrews*, no. 474; also June 17, 1897, and 31, 1898, *Bissell*, nos. 12 and 421.

There is an account in Rhodora xviii. 23 (1916) of the occurrence of this species as a weed in New England.

9. A. INTERMEDIA F. & M. Ind. Sem. Hort. Petrop. 26 (1836). *A. maritima* Eastw. Proc. Cal. Acad. ser. 3, i. 110, t. 8, fig. 8 (1898).

A. lycopsoides Gray in Brewer & Wats. Bot. Cal. i. 524 (1876) and Syn. Fl. ii. pt. I. 198 (1886), in part; Greene, Man. Bay-Region 262 (1894); Jepson, Fl. W. Middle Cal. ed. 2, 350 (1911), not Lehm.; *A. spectabilis* Abrams, Fl. Los Ang. 335 (1911), in part, not F. & M. — Along the seaboard, north to Sonoma County. — CALIFORNIA: Bodega Bay, Sonoma Co., May 27, 1902, *Heller*, no. 5614; Angel Island, San Francisco Bay, *Vasey*; and April 12, 1904, *Mulliken*, no. 92 (R. Mt. Herb.); Bodega Point, June 29, 1915, *Eastwood*, nos. 4798, 4798a; Lone Mt. near San Francisco, March 27, *Kellogg & Harford*, no. 758 (Mo. Bot. Gard.); coast west of Watsonville, Santa Cruz Co., April 14, 1903, *Baker*, no. 1952; San Simeon Bay, San Luis Obispo Co., 1876, *Palmer*, no. 370; Cypress Point, Monterey Co., July, 1884, *Ball*; coast at Wilmington, Los Angeles Co., 1885, *Nevin*; stems decumbent, grassy places in park, San Diego, Feb. 22, 1916, *Mary F. Spencer*; San Diego, May 4, 1895, *Belle Sumner Angier*, no. 80 (Mo. Bot. Gard.); San Nicolas Island, April, 1901, *Blanche Trask*, no. 59.

The name *Amsinckia intermedia* has been applied to various plants but in its essential characters the seaboard species of central and southern California is the only plant occurring at Bodega Point, the type locality, that agrees at all closely with Fischer and Meyer's description. Miss Eastwood, l. c., in comparing her species with *A. lycopsoides* erred in regarding the description by Fischer and Meyer (l. c.) as the original characterization. The latter species was published by Lehman as *Lithospermum lycopsoides*, Pug. ii. 28 (1830), and according to Hooker, Fl. Bor. Am. ii. 89 (1838) was based on specimens by Scouler from "Straits of de Fuca." That this is correct seems quite probable because the only specimens I have seen that accord with Lehman's complete diagnosis have come from the coastal region of northwestern Washington. This plant is evidently not the same as the coast-plant of California. *A. lycopsoides* F. & M. with "corolla fauce barbata" has not been identified unless Miss Eastwood, l. c., is correct in referring to it a collection she made in Alameda County. If the feature "corolla with bearded throat" is constant this plant would seem to need a name but according to Gray's observations, Proc. Am Acad. x. 53 (1875), the character is reciprocal to the insertion of the stamens and the length of the style. Fischer and Meyer's *A. lycopsoides*, therefore, would appear to be a condition of *A. intermedia* with "staminibus corollae tubo paulo supra basin insertis" and long style. Heller's collection no. 5614 from Bodega Point exhibits

both high and low stamen insertion. Careful field work is needed to show whether this phenomenon is to be regarded as a heterogeneous variation potentially possible for all, or peculiar only to certain species. I have discussed this question, Contrib. Gray Herb. xlviii. 51 (1916), in regard to *A. tessellata* and *A. Lemmonii*.

10. A. Menziesii (Lehm.) Nels. & Macbr. Bot. Gaz. lxi. 36 (1916). *Echium Menziesii* Lehm. Pug. ii. 29 (1830). *A. intermedia* Gray, Syn. Fl. ii. pt. I. 198 (1886), in part; Piper, Contrib. U. S. Nat. Herb. xi. 480 (1906), in part; Piper & Beattie, Fl. N. W. Coast 303 (1915), in part. — Vancouver Island to northern California, Montana, Nevada, and Arizona; introduced in the Middle West. — Illinois: Rantoul, July 5, 1907, *Gleason*. Missouri: along railroad, Courtney, June 2, 1914, *Bush*, no. 7123. Idaho: Hot Hole, East Bruneau, Owyhee Co., July 3, 1912, *Nelson & Macbride*, no. 1895; Silver City, July 13, 1910, *Macbride*, no. 367; Boise, 1892, *Mulford* (Mo. Bot. Gard.); Twin and Shoshone Falls, July 25, 1911, *Nelson & Macbride*, no. 1330 (R. Mt. Herb.). Nevada: Truckee Pass, Washoe Co., June 19, 1906, *Kennedy*, no. 1347 (Mo. Bot. Gard.); Diamond Mts., July, 1868, *Watson*, no. 846, in part; Truckee Pass, June 28, 1907, *Heller*, no. 8649. Arizona: Camp Lowell, April 9, 1881, *Pringle*; Yucca, May, 1882, *Jones*, no. 19. California: Pampa Station, Kern Co., April 11, 1905, *Heller*, no. 7648; Mendocino, June, 1898, *Brown*, no. 814 (Mo. Bot. Gard.). Oregon: in fields, western Oregon, May, 1880, *Howell* (Mo. Bot. Gard.); 1871, *Hall*, no. 404; near Pineville, Aug. 26, 1894, *Leiberg*, no. 809; Pilot Butte, Crook Co., June 5, 1905, *E. Nelson*, no. 827. Washington: Meyer's Falls, Stevens Co., Aug. 21, 1902, *Kreager*, no. 479; Washtucna, Adams Co., May 18, 1903, *Cotton*, no. 985; Wawawai, May 26, 1894, *Piper*, no. 1838; Cheney, 1904, *Mrs. Susan Tucker*, no. 24; Rock Lake, May 30, 1893, *Sandberg & Leiberg*, no. 120; Port Ludlow, Jefferson Co., Aug. 25, 1890, *Binns*; Olympic Mts. 1899, *Grant*, no. 8; San Juan Island, May 10, 1858, *Lyall*; Wenatchee, May 4, 1898, *Whited*, no. 1063; Spokane, July 2, 1896, *Piper*, no. 2275. British Columbia: Revelstoke, July 21, 1890, *Macoun*; Howser Station, June 20, 1905, *Shaw*, no. 735; Victoria, Vancouver Island, May, 1875, 1887, and 1893, *Macoun*, nos. 1378, 685. Yukon: Dawson, June 22 and 23, 1914, *Eastwood*, nos. 336 and 351.

11. A. idahoensis Jones, Contrib. W. Bot. xii. 58 (1908). — Western Idaho to Montana and apparently Oregon. — Montana: near Naxon, Aug. 30, 1895, *Leiberg*, no. 1626. Idaho: Weiser, 1899, *Jones* (Mo. Bot. Gard.). Oregon: Dalles, May, 1860, *Lyall*?

More material of this species is needed from the region of the type before the constancy of the short, branched inflorescence can be fully established. The specimen from Montana has fruits which are exactly the same as those of Jones' plant but the racemes are greatly elongate and do not originate so near the base of the plant.

12. A. ARENARIA Suksd. Deutsche Bot. Monats. xviii. 133 (1900). *A. hispidissima* Suksd. l. c. *A. retrorsa* Suksd. l. c. 134. *A. micrantha* Suksd. l. c. *A. intermedia* Piper, Contrib. U. S. Nat. Herb. xi. 480 (1906), in part, not F. & M. — Washington and Oregon along the Columbia River to northern Idaho. — IDAHO: sandy soil, Nez Perces Co., May, 1892, *Sandberg* (Mo. Bot. Gard.). OREGON: near Hood River, May 23, 1894, *Suksdorf*, no. 2316; Portland, 1886, *Brandegee*. WASHINGTON: west Klickitat Co., May, 1882, *Suksdorf*; Columbia River, west Klickitat Co., May 3, 9, 22, 1891, *Suksdorf*, nos. 2007 and 390; also May 3, 5, 22, nos. 994 and 995.

This species is variable in size of corolla and nutlets and in degree of pubescence — characters upon which Mr. Suksdorf recognizes three additional species. In some cases these variations are considerable but the collections all come from the same region and indubitably, it seems to me, represent only one species genetically. The small flowered condition (*A. micrantha*) suggests *A. parviflora* but this resemblance is, I believe, superficial, and therefore in no manner affects the validity of the latter species which is a native of California and uniformly, even in an introduced state, has very pale as well as small corollas. Indeed the true relationship of *A. arenaria* is more probably with *A. Douglasiana* or one of its relatives.

13. A. PARVIFLORA Heller, Muhl. ii. 313 (1907). — Central California north to Plumas County; introduced outside the state. — IDAHO: Boise, May 6, 1911, *Clark*, no. 12; also June 13, 1892, *Mulford* (Mo. Bot. Gard.); Clearwater, *Spaulding*; Lewiston, April 27, 1896, *Heller*, no. 2985 (Mo. Bot. Gard.). UTAH: Salt Lake Valley, *Miss Van Rensselaer*; Salt Lake City, May, 1869, *Watson*, no. 846; Sulphur Baths, May 23, 1908, *Mrs. Joseph Clemens*; Huntsville, July 25, 1909, *C. P. Smith*, no. 1944 (R. Mt. Herb.). CALIFORNIA: Los Gatos, Santa Clara Co., April 30, 1908, *Heller*, no. 8936b; also Alum Rock Park, no. 8470; Marysville Buttes, Sutter Co., May 6, 1914, *Heller*, no. 11364; Oroville, Butte Co., April 7, 1913, *Heller*, no. 10725; also Chico, 1914, no.

~~11309;~~ Genessee, Plumas Co., July 15, 1907, *Heller & Kennedy*, no. 8850; Susanville, June 26, 1897, *Jones* (Mo. Bot. Gard.); Mormon Bar, April 19, 1903, *Congdon* (Mo. Bot. Gard.). OREGON: Harper Ranch, Malheur Co., May 23, 1896, *Leiberg*, no. 2119. WASHINGTON: wheat fields, Waitsburg, May 12, 1897, *Horner*, no. R147B364; 1889, *Vasey*, no. 422.

The name *A. parviflora* was used by Bernhardi, Del. Sem. Hort. Erf. 1833, for a South American species, but Bernhardi's plant has been considered a synonym of *A. angustifolia* Lehm. Lehmann's name appeared in a seed list (Del. Sem. Hort. Hamb. 7. 1832) but was not published until 1836 by Fischer and Meyer (Ind. Sem. Hort. Petrop. ii. 26) who cite *A. parviflora* as a synonym. Accordingly if Bernhardi's name was accompanied by a diagnosis it should displace the later *A. angustifolia* Lehm. providing it is, as supposed, a synonym of the latter but it seems very probable that Del. Sem. Hort. Erf. (which I have not seen) is a seed list similar to Del. Sem. Hort. Hamb., with the names unaccompanied by descriptions. Of course on the other hand there is the possibility that Lehmann's and Bernhardi's plants were not the same, yet Reiche, Fl. de Chile v. 238 (1910), follows Fischer and Meyer's treatment. Therefore, because of the uncertainty connected with the precise application of these names, it has not seemed necessary nor advisable to change at this time Mr. Heller's well-chosen name for the North American plant.

14. A. CAMPESTRIS Greene, Man. Bay-Region 263 (1894). *A. intermedia* Jepson, Fl. W. Middle Cal. ed. 2, 350 (1911), not F. & M. — Region of San Francisco Bay and northward. — CALIFORNIA: Los Gatos, April 4, 1904, *Heller*, 7282; Stanford University, March 27, 1902, *Baker*, no. 391, in part; Concord, Contra Costa Co., March 4 and 14, 1914, *Eastwood*, no. 3773, and nos. 3774, 3796; Yreka, Siskiyou Co., May 3, 1910, *Butler*, no. 1269 (R. Mt. Herb.); Oroville, Butte Co., March 9, 1913, *Heller*, no. 10683 (Mo. Bot. Gard.); Red Bluff, Tehama Co., April 25, 1911, *W. W. Jones*, no. 268.

The appressed pubescence, especially on the calyx, is the distinctive feature of this species. The stamens are inserted either in the throat or tube of the corolla, as illustrated by Miss Eastwood's numbers 3774 and 3773, respectively.

15. **A. obvallata** Greene, in herb., planta circa 3.5 dm. alta; caulibus adpresse strigillosis ad basem haud hispidis; folliis radi-

calibus ignotis, caulinis paucis gradatim reductis fere oblongis circa 2 cm. longis parce strigillosis et paullo hispidulis cum pilis plus minusve patentibus; racemis demum elongatis; calycis fructiferi laciniis fere linearibus 5 mm. longis strigillosis et paullo hispidis, pilis haud fulvescentibus; corolla circa 10 mm. longa faucibus paullo ampliatis; staminibus faucibus corollae insertis; nuculis vix 2.5 mm. longis subcarinatis dense muriculatis et paullo rugulosis. — CALIFORNIA: frequent in low fields, Tracy, San Joaquin Co., April 25, 1903, *Baker*, no. 2779 (TYPE, Gray Herb.).

The almost entire absence of hispid pubescence, the small remote leaves, and short fruiting calyx are characters that give to this plant a distinctive aspect and seem to justify its segregation from *A. Douglasiana*.

16. **A. lunaris,** spec. nov., erecta circa 6 dm. alta; caulibus mediocriter hispidis et ad apicem dense retrorso-strigillosis; foliis caulinis inferioribus oblongis vel lineari-oblongis circa 3 mm. latis 4 cm. longis hispidulis, pilis basi albo-tuberculatis, superioribus gradatim reductis ovato-lanceolatis canescenti-strigillosis costa media et margine minute hispidis, pilis plus minusve patentibus; calycis fructiferi laciniis linearibus 4–5 mm. longis strigosis et basi papilloso-setoso-hispidis, pilis fulvescentibus; corolla circa 7 mm. longa faucibus mediocriter ampliatis; staminibus 3 in faucibus, 2 in tubo corollae insertis; nuculis sublunatis fere 3 mm. longis valde carinatis albo-tuberculatis haud rugosis. — CALIFORNIA: grassy bank near San Mateo, on the Half Moon Bay road, San Mateo Co., May 23, 1907, *Heller*, no. 8555 (TYPE, Gray Herb.).

A segregate of the next species but apparently very distinct because of the very pubescent upper leaves and the not at all rugose nutlets.

17. A. DOUGLASIANA A. DC. Prod. x. 118 (1846). *A. spectabilis* Gray in Brewer & Wats. Bot. Cal. i. 524 (1876) and Syn. Fl. ii. pt. I. 198 (1886), in large part; Greene, Man. Bay-Region 262 (1894); Jepson, Fl. W. Middle Cal. ed. 2. 350 (1911); Abrams, Fl. Los Ang. 335 (1911), in part, not F. & M. — Sonoma County to San Diego County, mostly west of the Coast Ranges. — CALIFORNIA: Santa Rosa Creek, Sonoma Co., March 26, 1902, *Heller & Brown*; Palo Alto, March, 1910, *Mrs. T. C. Pease*; Stanford, April 21, 1902, *Abrams*, no. 2349; Antioch, Contra Costa Co., April 17, 1908, *Heller*, no. 8908; Byron Springs, March 14, 1914, *Eastwood*, no. 3812; Los Gatos, April 23, 1904, *Heller*, no. 7347; Stanford, April 1, 1902, *Baker*, no. 485; also March 27 and May 15, no. 391, in part; Del Monte, April, 1902, *Elmer*, no. 3567; Santa Lucia Mts., March, 1898, *Plaskett*, no. 41; near Monterey, 1832, *Doug-*

las; San Luis Obispo and Monterey Cos., April 15–May 10, *Jared*, no. 3; Ellwood, April 20, 1908, *Eastwood*, nos. 8 and 9; Pasadena, 1901–1905, *Grant*, no. 40; Santa Monica, *Gray*; San Pedro, March 14, 1903, *Abrams*, no. 3140 (?); Bird Rock, April 11, 1914, *Clements*, no. 104; also La Jolla, March 1, nos. 103 and 105; San Diego, March 10, 1903, *Baker*, no. 3424; also *Abrams*, no. 3312; Campo, San Diego Co., May 24, 1903, *Abrams*, no. 3561; in park, San Diego, Feb. 22, 1916, *Mary F. Spencer*; San Bernardino Valley, April 10, 1906, *Parish*, no. 5575 (R. Mt. Herb.); Caliente, Kern Co., April 7, 1905, *Heller*, no. 7618; San Antonio Mts., June 1–3, 1900, *Hall*, no. 1440 (Mo. Bot. Gard.). MEXICO: Encenada, April 10, 1882, *Jones* (R. Mt. Herb.); Jacumba Hot Springs, May 24, 1894, *Schoenfeldt*, no. 3278.

17a. var. **interior,** var. nov., corolla 5–7 mm. longa fere tubulosa; calycis fructiferi laciniis circa 5 mm. longis. — South-central California to Arizona. — CALIFORNIA: between Earlinart and Delano, Tulare Co., March 26, 1914, *Eastwood*, no. 3921 (TYPE, Gray Herb.); also no. 3952; Hanford, Tulare Co., March 24, 1914, *Eastwood*, no. 3840. MEXICO: San Rafael Valley, Lower California, April 18, 1885, *Orcutt*, no. 1255. Thornber no. 514.

This, the most common species of California is, perhaps, the most variable. In its most abundant and most nearly typical form it is an inhabitant of the coastal hill country from the region of San Francisco Bay to San Diego County, but is represented in the interior of the southern part of the state by the variety *interior*. The proper disposition of this inland form is perplexing but by virtue of its relatively dull stem, small corolla and short calyx it appears distinct enough to warrant recognition as a variety, in spite of the fact that plants have been collected which apparently show clear intergradation with the typical form.

18. **A. intactilis,** spec. nov., robusta 3–6 dm. alta ubique plus minusve hispida paullo strigosa; foliis ovato-oblongis vel ovato-lanceolatis acutis circa 3.5 cm. longis (vel plantae in umbra foliis elongatis) pilis basi valde albo-tuberculatis; racemis demum elongatis parce hispidis et crispe puberulis; pedicellis fere 3 mm. longis; calycis fructiferi laciniis ovato-lanceolatis vel anguste lanceolatis 10–12mm. longis hispidis margine dense ciliatis imprimis ad basin cum pilis villosis aliquid fulvescentibus; corolla circa 10 mm. longa tubo calycem superante circa 5 mm. intus glabro vel pubescente faucibus; staminibus tubo corollae paullo supra basin insertis; nuculis ovatis fere 4 mm. longis mediocriter carinatis obscure tuberculatis sed valde rugosis imprimis ad apicem. — CALIFORNIA: near Orland, Glenn Co., May 1, 1914,

Heller, no. 11355 (TYPE, Gray Herb.); Bennett Spring, Glenn Co., June 16, 1915, *Heller*, no. 11985. NEVADA: north of Verdi, Washoe Co., June 24, 1913, *Heller*, no. 10880.

It is difficult to indicate the salient characters of this plant but it seems to be distinct from any described species. The large nutlets and long fruiting calyx are peculiarities that make impossible its reference to any member of the *A. Douglasiana* group of species.

19. **A. Eastwoodae,** spec. nov., usque ad 3–3.5 dm. alta; caulibus infirmis ubique pubescentibus cum pilis patentibus infirmis etiam praecipue ad apicem crispe hirsutulis; foliis internodiis longioribus, caulinis inferioribus lineari-lanceolatis acuminatis 3–7 cm. longis circa 4 mm. latis cum pubescentia ei caulis simile munitis, caulinis superioribus paucis gradatim reductis; racemis ubique ebracteatis setoso-hispidis mediocriter fulvescentibus; calycis fructiferi laciniis circa 7 mm. longis fere linearibus; corolla infundibuliformi 13–17 mm. longa tubo calyce 2–3-plo longiore, faucibus ampliatis; staminibus faucibus corollae insertis; nuculis 2.5–3.5 mm. longis plus minusve serratim carinatis et rugosis et mediocriter dense albo-muriculatis. — CALIFORNIA: near Pollasky, Fresno Co., April 11, 1906, *Heller*, no. 8153 (TYPE, Gray Herb.); Raymond, Madera Co., May 5, 1896, *Clara E. Cummings*; Mariposa, April 19, 1903, *Congdon* (Mo. Bot. Gard.); New York Falls, Amador Co., July, 1895, *Hansen*, no. 1046 (Mo. Bot. Gard.).

This beautiful and distinctive species is probably restricted to Fresno and counties adjacent. Its large corollas are very suggestive of those of *A. Lemmonii* but in fruit characters it resembles *A. Douglasiana*. Students are indebted to Miss Eastwood and Mr. Heller for the largest and most representative collections of *Amsinckia* in herbaria. The latter collector is the author of the widely disseminated *A. parviflora* but Miss Eastwood has not found time to study her collections and they have been mostly distributed unnamed. It seems peculiarly fitting that her name should become connected with this group of plants in which she has taken so great an interest.

20. **A. valens,** spec. nov., robusta 5–9 dm. alta; caulibus mediocriter hispidis haud adpresse strigillosis; foliis caulinis inferioribus oblongo-lanceolatis obtusis vel acutis 10–14 cm. longis 1–1.5 cm. latis utrinque subadpresse papilloso-hispidis, superioribus similibus sed gradatim reductis dense pubescentibus; racemis demum elongatis mediocriter hispidis et plus minusve crispe

puberulis; pedicellis brevissimis; calycis fructiferi laciniis fere linearibus circa 6 mm. longis adpresse villosis et hispidis, pilis aliquid fulvescentibus; corolla 12–15 mm. longa tubo calycem superante circa 5 mm. intus glabro; staminibus faucibus vel tubo corollae insertis; nuculis circa 3 mm. longis mediocriter carinatis valde rugosis et muriculatis. — CALIFORNIA: Anderson, Shasta Co., April 26, 1913, *L. E. Smith*, no. 143 (TYPE, Gray Herb.); Chico, Butte Co., April 21, 1914, *Heller*, 11310; Oroville, Butte Co., March 9, 1913, *Heller*, 10683; Marysville Buttes, Sutter Co., April 3, 1915, *Heller*, no. 11800; Auburn, Placer Co., April, 1895, *Mary E. P. Ames* (Mo. Bot. Gard.).

I cannot refer this large-flowered species to the relatively small-flowered *A. Douglasiana* which is not known to grow north of central California. *A. Eastwoodae*, however, might be interpreted so as to include *A. valens* but unless collections are secured that necessitate a reconstruction of our present conception of the foliage and size of the former species it would be unwise, it seems to me, to consider this huge and coarse plant of more northern range as of the same specific unit.

21. **A. inepta,** spec. nov., ut videtur circa 5 dm. alta; caulibus erectis nitidulis parce setoso-hispidis non omnino strigosis; foliis numerosis lineari-lanceolatis 3–7 cm. longis vix 3 mm. latis longo-acuminatis mediocriter hispidis, superioribus gradatim reductis; racemis ebracteatis; calycis fructiferi laciniis circa 5 mm. longis fere linearibus valde setoso-hispidis aliquid fulvescentibus; corolla circa 15 mm. longa tubo calyce 2–3-plo longiore, faucibus mediocriter ampliatis; staminibus faucibus corollae insertis; nuculis 3 mm. longis vix carinatis vel rugosis et solum minute muriculatis. — LOWER CALIFORNIA: San Martin Island, March–June, 1897, *Anthony*, no. 217 (TYPE, Gray Herb.).

Satisfactory characters with which to separate this species from narrow-leaved maritime specimens of *A. Douglasiana* are not numerous. Nevertheless the somewhat longer corolla and scarcely more than granularly roughened nutlets are features that forbid the reference of *A. inepta* to any form of the mainland plant.

22. A. MICROCARPA Greene, Eryth. ii. 191 (1894). — CALIFORNIA: *Coulter*, nos. 497 and 504; Fort Mojave, April 16, 1861, *Cooper*.

This species appears very distinct by reason of the densely villous and appressed-hispid calyces and the large corollas. The nutlets, however, are often larger than Greene indicated and in

our material by Coulter (presumably duplicates of the type) the full grown calyx is much longer than called for in the original description. An immature specimen from the Yosemite by Clara E. Cummings apparently belongs to this species.

23. A. ECHINATA Gray, Proc. Am. Acad. x. 54 (1875). — CALIFORNIA: Fort Mojave, Feb., 1860–61, *Cooper*; Maricopa, Kern Co., March, 1881, *Parry*, no. 207.

This is a remarkable species and apparently very local. Other specimens referred to it which I have seen belong to *A. Douglasiana* which may have nutlets with a serrated carination but are never truly echinate.

II. FURTHER NOTES ON THE BORAGINACEAE

Cordia Brittonii (Millspaugh), comb. nov. *Varronia Brittonii* Millspaugh, Field Col. Mus. Bot. ser. ii. 311 (1909).

I am unable to see that any good purpose will be served by raising the section *Varronia* to generic rank. Consistency will then demand the recognition of other subgeneric groups as genera thus splitting the reasonable entity long known as *Cordia* into a number of parts that will challenge sharp definition. If the technical characters upon which *Varronia*, for instance, is based, coincided with distinctive traits of aspect its recognition as a genus would appear to be more reasonable. But in *Cordia* there is no agreement of this nature between aspect and diagnostic characters so that plants possessing great superficial resemblances, as for instance many species with capitate inflorescences, for reasons purely technical occur in different sections of the genus. But logically these plants are all Cordias and are recognizable as such by the amateur, so why exaggerate the importance of the more or less obscure technical characters by calling some members of the group Varronias, others Sebestens, etc. to the utter confusion of all but the professional ? Surely the average traveler can learn to recognize a shrub of this alliance as a *Cordia* when he may be unable to assign it to a section which has been set up as a genus.

Cordia imparilis, spec. nov., fruticosa erecta aromatica; ramis teretibus glabris, ramulis rufo-hirsutis (pilis circa 2 mm. longis) et minute strigillosis; foliis (superioribus) ovato-lanceolatis circa 6 cm. longis 2.5 cm. latis basi et apice acutis subremote dentatis

supra scrabris subtus dense pubescentibus cum pilis albis brevissimis, petiolis hirsutis 7–10 mm. longis; spicis cylindraceis densis circa 5 cm. longis, pedunculis circa 3 cm. longis crispe puberulis et cum pilis nonnullis longioribus firmiusculis subadpressis intermixtis; calycibus junioribus globosis dense brevissimis hirsutis; corolla alba 4 mm. longa calyce duplo longiore parce pilosa ad faucem lobis inequaliter denticulatis; staminibus exsertis. — MEXICO: near the boundary of Michoacan and Guerrero, Aug. 1, 1898, *Langlassé*, no. 265 (TYPE, Gray Herb.).

It is with no little hesitation that I propose a plant of this large genus as new. However, apparently no member of the subsection *Spiciformes* occurring in Mexico agrees (at least as described) with the plant here characterized. In some respects it suggests both *C. brevispicata* Mart. & Gal. and *C. ferruginea* R. & S. but differs from both greatly in pubescence and foliage.

HELITROPIUM PHYSOCALYCINUM Donn. Sm. Bot. Gaz. xlix. 457 (1910) has an exact synonym in *H. jaliscense* Macbr. Proc. Am. Acad. li. 542 (1916). The first line of Capt. Smith's description reads " Omnibus fere in partibus glanduliferum." This does not well apply to the type of *H. jaliscense* but neither does it to *Hyde & Lux* no. 3990, the latter cited by Capt. Smith as representing his species. *H. physocalycinum* is very distinctive by virtue of its unique calyx. Since the original diagnosis was accompanied by citations of specimens from Guatemala and Peru only, the following collections showing the distribution of the species in southwestern Mexico may be named. MEXICO: Sierra Madre, Michoacan, June 6, 1898, *Langlassé*, no. 577; San Sebastian, Jalisco, March 16, 1897, *E. W. Nelson*, no. 4083; Talea, Oaxaca, Feb., 1844, *Galeotti*.

OREOCARYA INTERRUPTA Greene, Pitt. iii. 111 (1896). This species, not placed in my recent revision of the genus, is represented at the Mo. Bot. Gard. by Heller's no. 9185 from Humboldt Wells, Elko Co., Nevada, July 27, 1908. It is apparent that the relationship of the plant is with *O. spiculifera* Piper but the tubercles on the much smaller nutlets are not at all confluent into rugae. Nevertheless the habit and vegetative characters simulate *O. spiculifera* rather than any muriculate-fruited species. *O. interrupta*, therefore, seems to be a connecting link between the rugose and non-rugose groups of the small-flowered section of the genus.

LAPPULA CALIFORNICA (Gray) Piper, Bull. Torr. Club. xxix. 546 (1902). Mr. A. A. Heller has distributed recently under his number 12426 a Lappula secured by him June 22, 1916 in Siskiyou County, California, the label of which bears this inscription: "*Lappula bella* Macbride, Cont. Gray Herb. ii. 48: 39. 1916." If Mr. Heller had wished to collect the species most distantly related to *L. bella* he should have selected *L. californica*, which, as a matter of fact is nicely represented by his number 12426! *L. californica* is very common in Siskiyou County.

✓ **Mertensia Eastwoodae,** nom. nov. *M. alaskana* Eastw. Bot. Gaz. xxxiii. 287 (1902), not *M. alaskana* Britton, Bull. N. Y. Bot. Gard. ii. 181 (1901).

In Contrib. Gray Herb. n. ser. xlviii. 7 (1916) the above species were listed as segregates of *M. paniculata*, with the statement, " if I may judge from character alone, these are not worthy specific rank." Since then, however, I have examined a specimen preserved at the Missouri Botanical Garden which purports to be a part of the type collection of *M. alaskana* Eastw. and shows that Miss Eastwood's species is not, in reality, very closely related to *M. paniculata*. Indeed the pubescence on the pedicels is closely appressed, a characteristic which suggests *M. pratensis* and its allies but from which it is at once recognizable by its narrow acuminate leaves and pectinately-rugose fruits. *M. alaskana* Britton on the other hand is a segregate of *M. paniculata* as is shown by Miss Eastwood's no. 94 from Dawson Slide which agrees exactly with the original diagnosis. It is to be distinguished from *M. paniculata* by the glabrous or only ciliate sepals and the somewhat narrower, glabrous (or very slightly pubescent beneath) leaves. Numerous collections from different localities are needed to prove the value of the presence or absence and position of pubescence as a character for distinguishing species in this group.

MERTENSIA GRANDIS Woot. & Standl. Contrib. U. S. Nat. Herb. xvi. 165 (1913). In Contrib. Gray Herb. n. ser. xlviii. 8 (1916) this species was referred to *M. franciscana* Heller. Recently, however I have examined co-type material (*Metcalfe*, no. 1319) of *M. grandis* as preserved at the Missouri Botanical Garden and I now doubt the wisdom of my reduction. The species is indeed very near *M. franciscana* but the corollas are rather of the type of *M. pratensis*, except that they are even larger. Since the species

agree as to calyx-lobes and grow in the same region *M. grandis* may represent only a large-flowered state of *M. franciscana*, but more material is needed to prove or disprove this possibility.

Myosotis lutea (Cav.) Pers., var. **versicolor** (Pers.), comb. nov. *M. arvensis* (L.) Hill, var. ? *versicolor* Pers. Syn. i. 156 (1805). *M. versicolor* (Pers.) Sm. in Sowerby's Engl. Bot. xxxvi. sub t. 2558 (1814).

Anchusa lutea Cav. Icones i. 50, t. 69, fig. 1 (1791) is the earliest designation for this rather variable but unique species. That Cavenilles' plant is merely the form of the species with corollas remaining yellow (the common state has corollas yellow in anthesis but soon changing to bright- and then to rose-blue, i. e. the var. *versicolor*) is shown by the adoption of the name *M. lutea* for this species in the authoritative work, Flora der Schweiz by Schinz und Keller, 3 Auflage, I Teil 440 (1909). Hermann, in his carefully prepared Flora von Deutschland und Fennoskandinavien 384 (1912) also takes up Cavenilles' name. It seems to me however that this noticeable phenomenon of the color-change that takes place in the corolla after anthesis is important enough to justify varietal designation of these plants in which it occurs, especially since they are of more frequent occurrence than those with corollas yellow even in age.

Onosmodium. Mr. Mackenzie, in his discriminating revision of this group as it occurs north of Mexico, endeavored to define the genus so as to exclude from it the large-flowered section *Macromerioides* Gray (Syn. Fl. ii. pt. I. 205), and proposed for *O. Thurberi* Gray the new combination *Macromeria Thurberi* (Gray) Mackenzie, Bull. Torr. Club xxxii. 496 (1905). In regard to this transfer of *O. Thurberi* he wrote: "It seems certainly congeneric with *M. viridiflora* DC., *M. cinerascens* DC. and *M. discolor* Benth. Whether these species are congeneric with the original species of Don [*M. exserta*] I cannot determine at present, the material I have seen being too scanty." Examination of a number of good collections of *M. exserta* has disclosed the fact that the nutlets are always keeled ventrally. In all other species the nutlets are not at all keeled. Accordingly *M. exserta*, since it possesses this distinctive character of fruit in addition to the great development of corolla with flaring lobes and long-exserted stamens, can scarcely be considered congeneric with *O. Thurberi* and its rela-

tives, a group characterized by not at all carinate nutlets, included or slightly exserted stamens and erect or suberect corolla-lobes. This group, section *Macromerioides* Gray, is possible of two interpretations. It may be regarded either as a subgenus of *Onosmodium* or as a genus intermediate to *Onosmodium* and *Macromeria*. Mackenzie, in writing of *O. Thurberi* stated, l. c., " It differs from *Onosmodium* in the greatly elongated corolla, exserted stamens, long filaments and versatile anthers, in usually ripening more nutlets, and in the persistence of the enlarged base of the style." However, upon examination of all the species of both sections, *Onosmodium* proper and *Macromerioides*, it seems to me clear that none of these characters are appropriate for the definition of genera because they exist in variable and inconstant degrees of development, even for example, the apparently distinctive character, " anthers versatile." As a matter of fact the anthers are quite as versatile in *O. occidentalis* as in *O. Thurberi*; in neither are they truly versatile or truly innate being attached above the base toward, but not at, the middle. Gray, l. c., indicated that the anthers of *O. Thurberi* were not truly versatile as in the related Mexican species but this fact did not deter Mackenzie from transfering *O. Thurberi* to the genus containing these species. That it would be unwise to try to maintain this section as a genus distinct from *Onosmodium* proper becomes even more evident when the species *O. strigosum* G. Don is taken into consideration. This plant " looks " like a narrow-leaved *O. Thurberi* with corollas only about half as long. But the stamens are included and moreover the anthers are woolly dorsally. Altogether it seems advisable to regard these large-flowered species as congeneric with the smaller-flowered group *Onosmodium* proper, allowing *Macromeria* to stand as a monotypic genus, distinguished principally by the keeled nutlets. It becomes necessary, in accordance with this viewpoint of the generic limitation of *Macromeria* to transfer a few species described under that genus to *Onosmodium*. Since three of these are represented in this herbarium I am making this number of the required new combinations.

Onosmodium discolor (Benth.), comb. nov. *Macromeria discolor* Benth. Pl. Hartw. 49 (1840).

Onosmodium Pringlei (Greenm.), comb. nov. *Macromeria Pringlei* Greenm. Proc. Am. Acad. xxxiv. 570 (1899).

Onosmodium longiflorum (D. Don), comb. nov. *Macromeria longiflora* D. Don, Edinb. N. Phil. Journ. xiii. 239 (1832).

ONOSMODIUM LONGIFLORUM (D. Don) Macbr., var. **hispidum** (Mart. & Gal.), comb. nov. *Macromeria hispida* Mart. & Gal. Bull. Acad. Brux. xi. pt. 2, 339 (1844). *M. longiflora* D. Don, var. *hispida* (Mart. & Gal.) A. DC. Prod. x. 68 (1846).

Onosmodium unicum, spec. nov., ut videtur 4–5 dm. altum; caule ad apicem ramoso pilis adpresse crispeque et cum nonnullis pilis longioribus firmiusculis intermixtis; foliis radicalibus ignotis caulinis oblongo-lanceolatis basi et apice acutis circa 5 cm. longis 1.5–1.8 cm. latis supra viridibus parce papilloso-hispidis et minute strigillosis subtus pallidioribus 3–5 nerviis strigillosis et imprimis veniis adpresse hispidis, foliis superioribus gradatim reductis; racemis subviscoso-strigosis et -hispidis; corolla circa 12 mm. longa, tubo (ut videtur flavo) extus parce villoso, intus glabro; lobis (ut videtur viridibus) corollae anguste ovato-acuminatis ad apicem plus minusve recurvatis extus adpresse strigosis fere 4 mm. longis; antheris 2.5 mm. longis apiculatis; stylo exserto; calycis lobis inaequalibus fere linearibus circa 8 mm. longis; nuculis acute fere rotundis circa 4 mm. longis nitidis laevissimis. — MEXICO: Alvarez, San Luis Potosi, July 13–23, 1904, *Palmer*, no. 185 (TYPE, Gray Herb.).

This very unique species is related to the Texan *O. bejariense* DC. which has extremely hispid stems and calyces, the long hairs widely spreading, and is not at all viscid.

Onosmodium revolutum (Robinson), comb. nov. *Lithospermum revolutum* Robinson, Proc. Am. Acad. xxvii. 182 (1892).

This very distinctive plant is a better *Onosmodium* it seems to me than a *Lithospermum*. Since the discovery of the Mexican species *L. Palmeri* and *L. oblongifolium*, both with the aspect of *Onosmodium* and with nearly the corolla of that genus, the difficulty of defining in good contrast these genera has been greatly increased. The above species, which may be said to be on the border-line between the genera possess, however, very rounded corolla-lobes which are somewhat spreading. This character is peculiar to *Lithospermum*. But the corolla of *L. revolutum* has erect lobes that are acute or at least acutish and moreover the limb is entirely without appendages of any sort; they are usually present in some degree in *Lithospermum*. *L. strictum* Lehm. (under which name *L. revolutum* was first distributed) is aberrant in *Lithospermum* because it has the tubular corolla of *Onosmodium*

with suberect lobes. The lobes, however, are rounded, the throat of the corolla is appendaged and the aspect of the plant is more suggestive of *Lithospermum* than of *Onosmodium*. But *L. revolutum* has the aspect of *Onosmodium*, which fact, taken together with its corolla-characters seems to justify its classification as a member of that genus rather than of *Lithospermum*.

Macromeria exserta D. Don, var **imparata,** var. nov., caulibus adpresse strigillosis; pilis haud patentibus; aliter formae typicae simillima. — Mexico: Oaxaca, 1842, *Ghiesbreght* (Type, Gray Herb.).

This variety is not furnished with the rigid widely spreading hairs which are so abundant on the stems of the typical form of the species with which it otherwise agrees.

Lithospermum chersinum, spec. nov., ut videtur herbaceum 7.5 dm. altum (Langlassé in schedulis); caulibus superne 2–3-chotomis adpresse strigillosis et hispidis; foliis caulinis superioribus ovato-lanceolatis acuminatis basi abrupte acutis 4-6 cm. longis 1–1.5 cm. latis mediocriter conspicue pinnativeniis subadpresse papilloso-hispidis subtus inter nervos subvillosis canescentibus et parce hispidis imprimis in nervos; racemis elongatis; pedicellis fructiferis incurvatis circa 5 mm. longis et calycis laciniis 10 mm. longis linearibus hispidis et strigosis; corolla alba circa 15 mm. longa, tubo circa 12 mm. longo extus et intus adpresse piloso et faucibus glandulari-granulosis; limbi lobis rotundatis minute crenulatis; nuculis laevissimis haud punctatis. — Mexico: Cerro Verde, near the boundary between Michoacan and Guerrero, Nov. 6, 1898, *Langlassé*, no. 581 (Type, Gray Herb.); hills, Uruapan, Michoacan, Nov. 15, 1905, *Pringle*, no. 13761.

This species is apparently related to *L. Nelsonii* Greenm. but the resemblance is mostly one of aspect rather than of agreement in technical characters. The presence of pubescence within the corolla tube, the absence of appendages in the throat and the crenulate corolla lobes are a few of the distinctive features of *L. chersinum*.