

CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD  
UNIVERSITY—NEW SERIES, No. XLVIII

I. THE TRUE MERTENSIAS OF WESTERN  
NORTH AMERICA

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THE genus *Mertensia* reaches its greatest development in the United States west of the Great Plains or the Missouri River. No broad treatment of the genus has appeared since Dr. Gray's in the Synoptical Flora thirty years ago, although several floras have covered the species known to occur within their respective territories. These works and the number of *Mertensia* species recognized by each are as follows. Piper's Flora of Washington (Contrib. U. S. Nat. Herb. xi. 1906), 14 species; Rydberg's Flora of Colorado (Bulletin 100, Colo. Exp. Sta. 1906), 25 species; Coulter & Nelson's Man. Rocky Mt. Bot. 1909, 14 species and 10 varieties; Wootton & Standley's Flora of New Mexico (Contrib. U. S. Nat. Herb. xix. 1915), 8 species. The Synoptical Flora contains 7 species and 3 varieties, 2 species being confined to the Atlantic states. Since its publication (1886), 69 species and several varieties (without including those published here) have been proposed.

These data have been given in order to show that students are agreed in admitting in recent years a large increase to the number of species, but that they are not agreed as to what percentage of these species are valid. These great differences of opinion are due to the lack of any consensus as to what characters have specific value. The presence, absence, location or quality of pubescence, the relative lengths of corolla-limb, -tube, and calyx, the shape of the calyx-lobes and leaves have all been regarded as of equal worth. Then habit and general aspect have been considered. I have reached the conclusion that, generally speaking, the most salient and most reliable of these characters are the shape of the calyx-lobes, the location of the pubescence, and, especially when on the pedicels, its quality, coupled with aspect and habital characteristics.

The latter are of great importance, especially in the division of the genus into sections, although of course they are characteristics



that are very difficult to describe. For instance, students have long recognized that the genus, by reason of differences of aspect, falls into several natural and recognizable groups, which often appear to lack technical means of separation. A character is proposed to separate two such groups, viz.: the *Lanceolatae* and the *Oblongifoliae*, which is believed to be valid in so far as those sections are concerned, but it is of no value in separating the *Alpinae*, which happen to be well-marked, however, by their subsessile anthers. This character, the presence or absence of a ring of hairs near the base of the corolla-tube, has been used by Nelson as a specific difference. In order to determine the constancy of the character over one hundred corollas were boiled, dissected and studied critically in relation to the other characters of the particular specimens concerned.

While the present revision aims to cover the western United States a few species are omitted, notably *M. symphytoides* Greene, Pl. Baker. iii. 20 (1901) and *M. tubiflora* Rydb. Bull. Torr. Club xxvi. 544 (1899). I have seen no authentic material of these, but if I may judge from the inadequate characterization of the former, it is very near to a variety of *M. arizonica* Greene. The latter (*M. tubiflora*) seems to be related to *M. oblongifolia* (Nutt.) G. Don, and perhaps is distinct.

I am indebted to Dr. Aven Nelson, Curator of the Rocky Mountain Herbarium at the University of Wyoming, and to Mr. W. R. Maxon, Curator of the National Herbarium at Washington, D. C., for the loan of valuable specimens, including many types. The abbreviations "R. Mt. Herb." and "Nat. Herb." follow the citations of specimens from these institutions respectively; otherwise the specimens cited are in the Gray Herbarium.

#### EUMERTENSIA — KEY TO SECTIONS AND SPECIES OF WESTERN NORTH AMERICA

- Leaves with distinct lateral veins or net-veined, large, the middle cauline 6–12 cm. long; aestival species, 3–12 dm. high, growing along streams or in woods below timber-line or rarely above timber-line and then clearly possessing the other characters of this group. . . . . Group I.
- Calyx-lobes acute or acuminate, usually longer than the fruit, always more or less triangular in outline, distinctly so if shorter than the fruit. . . . . Subsect. PANICULATAE.
- Calyx-lobes obtuse, shorter than, or barely as long as the fruit, oblong or linear-oblong. . . . . Subsect. CILIATAE.



Leaves (except sometimes the lower), without distinct lateral veins, the middle cauline rarely over 6 cm. long; vernal species, 0.5–3 (rarely 4) dm. high, of plains and foothills, or if aestival, alpine or subalpine and then possessing none of the other characters of group I. . . . . Group II.

Filaments as long as or longer than (with one exception in the *Oblongifoliae*) and as broad as or broader than the anthers; style usually longer than the corolla-tube.

Corolla-tube pubescent within, the hairs scattered over the surface or confined to a ring; species of the Great Plains and Central Rocky Mountains and southward.

Subsect. LANCEOLATAE.

Corolla-tube glabrous within; species essentially of the Northwest, mostly occurring north of Nevada and west of Wyoming. . . . . Subsect. OBLONGIFOLIAE.

Filaments narrower and much shorter than the anthers; style short, little exceeding the calyx. . . . . Subsect. ALPINAE.

#### Subsection PANICULATAE

- a. Pedicels and leaves pubescent, the latter sometimes glabrous on one surface b.
- b. Pubescence on pedicels more or less spreading and hispid in character c.
- c. Calyx-lobes lance-linear or lanceolate in anthesis, acuminate; occurring only north of latitude 40°.
 

Leaves more or less pubescent on both surfaces.

Calyx-lobes in anthesis 2–3 mm. long; corolla-limb 5–8 mm. broad . . . . . 1. *M. paniculata*.

Calyx-lobes in anthesis 4–6 mm. long; corolla-limb about 10 mm. broad . . . . . 1a. var. *longisepala*.

Leaves glabrous on the upper surface. . . . . 1b. var. *subcordata*.
- c. Calyx-lobes oblong-lanceolate in anthesis, merely acutish; occurring only south of latitude 40°.
 

Leaves pubescent on both surfaces. . . . . 2. *M. toyabensis*.

Leaves glabrous on the lower surface. . . . . 2a. var. *subnuda*.
- b. Pubescence on pedicels closely appressed, usually dense, tending to canescence c.
- c. Leaves broadly ovate, the lower subcordate. . . . . 3. *M. platyphylla*.
- c. Leaves lanceolate or ovate-lanceolate, never subcordate d.
- d. Fruiting pedicels strongly reflexed; corolla less than or barely 10 mm. long. . . . . 4. *M. refracta*.
- d. Fruiting pedicels ascending or nodding; corolla 10–16 mm. long e.
- e. Calyx-lobes lanceolate, acute or acuminate; corolla 13–16 mm. long, funnelform-campanulate; leaves often pubescent beneath.
 

Pedicels, and at least the upper leaf-surfaces, markedly pubescent; plant of the southern Rocky Mts. . . . . 5. *M. pratensis*.

Pedicels and only upper leaf-surfaces pubescent, the hairs few and minute; plant of the northern Rocky Mts. . . . . 5a. var. *borealis*.
- e. Calyx-lobes nearly oblong, acutish; corolla 10–12 mm. long, tubular-funnelform; leaves glabrous beneath. . . . . 6. *M. franciscana*.



- a. Pedicels mostly glabrous; the leaves glabrous on both surfaces *b.*
- b. Calyx campanulate-turbinate, the lobes much shorter than the tube and not increasing after anthesis. . . . . 7. *M. campanulata.*
- b. Calyx not campanulate, or the lobes increasing after anthesis to equal or far exceed the tube *c.*
- c. Leaves sessile, except the lowest, acute or obtuse, not ovate-acuminate *d.*
- d. Leaves about three times longer than broad; corolla tubular-funnelform.  
Calyx-lobes in anthesis somewhat shorter than the tube . . . . . 8. *M. arizonica.*  
Calyx-lobes as long as or longer than the tube, the latter sometimes nearly obsolete . . . . . 8a. var. *umbratilis.*
- d. Leaves not more than twice longer than broad; corolla narrowly tubular . . . . . 9. *M. praecox.*
- c. Leaves petiolate, except the upper, and ovate-acuminate.  
Calyx in anthesis 4-5 mm. long, the lobes elongate. . . . . 10. *M. laevigata.*  
Calyx in anthesis about 2 mm. long, the lobes short. . . . . 10a. var. *brachycalyx.*

## Subsection CILIATAE

- Style included in the full-grown corolla or barely exerted; calyx-lobes seldom more than 2 mm. long, the sinuses between them broad.
- Leaves pubescent on the lower surface . . . . . 11. *M. subpubescens.*
- Leaves glabrous on both surfaces.  
Inflorescence terminal, or if in the upper axils the peduncles much shorter than the leaves . . . . . 12. *M. ciliata.*  
Inflorescence terminal and axillary, the peduncles long, often exceeding the leaves . . . . . 12a. var. *longipedunculata.*
- Style well exerted from the full-grown corolla; calyx-lobes 2.5-3 mm. long, their sinuses nearly or quite closed. . . . . 13. *M. stomatechoides.*

## Subsection LANCEOLATAE

- a. Tufted alpine or subalpine species with numerous basal leaves, green; calyx-tube short; calyx-lobes of soft texture, 2-5 mm. long in anthesis, the midrib not evident or at least not pronounced in fruit; midrib of cauline leaves not strongly developed (except sometimes in number 21) *b.*
- b. Leaves glabrous, at least below *c.*
- c. Inflorescence a leafy-bracteate panicle, the racemes open even in anthesis; calyx-lobes ovate-lanceolate.  
Pubescence on pedicels and calyx-lobes sparse, not hispid-spreading . . . . . 14. *M. viridis.*  
Pubescence on pedicels and calyx-lobes hispid-spreading . . . . . 14a. var. *cynoglossoides.*
- c. Racemes terminal and axillary (when well peduncled), the flowers relatively crowded even in fruit; calyx-lobes linear or lanceolate *d.*
- d. Leaves glabrous on both surfaces.  
Hairs in corolla-tube scattered; inflorescence becoming lax in fruit . . . . . 15. *M. coronata.*



Hairs in corolla-tube confined to a ring; inflorescence congested.

Leaves mostly oblanceolate or elliptic-oblong; roots not fusiform.

Calyx-lobes lanceolate, 2–3.5 mm. long, half as long as the corolla-tube; plants 1.5–3 dm. high. . . . . 16. *M. coriacea*.

Calyx-lobes linear, 5 mm. long, nearly as long as the corolla-tube; plants 1–1.5 dm. high. . . . . 17. *M. caelestina*.

Leaves all ovate or oval; plant from a fusiform taproot . . . . . 20. *M. MacDougalii*.

d. Leaves pubescent on the upper surface.

Calyx-lobes merely ciliate on the margins; roots not fusiform . . . . . 18. *M. ovata*.

Calyx-lobes more or less long-pubescent; plant from a fusiform tap-root . . . . . 21. *M. fusiformis*.

b. Leaves pubescent on both surfaces.

Leaves oblong-lanceolate to ovate-lanceolate.

Pubescence mostly appressed . . . . . 19. *M. Bakeri*.

Pubescence spreading . . . . . 19a. var. *amoena*.

Leaves linear-oblong . . . . . 19b. var. *lateriflora*.

a. High-plain and foothill species, not cespitosely tufted nor with numerous basal leaves, though these often present, gray-green; calyx-tube usually about equalling the lobes, the latter often only 1–2 mm. long in anthesis, the prominent midrib coriaceous in fruit; midrib of cauline leaves strongly developed b.

b. Calyx-lobes ovate, shorter than the calyx-tube; calyx appearing inflated in fruit; leaves pubescent, at least above.

Leaves pubescent above only . . . . . 22. *M. Fendleri*.

Leaves pubescent on both surfaces . . . . . 22a. var. *pubens*.

b. Calyx-lobes ovate-lanceolate to linear-lanceolate, as long as, or longer than the tube, or, if shorter, the leaves glabrous; calyx not inflated in fruit.

Leaves glabrous on both surfaces.

Calyx-lobes lanceolate to linear, often equalling, or longer than the tube . . . . . 23. *M. lanceolata*.

Calyx-lobes ovate, shorter than the tube . . . . . 23a. var. *brachyloba*.

Leaves pubescent on one or both surfaces.

Leaves pubescent only on the upper surface . . . . . 23b. var. *lineariloba*.

Leaves pubescent on both surfaces . . . . . 23c. var. *myosotifolia*.

#### Subsection OBLONGIFOLIAE

a. Leaves densely pubescent on both surfaces; plants large, 2–3 dm. high.

Corolla 10–12 mm. long; crests in throat glabrous; tube with 5 rigid folds . . . . . 24. *M. Cusickii*.

Corolla about 15 mm. long; crests long-villous; tube not plicate . . . . . 25. *M. eplicata*.

a. Leaves glabrous, at least on one surface; or if pubescent on both surfaces, plants small, about 1 dm. high b.

b. Stems 1–2 (rarely more) from shallow-seated tubers.

Leaves pubescent on the upper surface.

Corolla-tube 3 times, or at least 2 times, as long as the limb . . . . . 26. *M. longiflora*.



- Corolla-tube less than 2 times as long as the limb. 26a. var. *Horneri*.  
 Leaves glabrous on both surfaces. . . . . 26b. var. *pulchella*.  
 b. Stems 1—many from woody fusiform or branched roots c.  
 c. Filaments fully equalling or longer than the anthers;  
 stems less than 3 dm. high.  
 Stems 1–2; roots woody-fusiform; leaves oblong-  
 lanceolate, acute; basal few or wanting. . . 27. *M. oblongifolia*.  
 Stems several—many; roots branched from a  
 branched caudex; this clothed with the remains  
 of numerous basal leaves; leaves usually ovate-  
 lanceolate, obtusish.  
 Inflorescence congested, the fruiting pedicels  
 about 5 mm. long.  
 Leaves glabrous on both surfaces. . . . . 28. *M. foliosa*.  
 Leaves pubescent above. . . . . 28a. var. *subcalva*.  
 Leaves pubescent on both surfaces. . . . . 28b. var. *pubescens*.  
 Inflorescence open, the fruiting pedicels about 1  
 cm. long. . . . . 28c. var. *nevadensis*.  
 c. Filaments much shorter than the anthers; plants 3  
 dm. or more high. . . . . 29. *M. Nelsonii*.

## Subsection ALPINAE

- a. Inflorescence congested, even in fruit; middle-cauline  
 leaves acute b.  
 b. Leaves glabrous, or somewhat strigillose on the upper  
 surface.  
 Plants truly alpine; leaves more or less strigillose above.  
 Plants less than 1 dm. high, the stems ascending. . . 30. *M. alpina*.  
 Plants 2–3 dm. high, the stems erect. . . . . 30a. var. *perplexa*.  
 Plants of the high-plains; leaves glabrous. . . . . 30b. var. *humilis*.  
 b. Leaves densely pubescent on both surfaces. . . . . 31. *M. canescens*.  
 a. Inflorescence open in fruit; middle cauline leaves rounded  
 at apex. . . . . 32. *M. brevistyla*.

1. *M. PANICULATA* (Ait.) G. Don, Gen. Syst. iv. 318 (1838). *M. membranacea* Rydb. Bull. Torr. Club xxviii. 33 (1901). *Pulmonaria paniculata* Ait. Hort. Kew. i. 181 (1789). — Hudson Bay to Alberta, northern Idaho, Montana, and Michigan. — ONTARIO: Onamou River, Nipigon River, and Lake Nipigon, 1912, *H. E. Pulling*; Hudson Bay, *Burke*. MICHIGAN: south shore Lake Superior, *Loring*, *Whitney*. SASKATCHEWAN: 1858, *E. Bourgeau*. ALBERTA: Elbow River Valley, vicinity of Calgary, July 7, 1915, *Marion E. Moodie*, no. 1053. MONTANA: Lolo Creek Canyon, Aug. 19, 1880, *Watson*. IDAHO: Cedar Mt., Latah Co., June 17, 1892, *Sandberg*, *MacDougal & Heller*, no. 420; Mt. Moscow, *Henderson*, no. 2813; Forks of St. Mary's River, Shoshone Co., July 1, 1895, *Leiberg*, no. 1136.

1a. var. *longisepala*, var. nov., calyce fere 5-diviso, lobis 4–6 mm. longis; corollae tubo calycem paullo superante, limbo circa 10 mm. lato. — Ontario and northern Minnesota to British Columbia and Alaska. — ONTARIO: Moose River Basin, *J. Mackintosh Bell*, 1903. MINNESOTA: Two Harbors, Lake Co., June, 1893, *E. P. Sheldon*. ALBERTA: near Banff, July 14, 1891, *Macoun*; wet wood near Boro



River, *M. A. Barber*, no. 198. BRITISH COLUMBIA: 1865–66, *Rothrock*, no. 52. ALASKA: Upper Yukon River, June, 1903, *Lt. Schuatter*; St. Michaels, June 25, 1902, *H. E. Brooks*; Anvik, 1905, *Rev. J. W. Chapman*, no. 6 (TYPE, Gray Herb.).

The variety is well-marked but its characters are superficial, and its range overlaps that of the typical form of the species. But I have not seen typical *M. paniculata* from Alaska. *M. strigosa* Greene, Pitt. iv. 88 (1899); *M. alaskana* Britton, Bull. N. Y. Bot. Gard. ii. 181 (1901); and *M. alaskana* Eastw. Bot. Gaz. xxxiii. 287 (1902), are all segregates, and, if I may judge from character alone, are not worthy specific rank.

1b. var. **subcordata** (Greene), comb. nov. *M. subcordata* Greene, Pitt. iv. 89 (1899). The form with glabrous calyx-lobes is *M. leptophylla* Piper, Contrib. U. S. Nat. Herb. xi. 478 (1906), and may be known as forma **leptophylla** (Piper), comb. nov. — WASHINGTON and northeastern Oregon. — OREGON: eastern Oregon, 1898, *Cusick*, no. 1911a; Union Co., 1877, *Cusick*; Wallowa Mts., July 28 & 30, 1908, *Cusick*, nos. 3292 & 3296. WASHINGTON: Blue Mts., Columbia Co., June 11, 1897, *Robt. M. Horner*, no. B.367; Mt. Stuart, July 29, 1898, *Whited*, no. 796; Olympic Mts., Sept. 27, 1890, *Piper*, no. 919.

2. *M. toyabensis*, spec. nov., robusta 4–5 dm. alta ubique subvillosa; foliis radicalibus vel infra caulis medium oblongo-lanceolatis basi in petiolum longum attenuatis 10–15 cm. longis, caulinis sessilibus lanceolatis vel ovato-lanceolatis acuminatis circa 10 cm. longis; pedunculis axillaribus a medio ad apicem caulis orientibus 6–8 cm. longis; pedicellis hirsutulis 4–8 mm. longis; calyce 5-partito, laciniis hirsutulis fere oblongis vix acutis 3–4 mm. longis post anthesin 5–6 mm. longis fructum superantibus; corollae tubo circa 6 mm. longo limbum subaequante; stylo incluso. — *M. paniculata* Gray, Syn. Fl. ii. pt. i. 201 (1886), in some part. — NEVADA: Toyabe Mts., northern Nye Co., July, 1868, *Sereno Watson*, no. 843 (TYPE, Gray Herb.).

2a. var. **subnuda**, var. nov., foliis supra villosis vel strigosis, subtus glabris. — UTAH: Fish Lake Mt., Sevier Co., July 8, 1875, *L. F. Ward* (TYPE, Gray Herb.).

This species combines the characters of the northern *M. paniculata* and its varieties with those of the southern *M. franciscana*, having the hirsutulous pedicels and paniced inflorescence of the former, but the calyx-lobes and leaves of the latter.

3. *M. PLATYPHYLLA* Heller, Bull. Torr. Club xxvi. 548 (1899). *M. denticulata* Piper, Fl. N. W. Coast 301 (1915), scarcely of (Lehm.) G. Don. — In woods near the coast of Washington and probably Oregon.



The original description of this species implies that the upper leaf-surfaces are glabrous. However they are uniformly, although minutely, strigillose. Mr. Heller informs me that the plant is plentiful about Montesano, the locality of the type specimens and the only ones seen by me.

4. *M. REFRACTA* A. Nels. Bot. Gaz. lvi. 69 (1913). — The refracted pedicels and short corollas give this plant an aspect very different from *M. pratensis*, its nearest relative. In fact, its salient characteristic suggests *Myosotis refracta* Boiss., a species equally unique in its genus. Known to me only from the original collection from Blue Park, Colorado.

5. *M. PRATENSIS* Heller, Bull. Torr. Club xxvi. 550 (1899). *M. amplifolia* Wootton & Standley, Contrib. U. S. Nat. Herb. xvi. 165 (1913). *M. alba* Rydb. Bull. Torr. Club xxxi. 638 (1905) is a white-flowered form and may be known as forma **alba** (Rydb.), comb. nov. — Western Colorado and adjacent Utah, New Mexico; probably Arizona. — COLORADO: Bob Creek, West La Plata Mts., and Mt. Hesperus, June 29 & 30, 1898, *Baker, Earle, & Tracy*, nos. 234 & 252; above Cimarron and above Ouray, July 10 & Aug. 10, 1901, *C. F. Baker*, nos. 391 & 773; Tabeguache Basin, July 29, 1914, *Edwin Payson*, no. 552. UTAH: Geyser Canyon, San Juan Co., July 11, 1912, *Ernest P. Walker*, no. 256. NEW MEXICO: Santa Fe Canon, June 2, 1897, *A. A. & E. Gertrude Heller*, no. 3641; Santa Fe Creek, 1847, *Fendler*, no. 626.

5a. var. **borealis**, var. nov., fere glabescens; calycis lobis glabris. *M. paniculata* Piper, Contrib. U. S. Nat. Herb. xi. 478 (1906), not (Ait.) G. Don. — IDAHO: divide between St. Joe and Clearwater rivers, July 9, 1895, *Leiberg*, no. 1217 (TYPE, Gray Herb.; distributed as *M. siberica*). WASHINGTON: Mt. Carleton, July 16, 1902, *Kreager*, no. 190 (distributed as *M. paniculata*).

Notwithstanding the remoteness of this plant from the range of the type, its affinities with *M. pratensis* are so evident that I am constrained to treat it as only a geographical variant of the southern plant, rather than as a distinct species among the allied species of the Northwest, to none of which it is so closely related.

6. *M. FRANCISCANA* Heller, Bull. Torr. Club xxvi. 549 (1899). *M. grandis* Wootton & Standley, Contrib. U. S. Nat. Herb. xvi. 165 (1913). — Arizona and southwestern New Mexico. — NEW MEXICO: Mogollon Creek, Socorro Co., July 23, 1903, *Metcalfe*, no. 302. ARIZONA: Black River, & Huachuca Mts., July, 1909, *Goodding*, nos. 594, 540 & 178; Willow Spring, July 5–6, 1890, *Palmer*, no. 619; vicinity of Flagstaff, July 5, 1898, *MacDougal*, no. 232; near



Fort Huachuca, July 27, 1893, *Mearns*, no. 1547, & 1882, *Lemmon*, no. 2831.

This species is closely related to the preceding but it is confined to its own range and the differences noted in the key appear constant. The calyx-lobes approach in shape species of the *Ciliatae*, but otherwise the plant evidently belongs here.

7. *M. CAMPANULATA* A. Nels. Bot. Gaz. liv. 150 (1912). — In the mountains of south-central Idaho. — Hailey, Blaine Co., July, 1911, *C. N. Woods*, no. 328; moist flat near Alturus Lake, Blaine Co., July 12, 1910, *A. C. McCain* (R. Mt. Herb.). Mr. McCain reports that the species occurs in only a few places, in which localities, however, it is abundant and grows in clusters. It seems to be confined to the Sawtooth National Forest.

8. *M. ARIZONICA* Greene, Pitt. iii. 197 (1897). — Utah and Arizona. — UTAH: near Marysvale, July 23, 1905, *Rydberg & Carlton*, no. 7077; Pine Valley Mt., May 17, 1902, *Goodding*, no. 855 (R. Mt. Herb.); Dixie National Forest, 1914, *A. C. McCain*, no. 65 (R. Mt. Herb.). ARIZONA: 1869, *Palmer* (Nat. Herb.).

8a. var. **umbratilis** (Greenm.), comb. nov. *M. umbratilis* Greenm. Eryth. vii. 118 (1899). *M. intermedia* Rydb. Mem. N. Y. Bot. Gard. i. 335 (1900). *M. stenoloba* Greene, Pl. Baker. iii. 20 (1901). *M. Leonardi* Rydb. Bull. Torr. Club xxxvi. 680 (1909). *M. infirma* Piper, Contrib. U. S. Nat. Herb. xi. 476 (1906). *M. Sampsonii* Tidestr. Proc. Biol. Soc. Wash. xxvi. 122 (1913). — Western Montana to central Washington, eastern Oregon and Utah. — MONTANA: Bridger's Pass, 1856, *H. Engelmann*; Bozeman Pass, May 28, 1883, *F. Lamson-Scribner*, no. 176. UTAH: Red Butte, June 26, 1908, *Mrs. Joseph Clemens*; Petersen, July 19, 1902, *Pammel & Blackwood*, no. 3820; Big Cottonwood Canyon, June 29 & 30, 1905, *Rydberg & Carlton*, nos. 6442 & 6516 (R. Mt. Herb.); headwaters of Little Cottonwood Creek, above Alta, July 10, 1905, *Rydberg*, no. 6863; Logan Canyon, Cache Co., June 28, 1910, *Charles Piper Smith*, no. 2216 (R. Mt. Herb.); Provo, July 3, 1894, *Jones*, no. 5585 (R. Mt. Herb.); Mt. Nebo, June 13, 1902, *Goodding*, no. 1145 (R. Mt. Herb.). OREGON: Sparta, near Snake River, May 23, June 3, 1898, *Cusick*, no. 1886; and June, 1880, no. 856; Crook Co., Blue Mts., June 10, 1902, *Cusick*, no. 2807. WASHINGTON: damp thickets at Ellensburg, April 25, 1897, *Whited*, no. 307 (Nat. Herb.).

The only really distinguishable feature of this variety is the more deeply cleft calyx and even this is a matter of degree. Much has been made also of the relative lengths of limb and corolla-tube but it seems to me clear that these characters are individual rather than specific or even good varietal traits, and appear to be im-



possible of correlation with geographical distribution or with other characters that are constant.

9. **M. praecox** Smiley, in herb., planta 4–5 dm. alta glabra; caulibus infirmis; foliis glaucescentibus, caulinis (radicalibus ignotis) sessilibus vel semi-amplexicaulibus ovato-ellipticis, vel superioribus suborbiculatis 6–9 cm. longis 3–4.5 cm. latis; pedunculis axillaribus 4–10 cm. longis; racemis subcorymbosis mediocriter laxis; calyce fere 5-partito, lobis glabris vel paullo ciliatis ovatis acutis 2–4 mm. longis fructum superantibus; corolla graciliter tubulosa, tubo 2.5 mm. diametro calycem triplo superante, limbo circa 5 mm. longo; stylo incluso. — UTAH: Spring Hollow, Logan Canyon, Cache Co., May 28, 1910, *Charles Piper Smith*, no. 2160 (TYPE, Gray Herb.).

The very broad rounded leaves and narrow almost exactly tubular corollas are characters that give this plant a very different aspect from *M. arizonica*, var. *umbratilis*, its closest relative. That plant is so variable, however, that *M. praecox* might be regarded as merely a broad-leaved form were it not for the fact that it seems to bloom in the same locality about a month earlier. Although the type specimens were secured May 28, they are largely in fruit, and June 28, of the same year Professor Smith secured at the same locality the variety of *M. arizonica*, just in good blossom. Other collections from the same region (see citations under *M. arizonica*, var. *umbratilis*) indicate that it blooms a month or two later than *M. praecox*. Mr. F. J. Smiley, now of the University of California, studied this plant when he was an assistant at the Gray Herbarium and he left notes outlining the chief characters of the species, which I am here publishing with his kind permission.

10. **M. LAEVIGATA** Piper, Contrib. U. S. Nat. Herb. xi. 477 (1906). — Cascade and Olympia Mts., Washington; probably adjacent Oregon. — WASHINGTON: Mt. Ranier, July 20, 1892, *Allen*, no. 2; Goat Mts., July 22, 1896, *Allen*, no. 231; Simcoe Mts., 1860, *Lyall*.

10a. var. **brachycalyx** (Piper), comb. nov. *M. brachycalyx* Piper, Contrib. U. S. Nat. Herb. xi. 477 (1906). — WASHINGTON: Nason Creek, Chelan Co., Aug. 4, 1893, *Sandberg & Leiberg*, no. 678. ["IDAHO," according to Rydberg, Bull. Torr. Club xl. 481 (1913).]

11. **M. SUBPUBESCENS** Rydb. Bull. Torr. Club xxx. 261 (1903). — Southwestern Montana and northern Wyoming. — MONTANA: West Gallatin River, June 9, 1883, *F. Lamson Scribner*, no. 175; Bozeman, June 18, 1900, *Blankinship*. WYOMING: Ten Sleep



Lakes, Big Horn Co., July 30, 1901, *Goodding*, no. 409 (distributed as *M. ciliata*).

Possibly this should be regarded as a variety of the next but the pubescent leaves suggest a relationship to some member of the *Paniculatae*. Part of the collection cited as the type was apparently mixed, as that number in this herbarium (*Rydberg & Bessey*, no. 4876) is typical *M. ciliata*.

12. *M. CILIATA* (James) G. Don, Gen. Syst. iv. 372 (1838). *M. polyphylla* Greene, Pitt. iv. 87 (1899); var. *polyphylla* (Greene) A. Nels. in Coulter & Nelson Man. R. Mt. 421 (1909). *M. punctata* Greene, l. c. 88; var. *punctata* (Greene) A. Nels., l. c. *M. polyphylla* Greene, var. *platensis* Rydb. Bull. Torr. Club xxxi. 638 (1905). *M. picta* Rydb. l. c. *M. platensis* Rydb. l. c. xxxiii. 150 (1906). *Pulmonaria ciliata* James ex Torr. Ann. Lyc. ii. 224 (1827). —Southwestern Montana to southern Colorado, northern Utah and northern Nevada. —MONTANA: Spanish Basin, Gallatin Co., June 23, 1897, *Rydberg & Bessey*, no. 4876 in part. WYOMING: Union Pass, Aug. 13, 1894, *Aven Nelson*, no. 1098; Nash's Fork, Albany Co., July 28, 1900, *Aven Nelson*, no. 7752; Teton Mts., near Leigh's Lake, July 26, 1901, *Merrill & Wilcox*, no. 1129. COLORADO: Beaver Creek, July 7, 1896, *Crandall*, no. 1644; Mount Baldy, Dark Canon & Peak Valley, July 15 & Aug. 21, 1901, *F. E. & E. S. Clements*, nos. 288, 376, & 367; Bob Creek, West La Plata Mts., June 26, 1898, *Baker, Earle & Tracy*, no. 180; region of the Gunnison Watershed, Black Canyon & above Cimarron, June 20 & July 10, 1901, *C. F. Baker*, nos. 189 & 403; near Pagosa Peak, Aug., 1899, *C. F. Baker*, nos. 559 & 560; Uncompahgre Divide, July 27, 1914, *Edwin Payson*, no. 538. UTAH: Bear River, Aug. 1, 1902, *Pammel & Blackwood*, no. 4234; Dyer Mine, Uintah Mts., June 30, 1902, *Goodding*, no. 1200. NEVADA: near Deeth, Elko Co., July 24, 1908, *Heller*, no. 9236; Jarbidge, July 8, 1912, *Nelson & Macbride*, no. 1994.

12a. var. *LONGIPEDUNCULATA* A. Nels Bull. Torr. Club xxix. 402 (1902). *M. ambigua* Piper, Contrib. U. S. Nat. Herb. xi. 477 (1906). *M. denticulata* (Lehm.) G. Don, Gen. Syst. 319 (1838)? *Lithospermum denticulatum* Lehm. Asper. ii. 294 (1818)? —Yellowstone Park to Colorado, northern Nevada and central Washington. —IDAHO: Snake County, *Burke*; Silver City, Owyhee Co., July 18, 1910, *Macbride*, no. 416. WYOMING: Yellowstone Park, July 4, 1899, *A. & E. Nelson*, no. 5669; Sybille Creek, July 8, 1894, *Aven Nelson*, no. 408; Big Horn Mts., Aug. 1880, *Forwood*, no. 32; Chug Creek, Albany Co., June 30, 1900, *Aven Nelson*, no. 7321; Birds Eye, June 27 & 31, 1902, *Aven Nelson*, nos. 8695 & 8723. COLORADO: Marshal Pass, July 19, 1901, *C. F. Baker*, no. 486; summit of North Park Range, Lorimer Co., Aug. 11, 1903, *Goodding*, no. 1855;



Long's Peak, Aug. 29, 1914, *F. W. Hunnewell, 2nd.* NEVADA: East Humboldt Mts., Aug. 1868, *Watson*, no. 842. WASHINGTON: Cascade Mts., 1889, *Vasey*, no. 402 (Nat. Herb.).

This somewhat variable species is the most common *Mertensia* of the intermountain region. Dr. Gray, in the Syn. Fl. ii. pt. 1, 200 (1886), referred it to *M. siberica* (L.) G. Don, but the identity of that species is very obscure. Then there are other nearly related species, the identity of which must be established before it will be possible to state, with any degree of certainty, the relationship of our *Mertensias* to those of Siberia. Although the Siberian material which I have been able to examine has been very meager it has not suggested that our species will ultimately prove identical with the Asiatic. Accordingly I have followed nearly all recent American botanists in excluding *M. siberica* from the United States.

The disposition of *M. denticulata* (Lehm.) G. Don is equally perplexing. Piper, Contrib. U. S. Nat. Herb. xi. 478 (1906), referred it doubtfully to *M. platyphylla* Heller and called attention to the fact that, according to Hooker, the type came from "shady woods near the confluence of the Columbia with the sea." More recently in Piper & Beattie's Fl. N. W. Coast, 301 (1915) the name *M. denticulata* is taken up for Heller's species. It is true, if Hooker was not mistaken, that the type locality is almost the same as that of *M. platyphylla* Heller, but if Lehmann's characterization is correct, the names must apply to different plants. For instance, "foliis subglabris . . . radicalibus ovatis, caulinis oblongis," and "calyx brevissimus, . . . laciniis oblongis" (l. c.), are characters that do not accord with the distinctly pubescent broadly subcordate basal, and broadly ovate cauline leaves and the long, linear-lanceolate calyx-lobes of *M. platyphylla*. On the contrary, if one may judge from the original description, it seems very probable that Dr. Gray was justified in considering *M. denticulata* the same as *M. ciliata* (i. e. *M. siberica* of the Syn. Fl., l. c.). The inflorescence (ex char.), however, is that of the variety *longipedunculata*, so that, on the adoption of the name *M. denticulata*, the species *ciliata* (in accord with my treatment) would become the variety. But there is still the possibility that *M. siberica* will be shown to be the same, and in that case, since it is an earlier name, it would supplant *M. denticulata*. Accordingly it has not seemed advisable to substitute at this time either *M. denticulata* or *M. siberica* for the well-known



*M. ciliata*, the precise application of the former two being so seriously open to question.

13. *M. STOMATECHOIDES* Kellogg, Proc. Cal. Acad. ii. 148 (1862). *M. siberica* Gray, Syn. Fl. ii. pt. i. 200 (1886), in part, not (L.) G. Don. — In the mountains, western Nevada to southern California. — NEVADA: Marlette Lake, Washoe Co., July 10, 1902, *C. F. Baker*, no. 1302; Snow Valley, Ormsby Co., June 24, 1902, *C. F. Baker*, no. 1154. CALIFORNIA: Sierra Co., & Sierra Valley, 1874 & 1873, *Lemmon*; southern Sierras, 186–, *Bolander*, no. 2487; Hockett's Meadow, Tulare Co., July 16, 1904, *Culbertson*, no. 4375.

14. *M. VIRIDIS* A. Nels. Bull. Torr. Club xxvi. 244 (1899). *M. viridula* Rydb. Bull. Torr. Club xxxi. 639 (1905). — Southern Wyoming and Colorado. — WYOMING: Laramie Peak, Albany Co., July 12, 1900 & Aug. 6, 1895, *Aven Nelson*, nos. 7549 & 1608. COLORADO: Jack Brook, June 25, 1901, *F. E. & E. S. Clements*, no. 232 (distributed as *M. pratensis*).

14a. var. *cynoglossoides* (Greene), comb. nov. *M. cynoglossoides* Greene, Pl. Baker. iii. 19 (1901); *M. muriculata* Greene, l. c. — West central Colorado. — Black Canyon, June 20, 1901, *C. F. Baker*, nos. 191 & 193.

15. *M. CORONATA* A. Nels. Bull. Torr. Club xxix. 403 (1902). — Apparently restricted to the Leucite Hills formation, southwestern Wyoming. — Leucite Hills, Sweetwater Co., June 9, 1900, *Aven Nelson*, no. 7071; Leucite Hills, June 17, 1901, *Merrill & Wilcox*, no. 698 (distributed as *M. lanceolata*).

16. *M. CORIACEA* A. Nels. Bull. Torr. Club xxxix. 402 (1902); Coulter & Nelson Man. R. Mt. 420 (1909), as to description. *M. coriacea* A. Nels., var. *dilatata* A. Nels. l. c. 403. — Alpine; Medicine Bow Mts., southeastern Wyoming to Grand Co., Colorado. — WYOMING: Medicine Bow Mts., Aug. 1, 1900 & Aug. 15, 1908, *Aven Nelson*, nos. 7844, 7870 & 9149. COLORADO: Summit of North Park Range, Larimer Co., Aug. 10, 1903, *Goodding*, no. 1827.

Dr. Rydberg has expressed the opinion, Bull. Torr. Club xl. 481 (1913), that this plant is the same as *M. lanceolata* (Pursh) DC.

17. *M. CAELESTINA* Nels. & Ckll. Proc. Biol. Soc. Wash. xvi. 46 (1903); Wootton & Standley, Contrib. U. S. Nat. Herb. xix. 541 (1915). — Alpine; northern New Mexico. — Truchas Peaks, above timber line, 1902, *Mrs. W. P. Cockerell*, no. 40 (R. Mt. Herb.).

18. *M. OVATA* Rydb. Bull. Torr. Club xxviii. 32 (1901); Coulter & Nelson Man. R. Mt. 421 (1909). *M. Parryi* Rydb. l. c. xxxi. 639 (1905); as synonym, Coulter & Nelson, l. c. — On the higher mountains of Colorado. — West Spanish Peak, July 6, 1900, *Rydberg & Vreeland*, no. 5690 (R. Mt. Herb.); Estes Park, July 22, 1903, *Osterhout*, no. 2848 (R. Mt. Herb.); Beaver Creek, July 19, 1898, *Rydberg* (?), no. 4189 (R. Mt. Herb.); Sierra Blanca, 1877,



*Hooker & Gray*; Anita Peak, Routt Co., Aug. 3, 1903, *Goodding*; alpine ridges lying east of Middle Park, 1861, *Parry*, no. 283 (type of *M. Parryi* Rydb. l. c. and cited wrongly as no. "286").

19. *M. BAKERI* Greene, Pitt. iv. 90 (1899). *M. nivalis* (Wats.) Rydb. Mem. N. Y. Bot. Gard. i. 336 (1900), as to name, not as to plants cited; *M. paniculata* (Ait.) G. Don, var. *nivalis* Wats. Bot. King's Expl. v. 239 (1871). — Colorado and northwestern Utah. — COLORADO: Hayden Peak, July 14, 1898, *Baker, Earle & Tracy*, no. 576; Carson, July 2, & Marshall Pass, July 19, 1901, *C. F. Baker*, nos. 293 & 497; Spicer, Larimer Co., July 10, 1903, *Goodding*, no. 1519. UTAH: Fish Lake, Uintah Mts., July 17, 1902, *Goodding*, no. 1386; Bear River Canyon, Aug. 1869, *Watson*, no. 844.

19a. var. *AMOENA* A. Nels. in Coulter & Nelson Man. R. Mt. 422 (1909). *M. amoena* A. Nels. Bot. Gaz. xxx. 195 (1900). — Yellowstone Park and adjacent regions to northern New Mexico. — MONTANA: Monida, Madison Co., June 16, 1899, *A. & E. Nelson*, no. 5413. COLORADO: Sulphur Springs, Grand Co., June 8, 1906, *Osterhout*, no. 3225.

19b. var. *LATIFLORA* (Greene) A. Nels. in Coulter & Nelson Man. R. Mt. 423 (1909), excluding synonym. *M. lateriflora* Greene, Pl. Baker. iii. 18 (1901). — COLORADO: Carson, July 21, 1901, *C. F. Baker*, no. 334; Palsgrove Canyon, June 27, 1901, *F. E. & E. S. Clements*, no. 324; ex regione media Montium Scopulosorum, July, 1884, *John Ball*; Veta Pass, *G. H. Hicks*.

20. *M. MACDOUGALII* Heller, Bull. Torr. Club xxvi. 550 (1899). — ARIZONA: about Mormon Lake, June 12, 1898, *MacDougal*, no. 95. — This is the only collection I have seen and our specimen, unfortunately, is in full fruit.

21. *M. FUSIFORMIS* Greene, Pitt. iv. 89 (1899). *M. congesta* Greene, Pl. Baker, iii. 17 (1901). *M. papillosa* Greene, var. *fusiformis* (Greene) A. Nels. in Coulter & Nelson Man. R. Mt. 421 (1909). — Southwestern Colorado to northeastern Utah. — COLORADO: Bob Creek, West LaPlata Mts., June 28, 1898, *Baker, Earle & Tracy*, no. 206; Poverty Ridge, above Cimarron, June 13, 1901, *C. F. Baker*, no. 129; Graham's Park, May, 1899, *C. F. Baker*, no. 558; Tebeguache Basin, June 3, 1914, *Edwin Payson*, no. 376. UTAH: Dyer Mine, Uintah Mts., June 30, 1902, *Goodding*, no. 1222.

22. *M. FENDLERI* Gray, Am. Journ. Sci. II. xxxiv. 339 (1862). *M. lanceolata* (Pursh) DC., var. *Fendleri* Gray, Proc. Am. Acad. x. 53 (1874). — NORTHERN NEW MEXICO: Santa Fe Canyon, June 2, 1897, *A. A. & E. Gertrude Heller*, no. 3640; Santa Fe Creek, 1847, *Fendler*, no. 625; *Palmer* (no locality).

22a. var. *pubens*, var. nov., foliis utrinque dense pubescentibus. — NEW MEXICO: Winsor's Ranch, San Miguel Co., June 29, 1908, *Standley*, no. 4023 (TYPE, Gray Herb.); 5 miles above Mora, San Miguel Co., May 30–June 1, 1902, *W. C. Sturgis*.



23. *M. LANCEOLATA* (Pursh) DC. ex A. DC. Prod. x. 88 (1846). *M. papillosa* Greene, Pitt. iii. 261 (1898). *Pulmonaria lanceolata* Pursh, Fl. Am. Bor. ii. 729 (1814). *M. lanceolata* Gray, Syn. Fl. ii. 201 (1886), as to most glabrous specimens. — Plains and foothills; southern Saskatchewan to central Colorado. — SASKATCHEWAN: Wood Mt., June 6, 1895, *John Macoun*, no. 11,838. NORTH DAKOTA: Portal, June 13, 1913, *M. A. Barber*, no. 333. SOUTH DAKOTA: Newell, May 12, 1913, *W. P. Carr*, no. 11. WYOMING: Stinking Water, 1873, *Parry*, no. 226. COLORADO: Sulphur Springs, Grand Co., June 10, 1906, *Osterhout*, no. 3249; Douglas Co., May, 1890, *Mrs. S. B. Walker* (in herb. of Walter Deane).

23a. var. *BRACHYLOBA* (Greene) A. Nels. in Coulter & Nelson Man. R. Mt. 422 (1909). *M. brachyloba* Greene, Pitt. iv. 90 (1899). — Central and northern COLORADO. — Estes Park, Larimer Co., July 6–9, 1913, *F. W. Hunnewell*, 2nd., no. 2414 (in herb. of collector).

23b. var. *lineariloba* (Rydb.), comb. nov. *M. linearis* Greene, Pitt. iii. 197 (1897). *M. lineariloba* Rydb. Bull. Torr. Club xxviii. 32 (1901). *M. papillosa* Greene, var. *lineariloba* (Rydb.) A. Nels. in Coulter & Nelson Man. R. Mt. 421 (1909). *M. lanceolata* A. Nels. in Coulter & Nelson Man. R. Mt. 422 (1909); Gray, Syn. Fl. ii. pt. i. 201 (1886), in part. — SOUTH DAKOTA: Willow Creek, near Custer, May 16, 1908, *John Murdock, Jr.*, no. 3023. WYOMING: Chug Creek, Albany Co., June 30, 1900, *Aven Nelson*, no. 7332; Laramie Hills, May 16, 1894, *Aven Nelson*, no. 34. COLORADO: Hills, south-east of LaVeta, May 18, 1900, *Rydb. & Vreeland*, no. 5695 (R. Mt. Herb.); Colorado Springs, May 14, 1903, *W. C. Sturgis*; "Ex regione media Montium Scopulosorum," July, 1884, *John Ball*; Rocky Mts., 1862, *Hall & Harbour*, no. 445.

23c. var. *myosotifolia* (Heller), comb. nov. *M. myosotifolia* Heller, ex Rydb. Fl. Colo. 290, 292 (1905). *M. secundorum* Ckl. Muhlenbergia iii. 68 (1907). *M. micrantha* A. Nels. Proc. Biol. Soc. Wash. xx. 37 (1907). *M. lanceolata* Gray, Syn. Fl. ii. pt. 1. 201 (1886), as to pubescent specimens. — Central and northern COLORADO. — Golden, etc., 1871, *Greene*; Cross Ruxton, June 16, 1901, *F. E. & E. S. Clements*; dry places in Clear Creek Canyon, Georgetown, July 8 & 27, 1885 (leaves and flowers small), & damp, shaded places near Empire, July 10, 1885 (leaves and flowers large), *H. N. Patterson*, no. 115; Boulder, May 18, 1909, *Cockerell*, no. 6256 (R. Mt. Herb.; Univ. of Colo. Herb.); Sugar Loaf Mt., July 14, 1906, *Rameley & Robbins*, no. 1750 (R. Mt. Herb.); Moraine Park, Larimer Co., July 20, 1903, *Osterhout*, no. 2824 (R. Mt. Herb.); Rocky Mts., 1862, *Hall & Harbour*, no. 134; Douglas Co., May, 1890, *Mrs. S. B. Walker* (part of collection cited under the typical form of the species).

Perhaps this is the most troublesome group in the genus. The plants vary greatly in amount of pubescence, size and shape of



leaves, and size of corollas; while the appendages in the corolla-throat vary from glabrous to more or less densely long-pubescent. The specimens examined all come from adjoining counties in central Colorado and it has seemed impossible to correlate any of these characters, or to find other concomitant characters. Therefore I have come to the conclusion that these apparent differences are superficial and possess here no taxonomic value. For instance, the collection from Douglas Co., by *Mrs. S. B. Walker* (cited both under the species and the var. *myosotifolia*), consists of two plants mounted on one sheet, one of which is glabrous, the other pubescent, but otherwise they are as similar as the proverbial peas; and I suspect that the "species" and the "variety" grew on the same hillside. Dr. Cockerell, of the University of Colorado, has an interesting and plausible theory in regard to this. He writes me, "My present view is that *M. secundorum* is *M. lanceolata* plus hairs — they very probably are Mendelian opposites and essentially one species." <sup>1</sup>

24. *M. CUSICKII* Piper, Bull. Torr. Club xxix. 643 (1902). — Southeastern Oregon. — Stein's Mts., June 18, 1901, *Cusick*, no. 2582; Owyhee, Malheur Divide, May 31, 1896, *Leiberg*, no. 2178.

25. *M. eplicata*, spec. nov., erecta 2–3 dm. alta; radice crassa fusiformi sublignosa; caulibus pubescentibus; foliis utrinque subvillosis, radicalibus 1.5–2.5 dm. longis, laminis ovatis obtusis basi cuneatis 6–12 cm. longis 2.5–4.5 cm. latis, petiolis 6–12 cm. longis; foliis caulinis oblongis vel oblongo-lanceolatis basi attenuatis apice obtusis; floribus terminalibus congestis, junioribus nutantibus; calyce villosa, lobis lanceolatis acutis 4–5 mm. longis; corolla fere tubulosa, tubo intus glabro sine plicaturis circa 10 mm. longo 3–3.5 mm. diametro, limbo 4–5 mm. lato circa 5 mm. longo; corollae appendiculis villosis; staminibus et stylo vix inclusis. — IDAHO: in clumps, moist open slopes, Dry Buck, Boise Co., May 10, 1911, *Macbride*, no. 856 (TYPE, R. Mt. Herb., COTYPE, Gray Herb.).

This species was distributed as *M. Cusickii* Piper. Then Dr. Rydberg expressed the opinion (in a letter) that he would refer it to *M. amoena* A. Nels. (*M. Bakeri* Greene, var. *amoena* A. Nels.). After a careful examination of the corolla I cannot agree with this

<sup>1</sup> As the present paper was going to press Professor T. D. A. Cockerell kindly informed me of a striking variation which he proposes as *M. LANCEOLATA* (Pursh) DC., var. *aperta* Ckll., var. nov., corolla multo apertiore circa 10 mm. diametro, tubo brevissimo; calycis lobis tubum corollae aequantibus. — Boulder, Colorado, April 27, 1916, *Viola Philipps* (TYPE, Univ. of Colo.; COTYPE, Gray Herb.). It seems entirely possible that this is only a teratological form.



view. The tube is glabrous, a fact that places the plant in the *Oblongifoliae*. Even if we disregard this important character, the fusiform tap-root, large basal leaves and tubular corolla are features at variance with *M. Bakeri* or other *Lanceolatae*. It is true the root resembles that of *M. fusiformis*, but the other characters are different. *M. Cusickii* is its nearest relative, and the resemblance is so great that it is not surprising that the species masqueraded under that name. However, the corolla of *M. Cusickii* is smaller, the appendages in the throat are glabrous, the tube has five longitudinal rigid folds within, and the stamens reach only to the base of the corolla-lobes. Dr. Rydberg considers some large specimens from Beaver Canyon, Idaho, as belonging here, but those that I have from there are, on the other hand, somewhat luxuriant examples of *M. Bakeri*, var. *amoena*.

26. *M. LONGIFLORA* Greene, Pitt. iii. 261 (1897). *M. oblongifolia* Gray, Syn. Fl. ii. pt. i. 200 (1886), in part; Piper, Contrib. U. S. Nat. Herb. xi. 479 (1906); Howell, Fl. N. W. Am. 491 (1901); Rydb. Mem. N. Y. Bot. Gard. i. 336 (1900), not (Nutt.) G. Don. — Western Montana to Washington and eastern Oregon. — MONTANA: Columbia Falls, May 22, 1893, *R. S. Williams*, no. 977. OREGON: Blue Mts., May 21, 1885, *Thomas Howell*, no. 526; *Geyer*, no. 316. WASHINGTON: Hangman Creek, Spokane Co., May 20, 1893, *Sandberg & Leiberg*, no. 48; Cheney, 1890, *Mrs. Susan Tucker*.

26a. var. **Horneri** (Piper), comb. nov. *M. Horneri* Piper, Contrib. U. S. Nat. Herb. xi. 479 (1906). — Eastern Oregon to southeastern Washington. — OREGON: stony hillsides, eastern Oregon, April 13, 1898, *Cusick*, no. 1830; basaltic soil, moist open hills, April 12, 1907, *Cusick*, no. 3151. WASHINGTON: Waitsburg, April 3, 1897, *Robt. M. Horner*, no. R 155, B 366.

Very near the species and possibly not even varietally distinct.

26b. var. **pulchella** (Piper), comb. nov. *M. pulchella* Piper, Contrib. U. S. Nat. Herb. xi. 478 (1906); *M. pulchella* Piper, subsp. *glauca* Piper, l. c. 479. — Southern British Columbia to eastern Oregon. — IDAHO: valley of Clearwater River, Nez Perces Co., April 28, 1892, *Sandberg, MacDougal & Heller*, no. 75. OREGON: Wallowa Mts., May 1, 6, & June 8, *Cusick*, nos. 3159, 3155, & 3169; Umatilla River, Blue Mts., April 7, 1910, *Cusick*, no. 3424. WASHINGTON: hills west of Wenatchee, March 31, 1899, *Whited*, no. 1010? BRITISH COLUMBIA: Trail, May 26, 1902, *J. M. Macoun*, no. 66,567.

27. *M. OBLONGIFOLIA* (Nutt.) G. Don, Gen. Syst. iv. 372 (1838). *Pulmonaria oblongifolia* Nutt. Journ. Acad. Phil. vii. 43 (1834), not



of recent botanists; see *M. longiflora* Greene. — Western Montana to British Columbia. — MONTANA: *W. J. Howard* (no locality); foothills, Bozeman, May 23, 1899 & May 11, 1900, *Blankinship*; Sedan, Gallatin Co., May 5, 1901, *B. J. Jones*.

This species has been long misinterpreted. The original description (l. c.) calls for "foliis lanceolato-oblongis obtusiusculis, superioribus acutis . . . calycibus abbreviatis, laciniis linearibus acutis ciliatis." And again in a footnote, "the segments of the calyx narrow-linear and very acute." Some scraps of a specimen in this herbarium are labeled in Dr. Gray's hand "*M. oblongifolia* Nutt.! ex. sp. Wyeth! misit Durand 1861." Evidently these are a part of the type, and they accord with Nuttall's description perfectly; additional characters may be noted as follows: pedicels very sparsely hispid; calyx cleft nearly to the base, the divisions 5 mm. long, when moistened, linear-lanceolate; corolla-tube glabrous within, 10 mm. long, limb 5 mm. long; filaments as broad and as long as the anthers which the style slightly exceeds. The specimens cited essentially agree with this type material.

28. *M. FOLIOSA* A. Nels. Bull. Torr. Club xxvi. 243 (1899). *M. nutans* Howell, Fl. N. W. Am. 491 (1901); *M. oblongifolia* Gray, Syn. Fl. ii. pt. i. 200 (1886), in small part. — Southern Montana and adjacent Wyoming to central Washington, south to Nevada, northern Utah and southwestern Wyoming. — MONTANA: Bridger Mts., Gallatin Co., June 15, 1897, *Rydberg & Bessey*, no. 4870 (distributed as *M. lanceolata*). IDAHO: Silver City, Owyhee Co., June 20, 1911, *Macbride*, no. 942. WYOMING: Hurlburt Creek, Sheridan Co., May 4, 1909, *Vie Willits*, no. 6 (R. Mt. Herb.); Cumberland & Kemmerer, Uinta Co., May 31 & June 1, 1907, *Aven Nelson*, nos. 9007 & 9016; Evanston, Uinta Co., May 28, 1897, *Aven Nelson*, no. 2951. UTAH: Red Butte, near Salt Lake, April 24 & 27, 1908, *Mrs. Joseph Clemens*, & April 22, 1905, *A. O. Garrett*, no. 1074. NEVADA: Trinity Mts., May, 1865, *Watson*, no. 840; Jarbidge, Elko Co., July 6, 1912, *Nelson & Macbride*, no. 1938, in part (distributed as *M. coronata*). OREGON: Castle Rock Mts. June 10, 1897, *Cusick*, no. 1629; Owyhee, Malheur Divide, May 30, 1896, *Leiberg*, no. 2166; Juniper Mt., Malheur Co., May 7, 1900, *Cusick*, no. 2376. WASHINGTON: Dutch John's, near Wenatchee, April 23, 1899, *Whited*, no. 1034, in part (Nat. Herb.).

28a. var. *subcalva* (Piper), comb. nov. *M. nutans* Howell, subsp. *subcalva* Piper, Contrib. U. S. Nat. Herb. xi. 479 (1906). — Southwestern Montana to Washington, south to Nevada. — MONTANA: Spanish Creek, Gallatin Co., May 12, 1901, *J. Vogel*. NEVADA: Jarbidge, July 6, 1912, *Nelson & Macbride*, no. 1938, in part; East



Humboldt Mts., July, 1865, *Watson*, no. 841. WASHINGTON: Dutch John's, near Wenatchee, April 23, 1899, *Whited*, no. 1034, in part; Rattlesnake Mts., April 29, 1901, *J. S. Cotton*, no. 328.

28b. var. **pubescens** (Piper), comb. nov. *M. pubescens* Piper, Contrib. U. S. Nat. Herb. xi. 479 (1906). — WASHINGTON: Waterville, Douglas Co., April 23, 1900, *Whited*, no. 1214 (Nat. Herb.).

28c. var. **nevadensis** (A. Nels.), comb. nov. *M. nevadensis* A. Nels. Proc. Biol. Soc. Wash. xvii. 96 (1904). — NEVADA: Hunter Creek Canyon, near Reno, May 16, 1903, *P. B. Kennedy & G. H. True*, no. 711 (R. Mt. Herb.); Ruby Mts. July 8, 1912, *Heller*, nos. 10541 & 10546; Clover Mt. Range near Deeth, July 24, 1908, *Heller*, no. 9181 (not typical). The specimens by Mr. Heller distributed as *M. lanceolata*.

The varieties merge with the species and with each other. The variety *nevadensis* is typically well-marked by its open inflorescence but the individual plants vary from glabrous to pubescent as in the variety *subcalva*.

29. **M. Nelsonii**, spec. nov., usque ad 3–4 dm. alta; radicibus numerosis lignescentibus et fibroso-ramosis; caulibus adscendentibus vel suberectis plus minusve flexuosis basi ad apicem fere aequaliter foliosissimis; foliis viridibus glabris vel interdum supra paullo pubescentibus, caulinis elliptico-lanceolatis sessilibus et basi cuneatis vel in petiolum attenuatis, apice obtusis, usque ad 8 cm. longis 2 cm. latis; superioribus ovato-ellipticis subacutis; pedunculis axillaribus circa 6 cm. longis; floribus subfasciculatis mediocriter congestis; pedicellis fructiferis 5–8 mm. longis; calyce fere 5-partito, laciniis ovatis acutis paullo ciliatis, 2–3 mm. longis; corollae tubo intus glabro 6 mm. longo, limbo 4 mm. longo; stylo circa 10 mm. longo; filamentis quam antherae multo brevioribus. — NEVADA: Jarbidge, Elko Co., July 9, 1912, *Nelson & Macbride*, no. 1995 (TYPE, R. Mt. Herb.).

This species bears a superficial resemblance to *M. viridis* A. Nels. of the *Lanceolatae*, but that plant, in common with the other members of its section, has the corolla-tube pubescent within, the filaments as long as or longer than the anthers, and a very different root system. The very short filaments suggest a relationship to the *Alpinae*, but the long style, habit and aspect of the plant place it in the *Oblongifoliae*. It is to be regarded, perhaps, as a connecting link between these two sections.

30. **M. ALPINA** (Torr.) G. Don, Gen. Syst. iv. 372 (1838). *M. Tweedyi* Rydb. Mem. N. Y. Bot. Gard. i. 336 (1901). *M. obtusiloba* Rydb. Bull. Torr. Club xxviii. 32 (1901). *M. brevistyla* Wats., var. *obtusiloba* (Rydb.) A. Nels. in Coulter & Nelson Man. R. Mt.



421 (1909). *Pulmonaria alpina* Torr. Ann. Lyc. ii. 224 (1827). — Montana, Wyoming, Colorado. — MONTANA: near Pony, July 7 & 9, 1897, *Rydberg & Bessey*, no. 4867; Spanish Peaks, July 10, 1901, *J. Vogel*. WYOMING: Yellowstone Park, July 13, 1899, *A. & E. Nelson*, no. 5811; Dune Lake, July 18, 1896, *Aven Nelson*, no. 2434. COLORADO: Saddle Cliffs, July 6, 1901, *A. E. & E. S. Clements*, no. 405; Pike's Peak, Aug. 27, 1895, *Canby*.

30a. var. **perplexa** (Rydb.), comb. nov. *M. perplexa* Rydb. Bull. Torr. Club xxxi. 639 (1905); *M. alpina* Gray, Syn. Fl. ii. pt. 1, 201 (1886), in part. — COLORADO: 1868, *Vasey*, no. 437; Gray's Peak & vicinity, July & August, 1885, *H. N. Patterson*, nos. 113 & 114, in part; 1872, *Gray*.

30b. var. **humilis** (Rydb.), comb. nov. *M. humilis* Rydb. Bull. Torr. Club xxxvi. 681 (1909). *M. alpina* A. Nels. in Coulter & Nelson Man. R. Mt., as to description and glabrous specimens; Gray, Syn. Fl. l. c. in part. — High Plains; southern Wyoming and Colorado. — WYOMING: Laramie Hills & Sand Creek, Albany Co., May 16, 1894 & June 2, 1900, *Aven Nelson*, nos. 33 & 7043. COLORADO: headwaters of Clear Creek, 1861, *Parry*, no. 287.

31. *M. CANESCENS* Rydb. Bull. Torr. Club xxxi. 640 (1905). *M. cana* Rydb. Bull. Torr. Club. xxxvi. 698 (1909). — COLORADO: Berthoud Pass, Grand Co., July, 1903, *Tweedy*, no. 5664 (R. Mt. Herb.); Gray's Peak & Vicinity, July & Aug., 1885, *H. N. Patterson*, no. 114, in part.

32. *M. BREVISTYLA* Wats. Bot. King's Expl. 239 (1871). *M. alpina* (Torr.) G. Don, var. *brevistyla* (Wats.) Jones, Contrib. W. Bot. xii. 56 (1908). *M. alpina* Gray, Syn. Fl. l. c. in part. — UTAH: Emigration Canyon, Salt Lake Co., June 14, 1913, *Garrett*, no. 2716; Wasatch Mts., May, 1869, *Watson*, no. 485; Red Butte Canyon, Salt Lake Co., April 22, 1905, *Garrett*, no. 1075; Red Butte & Parley's Canyons, May 8, 1909, & May 29, 1908, *Mrs. Joseph Clemens*.

Rydberg includes this species in his Flora of Colorado and Nelson in the Coulter & Nelson Manual gives the range as "western central Rocky Mountains." However the specimens I have seen have all come from Utah.

## II. REVISION OF THE GENUS OREOCARYA

This group of plants has never been revised as a genus. When Dr. Gray treated it as a section under *Krynitzkia*, Proc. Am. Acad. xx. 277 et seq. (1885), he recognized seven species and at that time but few more had been proposed. Then in 1896 Dr. Greene (Pitt. iii. 109-115) added seven species to his genus *Oreocarya*, Pitt. i. 57 (1887), and discussed the status of some of the older species. The





Macbride, J. Francis. 1916. "The true Mertensias of western North America." *Contributions from the Gray Herbarium of Harvard University* (48), 1–20.  
<https://doi.org/10.5962/p.335988>.

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