indicates a habitat on loose earth or gravel slides. The label on the type collection bears the statement, "Upper Temperate Life Zone." This is defined by Jones as the spruce belt. The plant is evidently one of the very few members of the genus that inhabits a subarctic region.

31. C. Bradburiana Payson new name. Plate 29, figs. 86–88.

Cynoglossum glomeratum Pursh, Fl. Am. Sept. **2:** 729. 1814, not *Cryptantha glomerata* Lehm.

Myosotis glomerata (Pursh) Nutt. Fl. Am. Sept. **2:** 729. 1814.

Rochelia glomerata (Pursh) Torr. Ann. Lyc. N. Y. **2:** 226. 1828.

Eritrichium glomeratum (Pursh) DC. Prodr. **10:** 131. 1846.

Krynitzkia glomerata (Pursh) Gray, Proc. Am. Acad. **20:** 279. 1885.

Oreocarya glomerata (Pursh) Greene, Pittonia **1:** 58. 1887.

O. affinis Greene, Pittonia **3:** 110. 1896 (Type: "sandy hills near Red Buttes, Wyoming, 5 July, 1896," *Greene*), not *Cryptantha affinis* (Gray) Greene.

Krynitzkia pustulata Blankinship, Montana Agr. Coll. Sci. Studies, Bot. **1:** 96. 1905, not *Cryptantha pustulosa* (Rydb.) Payson.

Oreocarya perennis Rydb. Fl. Rocky Mountains, 722. 1917, in part, not *O. affinis perennis* A. Nels.

Biennial, or short-lived perennial (?) from a tap root; stems rather stout, simple or branched from the base, if branched from the base then one stem usually exceeding the others, stems 1.5–3.5 dm. high, coarsely setose with divaricate bristles; leaves forming a rosette at the base the first year, radical leaves spatulate to oblanceolate or the outermost almost obovate, obtuse, 2–5 cm. long, cauline leaves somewhat narrower and longer, pubescence similar on both leaf surfaces, setose with spreading bristles and subtomentose, abundantly pustulate; inflorescence rather narrow, somewhat glomerate, extending over upper ⅔ or ¾ of the stem, foliar bracts near the base of the inflorescence conspicuous and longer than the cymules in the young inflorescence; calyx densely setose and hirsute, sepals linear-lanceolate, acute, in anthesis about 4 mm. long, in fruit 8–10 mm. long, exceeding the nutlets about 5 mm.; corolla white, tube 3–4 mm.

long, equalling the sepals, crests at the base of the tube conspicuous and well developed, fornices low, rounded or emarginate, about 0.5 mm. long, papillose, pale yellow, limb about 10 mm. broad, lobes and tube subequal or the lobes slightly longer than the tube, lobes united for about ⅓ their length; fruit ovoid, all four nutlets usually maturing; style exceeding the mature nutlets by about 1.5 mm.; nutlets dull or slightly glossy, margins acute, in contact, the dorsal surface of nutlets more or less rugose-tuberculate and with at least a few muriculations, ventral surface indefinitely tuberculate or rugose and somewhat muriculate, scar straight, closed, extending from near the base to near the apex, no elevated margin present.

Distribution: Upper Sonoran and Transition Zones, southern Alberta, North Dakota, western South Dakota and Nebraska, Montana, Wyoming, and northeastern Colorado. Type: "in Upper Louisiana," *Bradbury*. Bradbury collected this plant at the Big Bend of the Missouri in what is now South Dakota.

Specimens examined:

Alberta: Lethbridge, June 5, 1894, *Macoun 5802* (Mo., Canada, Gray).

North Dakota: Pembina, *Havard* (U.S.); Minot, June 5, 1908, *Lunell* (U.S.); Glen Ullin, June, 1891, *Holzinger 6* (U.S.); Medora, July 17, 1891, *Waldron* (R.Mt.); N. W. Territory, *Nicollet 374* (Phila.); Marmarth, June 15, 1914, *Moyer 453* (Minn.).

South Dakota: bluffs of Missouri River, Walworth Co., June 15, 1909, *Moyer* (Minn.); Missouri Valley near Ft. Pierre, June 25, 1839, *Geyer* (U.S.); Ft. Meade, June 9, 1887, *Forwood 272* (U.S.); "Louisiana," *Bradbury* (Phila.); Interior, Stanley Co., June 5, 1914, *Over 5188* (U.S.); White River, Washington Co., Aug. 5, 1914, *Over 6185* (U.S.); Date, Perkins Co., June 1, 1912, *Visher 587* (R.Mt.); Short Pines, Harding Co., June 9, 1911, *Visher 431* (R.Mt.); Cone Hills, Harding Co., July 8, 1920, *Over* (U.S.); Crook, July 23, 1910, *Visher 295* (R.Mt.); 8 miles north of Belle Fourche, Butte Co., June 11, 1916, *Eggleston 12520* (U.S.); Belle Fourche River, June 2, 1894, *Bailey 14* (U.S.); Piedmont, June, 1895, *Pratt* (R.Mt., Minn.); Rockerville, Black Hills, June 15–30, 1909, *White* (Mo.); Hot Springs, June 13, 1892, *Rydberg 893* (U.S.).

Nebraska: Lavaea, July 14, 1898, *Bates* (R.Mt.); Hay Springs, June 6–7, 1901, *MacDougal 60* (Mont.); Ft. Robinson, July, 1891, *Bates* (Minn.); Belmont, July 24, 1889, *Webber* (Mo.); Warbonnet Canyon, *Williams* (U.S.).

Montana: Custer, May 16, 1890, *Blankinship* (R.Mt., Mo.); Livingston, June 8, 1906, *Blankinship 372a* (Pomona, Mo.); Wreck Creek, Sweet Grass Co., June 15–19, 1912, *Eggleston 7959* (U.S.); Greycliff, Sweet Grass Co., May 15–31, 1912, *Eggleston 7838* (U.S.); Livingston, June 7, 1901, *Scheuber* (Minn., U.S.); Bozeman, May 19, 1900, *Moore* (Calif.); Bozeman, June 16, 1905, *Blankinship 373* (U.S.); Sedan, June 11, 1901, *Jones* (R.Mt.); mouth of Shield's River, June 6, 1883, *Scribner 174* (Phila., Gray); near Jefferson City, June 27, 1883, *Scribner 174* (U.S.); Park Co., 1889, *Tweedy* (U.S.); near Pony, July 8, 1897, *Rydberg & Bessey 4882*[1] (R.Mt., Wash., Minn., U.S., Mont., Gray); Spanish Basin, Gallatin Co., June 23, 1897, *Rydberg & Bessey 4883*[1] (R.Mt., Wash., Minn., U.S., Gray); Park Co., 1889, *Tweedy* (U.S.).

Wyoming: Cruse Creek, Sheridan Co., July 6, 1909, *Willits 236* (R.Mt.); hills east of Sheridan, June 17, 1912, *Sharp 132* (R.Mt.); between Sheridan and Buffalo, June 15–July 15, 1900, *Tweedy 3569* (R.Mt.); south of Buffalo, July 24, 1926, *Nelson 10741* (R.Mt.); 40 miles west of Cody, Aug. 31, 1922, *von Schrenk* (Mo.); Mammoth Hot Springs, June, 1887, *Tweedy 816* (Field, U.S.); Cheyenne River, *Williams* (R.Mt., Gray); Wind River, July 14, 1881–82, *Forwood* (U.S.); head of Middle Fork of Powder River, July 18, 1901, *Goodding 287* (Pomona, R.Mt., U.S., Gray); well on Salt Creek Road, Natrona Co., July 9, 1901, *Goodding 230* (R.Mt., Mo., U.S., Gray); Birds Eye, June 24, 1910, *Nelson 9355* (R.Mt., Minn., Gray); Birds Eye, June 20, 1910, *Nelson 9411* (R. Mt., Minn., Gray); Hartville, June 30, 1901, *Nelson 8319* (Pomona, R.Mt., Mo.); Uva, July 10, 1894, *Nelson 388* (Pomona, R.Mt., Minn., Mo., U.S., Gray); Chug Creek, Albany Co., July, 1900, *Nelson* (R.Mt.); Laramie Hills, June 16, 1894, *Nelson 255* (U.S., Gray); Sheep Mt., Albany Co., June 24, 1925, *Payson & Payson 4247* (R.Mt.); Laramie

[1] *Rydberg & Bessey 4882 and 4883* are not typical *C. Bradburiana* but are intermediate to *C. Sheldonii.*

Hills, June 18, 1896, *Nelson 1956* (Pomona, R.Mt., Minn., Mo.); Rock River, June 18, 1901, *Goodding 29* (Pomona, R.Mt., Field, U.S., Gray); Red Buttes, June 18, 1891, *Buffum 640* (R.Mt.); Sand Creek, Albany Co., May 31, 1900, *Nelson 6961* (Pomona, R.Mt., Mo., U.S.); Ft. Steele, June 16, 1907, *Nelson 9045* (R.Mt., Minn., Mo., Gray); Ft. Steele, June 18, 1898, *Nelson 4837* (R.Mt.); Ft. Steele, June 16, 1900, *Nelson 7248* (Pomona, R.Mt., Minn., U.S., Gray); Ft. Steele, May 25–June 10, 1901, *Tweedy 4261* (U.S., Gray); Tipton, June 17, 1898, *Nelson 4788* (R.Mt.); near Table Rock in Red Desert, July 5, 1926, *Nelson 10700* (R.Mt.).

Colorado: Pawnee Buttes, July 8, 1920, *Osterhout 5927* (R.Mt., U.S., Gray, Osterh.).

C. Bradburiana was the first species of this genus to be described and probably also the first species to find its way into herbaria. This was due very largely to its wide distribution in an accessible part of the western United States. Because of the priority of this species and the homogeneous nature of the genus as a whole, very many specimens have been determined as *glomerata* (i.e., *Bradburiana*) that are in reality quite different plants. A number of varieties of this species have been described from time to time that are equally far removed from *glomerata* as it is here understood. Indeed the plants most closely related have been described in recent years and have been proposed and maintained as species since their introduction into scientific literature.

The specific concept of *Bradburiana* and its allies that has been adopted in the present paper is too small for entire satisfaction. With a more inclusive concept the following units would be recognized as varieties only: *sobolifera, celosioides, Macounii, interrupta, spiculifera, Sheldonii,* and possibly *rugulosa.* This reduction of specific units is not accomplished in the present paper for a number of reasons. In the first place the smaller units are mostly satisfactory in the sense that the intermediates are few and the geographical ranges isolated and consistent. In the second place the binomials are somewhat more convenient and the segregates have been previously maintained by other authors as species. In the third place if aggregation proceeded to the point indicated above, there would be good reason to extend the

specific boundaries further and include *humilis*, *sericea*, and *aperta*. From that it would be only a step to include *nana* and its allies, and so the one species would come to contain a large proportion of the units in the genus. In other words, by maintaining a smaller specific concept than is entirely satisfactory, the various units in the genus are kept more nearly uniform in degree of difference from one another and when one commences to aggregate species, it is difficult to stop and the result is not satisfactory because the species retained are of such very different values.

The greatest difficulty comes in delimiting *Bradburiana*, *Sheldonii*,and *Macounii*. In western Montana these forms are very perplexing and much work yet remains to be done before an entirely satisfactory solution can be reached. *Sheldonii* is distinctly and conspicuously perennial and caespitose, while *Bradburiana* is typically biennial and solitary. The comparatively few intermediates that have come to hand have been cited with the species they seemed most to resemble. *Macounii* is distinctly perennial but has very narrow leaves. This is in great contrast with *Sheldonii* but in a few cases it has been difficult to place a particular plant in one species or the other. Only one segregate of *Bradburiana*, in the limited sense, has ever been proposed, namely, *O. affinis* Greene. The present author can see no reason for maintaining this. Macbride (Contr. Gray Herb. 48: 30. 1916) quotes Dr. Nelson concerning the validity of *affinis* over *glomerata* (i.e., *Bradburiana*). It has become evident that Nelson was contrasting *C. Bradburiana* and *C. thyrsiflora* and so the differences given do not relate to the present question. From Macbride's correspondence, which is at hand, it is certain that he maintained *affinis* almost entirely on Nelson's judgment.

It is unfortunate to have to substitute an unfamiliar name for a familiar one but since *Cryptantha glomerata* Lehm., which is a valid South American species and the type of the genus *Cryptantha*, was described long ago, there remains no other alternative if *Oreocarya* is merged in *Cryptantha*.

The name is given in honor of the first collector of the species, who, it seems, fared rather badly in the matter of scientific recognition for his many hardships and privations.

Explanation of Plate

PLATE 29

Figs. 80–82. *C. Macounii.* Drawn from specimen collected by *Macoun,* at Moose Jaw, Saskatchewan.

Figs. 83–85. *C. sobolifera.* Drawn from type, *M. E. Jones,* Upper Marias Pass, Montana.

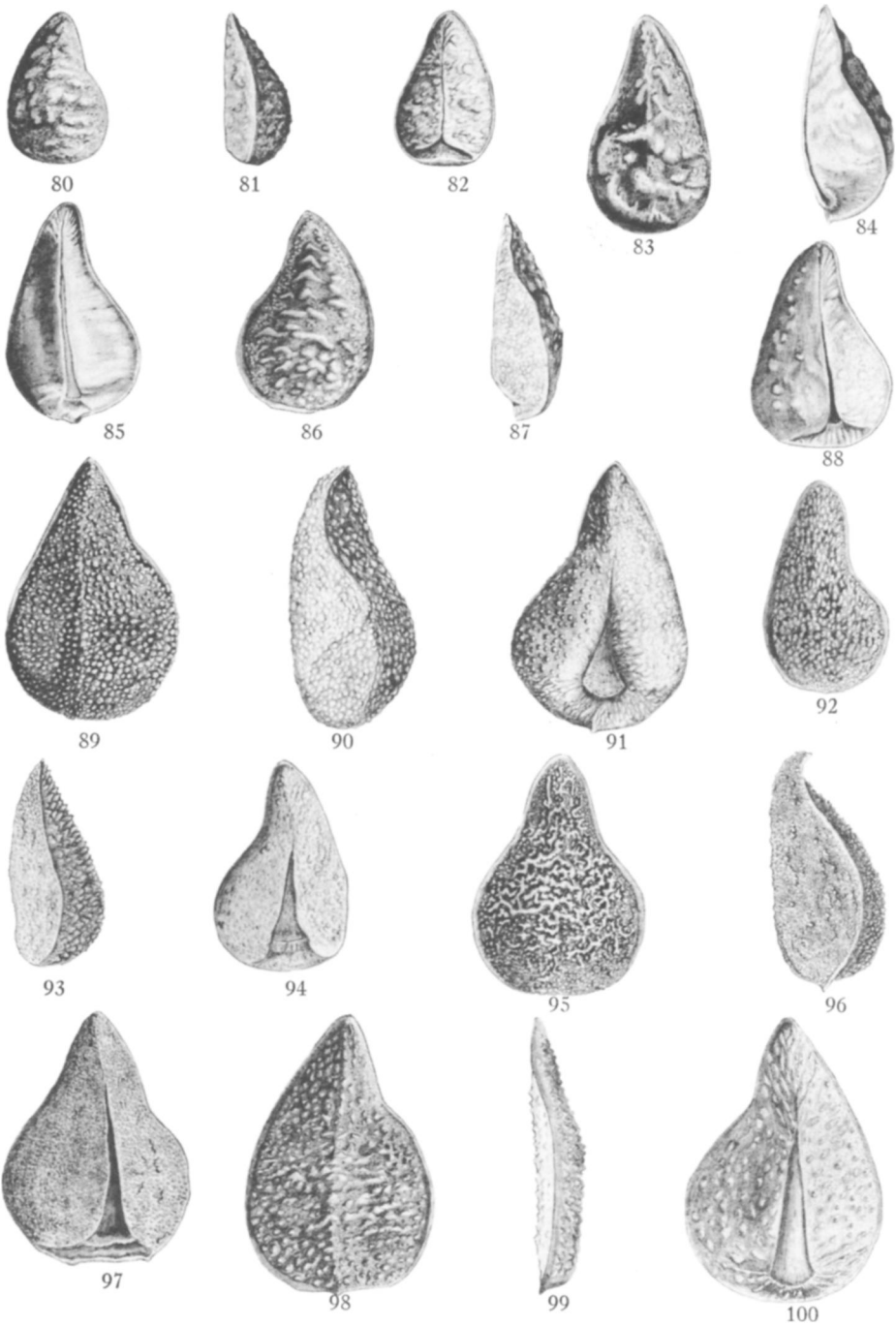
Figs. 86–88. *C. Bradburiana.*

Figs. 89–91. *C. nana* var. *Shantzii.* Drawn from type of *Oreocarya dolosa, C. P. Smith 1605.* The nutlets of *C. breviflora, C. fulvocanescens,* and *C. echinoides* are similar to those of *C. nana* var. *Shantzii.* The differences are noted in the descriptions.

Figs. 92–94. *C. cana.* Drawn from type, *A. Nelson 8309.*

Figs. 95–97. *C. propria.* Drawn from *Leiberg 2223.*

Figs. 98–100. *C. Jonesiana.* Drawn from type, *Jones,* San Rafael Swell, Utah.



PAYSON—SECTION OREOCARYA OF CRYPTANTHA

COCKAYNE, BOSTON