



Primroses

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**On the cover**

*In 1936 Dr. Walter C. Blasdale photographed *P. suffrutescens* on Ellis Peak (8475 feet) near Lake Tahoe. He pronounced it "the most beautiful alpine growing naturally in California." In time it forms mats several feet across, "filling the interstices of shattered rock ledges or between masses of boulders. The "Sierra primrose" was discovered in 1864 on Silver Mountain, California, and is the only primula occurring naturally in California.*

# Primulas of western America

## Reprint describes western primulas

In the 1930s Louis O. Williams received a specimen of primula from Utah in a collection. While he was trying to classify it, he decided that "a careful study of the related species was necessary."

In 1936 Williams offered "Revision of the Western Primulas" in a Missouri publication entitled "The American Midland Naturalist." He included all of the primula species "known to occur from the Rocky Mountains to the Pacific, south of Canada and north of Mexico."

Williams prepared a short description of each plant, its synonyms, distribution and some specimens examined. Part of his information was gleaned from Professor M.L. Fernald's treatment of the American representatives of the Farinosae section.

Williams visited herbaria to see samples of plant materials. He used the following designations in listing specimens from the herbaria: Pomona (P), Rocky Mountain Herbarium (Ry), Utah State Agricultural College, now Utah State University (Utah), Herbarium of the Missouri Botanical Garden (M), Herbarium Greeneanum at University of Notre Dame (ND), personal herbarium of George E. Osterhout (O), Herbarium of University of Nebraska (N), Herbarium of Kansas State College (K), Herbarium of Brigham Young University (BYU), Herbarium of the Field Museum of Natural History (F), personal herbarium of O. J. Murie (Murie).

Williams prepared the following key to the species and variety:

Primulas of the western American mountains are a challenge to find in the wild and exciting to grow successfully. *Capillaris* and *nevadensis* are so rare and isolated on their mountain tops that one wonders how they were discovered at all. Could there be more undiscovered species clinging to a mountainside or hidden in a deep canyon?

## Williams' key to western primulas

- I. Bracts of the involucre gibbous at the base; lobes of the corolla deeply emarginate; limb of the corolla 1 cm. or less broad.
  1. *P. specuicola*: calyx lobes acuminate to subulate-tipped; leaves mostly 6-12 cm. long. Mature calyx-lobes usually exceeding the capsules; plants of s.e. Utah.
  2. *P. Hunnewellii*: Mature calyx-lobes exceeded by the capsules; plants from the Grand Canyon, Arizona.
  3. *P. incana*: calyx lobes acute to obtuse; leaves mostly less than 6 cm. long.
- II. Bracts of the involucre not gibbous at the base; lobes of the corolla not deeply emarginate; limb of the corolla 1 cm. or more broad.
  1. *P. suffrutescens*: Apex of leaves subtruncate and dentate; Californian
    - A. Apex of leaves not subtruncate, not dentate; not Californian. Plants usually 1 dm. or more tall; inflorescence 3-20-flowered, umbellate.
    4. *P. Rusbyi*: calyx farinose; corolla-tube in anthesis twice as long as the calyx. Calyx in anthesis 4-5 mm. long, in fruit 5-7 mm. long; mature capsule 4-6 mm. long.
      - 4a. *P. Rusbyi* var. *Ellisiae*: calyx in anthesis 6-10 mm. long, in fruit 8-12 mm long; mature capsule 7-9 mm. long.
      5. *P. Parryi*: calyx efarinose; corolla-tube equaling or only slightly exceeding the calyx.
        - B. Apex of leaves not subtruncate, not dentate; not Californian. Plants 1 dm. or less tall; inflorescence 1-3 flowered, not umbellate.
      6. *P. angustifolia*: involucral bracts 1-4 mm. long, subulate, inconspicuous; plants 1-4 cm. tall; 1-rarely 2-flowered.
      7. *P. Cusickiana*: involucral bracts 4-7 mm. long, not subulate, conspicuous; plant 5-10 cm. tall; usually more than 1 flowered. Leaves lanceolate to oblong-lanceolate, acute or obtuse, widest near the middle, comparatively thick; capsule ovoid; stylo-podium absent or poorly developed in anthesis.
      8. *P. Maguirei*: Involucral bracts 4-7 mm. long, not subulate, conspicuous; plant 5-10 cm. tall; usually more than 1 flowered. Leaves spatulate, rounded at apex; broadest above the middle, comparatively thin; capsule cylindrical; stylopodium well developed in anthesis.

A renewed interest in American primulas has prompted the American Primrose Society to reprint this important reference. Pages of the original journal have been photographed from the copy provided by Dr. Arthur R. Kruckeberg, Department of Botany, University of Washington.

Dr. Kruckeberg was asked if *P. cusickiana* has been found in Washington. "P. cusickiana does not have any known

Washington (Blue Mts.) localities that I could find in our herbarium," he responded. "Its range is from Central Idaho (Seven Devils Mts., etc.) across Hell's Canyon to the Wallawas. However, it does seem logical that it should occur in southeast Washington."

Following are the pages of Williams "Revision of the Western Primula:"

1. *PRIMULA SPECUICOLA* Rydb., Bull. Torr. Bot. Club 40: 461. 1913.

Leaves spatulate, narrowed to the subpetiolar base, membranaceous, sinuate-dentate, 4-13 cm. long, 0.7-2 cm. broad, farinose to efarinose below; scape 1-1.6 dm. tall; involucre bracts 4-10 mm. long, lance-attenuate, dorsally thickened but slightly gibbous at the base; yellowish corolla-tube 8-10 mm. long, its violet limb 6-10 mm. broad; capsule usually overtopped by the calyx-lobes.

Southeastern Utah, canyons and bluffs.

UTAH: Bluff City, July 12, 1895, *Eastwood 68* (M); Bluff, May 28, 1919, *Jones* (P); Moab, June 7, 1913, *Jones* (P, F); damp sandy soil under overhanging cliff, Cottonwood Canyon, Bluff, San Juan Co., June 26, 1932, *Maguire, Richards, Maguire & Hammond 5122* (Utah, M); damp sandy bank of Horse Heaven Canyon, Cottonwood Canyon, Bluff, San Juan Co., July 2, 1933, *Maguire et al. 5133* (Utah, M); moist shady cliff, very established soil, July 2, 1927, *Cottam 2540* (BYU).

2. *PRIMULA HUNNEWELLII* Fernald, *Rhodora* 36: 117. 1934.

Leaves spatulate, membranaceous, more or less farinose below, 4-9 cm. long, 0.7-1.5 cm. broad, sinuate-dentate; scape 5.5-11.5 cm. high; involucre bracts linear-subulate, 2-4 mm. long, dilated or gibbous at the base; capsule overtopping the calyx. (Compiled. See plate 282 in *Rhodora* 36, opposite page 132, 1934.)

No material of this has been seen. The plate and Professor Fernald's statement show that it is closely related to *P. specuicola*. The outstanding characters given to separate the species from *P. specuicola* are a capsule overtopping the calyx and shorter calyx. Whether or not the characters are of specific value remains to be seen when abundant material is available. Miss Eastwood's number 68 has capsules which are both longer and shorter than the calyx.

3. *PRIMULA INCANA* Jones, Proc. Cal. Acad. Ser. 2. 5: 706. 1895.

*P. americana* Rydb., Bull. Torr. Bot. Club 28: 500. 1901.

*P. farinosa* subsp. *cusarinosa* var. *genuina* Pax, in Engler's Bot. Jahrb. 10: 199. 1905, in part.

*P. farinosa* var. *incana* Fernald, *Rhodora* 9:16. 1907.

Leaves oblong-ovate to spatulate, farinose beneath, shallowly denticulate, 1.5-8 cm. long, 0.5-2 cm. broad; scape 0.5-4.5 dm. high, strict; involucre bracts linear to linear-oblong, flat, broadly gibbous at the base; corolla-tube slightly exceeding the calyx (in one specimen seen much exceeding it); the limb 6-10 mm. broad, lilac; capsule only slightly exceeding the calyx.

Meadows, bogs and damp places, Mackenzie to Colorado and Utah. A few specimens from among many are cited.

MONTANA: moist meadows, Armstead, Beaverhead Co., June 20, 1920, *Payson & Payson 1735* (M, Ry); wet ground, mountain canyons, Deerlodge Co., *Blankenship 727* (M, P, N, F); Shite Sulphur Springs, Aug. 1893, *Startz* (M). WYOMING: sunny meadows, Rock River, June 30, 1913, *Macbride 2396* (M, Ry); Little Laramie River, *Nelson 3211* (P, F, K) and *1961* (M, Ry); Ft. Bridger, June 18, 1898,

*Nelson* (Ry); low meadows, north Pilot Butte, July 1, 1901, *Merrill & Wilcox 749* (Ry); wet soil, Adam's Ranch, Jackson Hole, July 14, 1901, *Merrill & Wilcox 990* (Ry); damp soil, Hot Spring Bar, 20 mi. south of Jackson, July 19, 1901, *Merrill & Wilcox 1039* (Ry); Big Piney, June 11, 1931, *Murie 133* (Ry, Murie); Bernt Fork, Uinta Mts., July 30, 1935, *Cottam 6143* (F); in a bog at Red Buttes, July 6, 1896, *Greene* (ND). COLORADO: Wet Mt. Valley, 1873, *Brandege 378* (M); Gunnison, July 7, 1901, *Baker 361* (M, P, O, Ry); Leadville, *Schedin & Schedin* (Ry); wet meadow, West Cliff, June 24, 1917, *Johnston & Hedgcock 859* (Ry); Walden, 16 mi. mt. road to Steamboat Springs, Aug. 1, 1917, *Johnston & Hedgcock 300* (Ry); Sapinero, June 20, 1898, *Wheeler 539* (Ry). UTAH: meadows above Tropic, Clay, Alt. 7000, June 28, 1894, *Jones 5312av* (P, TYPE).

4. *PRIMULA RUSBYI* Greene, Bull. Torr. Bot. Club 8: 122. 1881.

*P. serra* Small, Bull. Torr. Bot. Club 25: 319. 1898.

Leaves spatulate, obtuse, 1.5-4 cm. broad, 3-12 cm. long, entire or crenate with small calloused teeth, efarinose, glabrous to short glandular pubescent; scape 8-20 cm. high, erect or ascending; involucre bracts 2-4 mm. long, lanceolate-subulate, plain or falcate; corolla tube 9-10 mm. long; limb 1.3-2 cm. broad, purple; calyx in anthesis 4-5 mm. long, in fruit 5-7 mm. long; lobes 2-2.5 mm. long, acute or acuminate, farinose; capsule 4-6 mm. long.

Damp shaded hillsides and ledges. Southwestern New Mexico and southeastern Arizona.

NEW MEXICO: Mogollon Mountains, Aug. 5, 1903, *Metcalfe 399* (M, Ry); shaded hillsides, Mogollon Mountains, Aug. 1, 1881, *Rusby 252* (M). ARIZONA: Cave Creek Canyon, Chiricahua Mountains, July 25-Aug. 9, 1927, *Kusche* (P); n. side of cliff, Barfoot Peak, Chiricahua Mountains, June 25, 1907, *Blumer, 1539* (M, N, K, O); shade of rocks, Saucer Peak, Rincon Mountains, July 23, 1909, *Blumer 3290* (M, N, F, ND); damp ledges, Santa Rita Mountains, July 25, 1885, *Pringle* (M, F, ND); moist rock crevices, Rustler's Park, Chiricahua Mountains, June 18-19, 1930, *Goodman & Hitchcock 1179* (M, F); rocky summits, Carr Peak, Huachua Mts., July 16, 1909, *Gooding 214* (Ry).

4a. *Primula Rusbyi* var. *Ellisiae* (Pollard & Cockrell) comb. nov.

*P. Ellisiae* Pollard & Cockrell, Proc. Biol. Soc. Wash. 15: 178. 1902.

Leaves oblanceolate to spatulate, obtuse or acute, 6-15 cm. long, 1-2 cm. broad, crenulate with small calloused teeth, efarinose; scape 11-20 cm. high, strict or ascending; involucre bracts 2-5 mm. long, linear to lanceolate-subulate, plain or falcate; corolla-tube 9-12 mm. long; corolla-limb 1.6-2.5 cm. broad, purple, often with a yellow eye; calyx in anthesis 6-10 mm. long, in fruit 8-12 mm. long, lobes 2-4 mm. long, acute or acuminate; capsule 7-9 mm. long.

Moist crevices and ledges. Central, west central and north central New Mexico.

NEW MEXICO: in crevices of cliffs, "only place known," alt. 10,300 ft., Sandia Mountains, June-July, 1911, *Ellis 180* (M); top of Hillsboro Peak, Mimbres Mountains, Aug. 3, 1903, *Jones 455* (P); White Mountains, Aug. 1, 1901, *Wootton* (M, P, F, K, Ry); rock ledges, alt. 10,500 ft., Sandia Rim, June 29, 1930, *Castetter* (Ry); Sawyer's Peak, Black Range, July 7, 1904, *Metcalfe 1081* (M, P, F); Sandia Mountains, *Arsene & Benedict 16591* (F); Water Canyon, Magdalena Mountains, Socorro Co., July-August, 1910, *Herrick & Herrick 209* (F).

Similar to the species except for the greater length of the calyx-lobes and the larger size of the capsule. It is usually a stouter plant and the flowers are usually larger in size. Pax, Pflanzr. IV. 237. 1905, reduced it to *P. Rusbyi* but probably did not see material of it.

5. PRIMULA PARRYI Gray, Am. Journ. Sci. 34: 257. 1862.

*P. mucronata* Greene, Pittonia 3: 251. 1897.

*P. mucronata* var. *arizonica* Greene, l.c. 252.

*P. Parryi brachyantha* Rydb., Mem. N. Y. Bot. Gard. 1: 302. 1900.

*P. Parryi* f. *mucronata* Ckll., Torreya 15: 204. 1915.

Leaves spatulate-oblong to narrowly oblanceolate, obtuse or acute, often obscurely puberulent, 6-30 cm. long, 1-6 cm. broad, efarinose; scape 8-40 cm. high, erect; involucre bracts 3-12 mm. long; limb 1.5-3 cm. broad, deep red or purple in drying; calyx 7-15 mm. long, lobes 5-8 mm. long, lanceolate-acuminate, as long as the calyx-tube, glandular, usually purple, efarinose; capsule 7-11 mm. long, ovoid.

Moist alpine and subalpine meadows, forests, and cliffs. Montana to New Mexico, Nevada and Arizona along the high mountains. A few specimens from many are cited.

MONTANA: Trapper Peak, Bitter Root Mountains, August 31, 1921, Kirkwood 1245 (M); near Anaconda, Mt. Haggin, July 20, 1905, Jones (P); Darby, July 30, 1909, Jones (P). WYOMING: Ten Sleep Lakes, Big Horn Co., July 31, 1901, Goodding 446 (M, P, N); north side of Grand Teton, Teton National Park, July 19, 1932, Williams 897 (M, Ry); Surveyor Peak, Fremont Lake, Sublette Co., July 28, 1922, Payson & Payson 2828 (M, P, F, Ry); Medicine Bow Mountains, Albany Co., August 2, 1900, Nelson 7915 (M, P, N, Ry); eastern slope of Big Horn Mts., headwaters of Clear Creek and Crazy Woman River, July 20-August 15, 1900, Tweedy 3488 (Ry); Crazy Woman Creek, August 8, 1892, Buffum (ND). COLORADO: borders of alpine stream near the snow line, Middle Park, July, 1861, Parry 311 (M); Rocky Mountains, 1862, Hall & Harbour 379 (M, F); Mammoth Gulch, Tolland, Munz 3030 (P); Slide Rock Canyon, southern Colo., June 30, 1898, Baker, Earle & Tracy 238 (M, P, N, O); Argentine Pass, July 11, 1878, Jones 423 (P, ND); Little Ouray, Sept. 3, 1896, Greene (ND); Cameron Pass, 10,000 ft. July 15, 1896, Baker (ND). NEW MEXICO: Truchas Peak, August 8, 1908, Standley 4271 (M); Pecos Baldy, July 11, 1908, Standley 4271 (M). UTAH: La Motte Peak, Uinta Mountains, July 21, 1926, Payson & Payson 5003 (M, P, Ry); n. slope, Abajo Mountains, July 1-2, 1930, Goodman & Hitchcock 1379 (M, F); Fish Lake, August 10, 1894, Jones 5809 (M, P); American Fork Canyon, July 31, 1880, Jones 1393 (P, F); Silver Lake, Big Cottonwood Canyon, Sept. 30, 1909, Jones (P); Fish Lake, Uinta Mts., July 17, 1902, Goodding 1391 (Ry); Abajo Mts., August 17, 1911, Rydberg & Garrett 9711 (Ry); Mts. s. e. of Silver Lake, Big Cottonwood Creek, July 1, 1905, Rydberg & Garrett (Ry); American Fork Canyon, July 29, 1885, Leonard (K). NEVADA: East Humboldt Mountains, August 13, 1897 and July 27, 1900, Jones (P); Clover Mountain Range near Deeth, Elko Co., July 29, 1908, Heller 9214 (M); above timberline, n. slope Mt. Jeff Davis, August 26, 1933, Maguire & Richards 2732 (Utah); Ruby Mts., July 20, 1896, Greene [There are two sheets of this collection in the Greene Herbarium which are here designated as the type of *P. mucronata* Greene.] (ND). ARIZONA: San Francisco Peak, August 30, 1884, Jones 406 (P); Mt. Humphreys, July 28, 1883, Rusby 716 (M, F); San Francisco Mountains, June 30, 1923, Hansen & Hansen 4613 (M, N); Mt. San Francisco, July 1889, Greene [Two sheets in the Greene Herbarium are here designated as the type of *P. mucronata* Greene var. *arizonica* Greene.] (ND); San Francisco Mountain at 11,000 ft. July 12, 1910, Hill [Cotype *P. mucronata* Greene var. *arizonica* Greene] (ND); below snow, Thomas Peak, White Mts., July 15, 1910, Goodding 604 (Ry); alpine

stream, Thomas Peak, July 8, 1912, Goodding 1142 (Ry); Humphreys Peak of San Francisco Mountain, at 9-12,000 ft., August 7-10, 1898, Macdougall 407 (F).

This is the prettiest of the Rocky Mountain primulas and probably the largest native *Primula* in the United States. Occurring along moist cliffs and cold stream banks in the alpine and subalpine zones. It is the most common Rocky Mountain species. Nelson, Man. Ry. Mt. Bot. 373, 1909, says it is "A handsome plant but very rank smelling." The author has found it many times but has been unable to find a "rank smelling" specimen, on the contrary the slight odor that it does have is rather pleasing. A note on the type collection states that "the root is quite fragrant." The species is quite polymorphic, not only in the size of the plant and shape of the leaves but also in the size of the flowers, even on the same plant, generally the first flower to develop is much larger than the rest and may be twice as large as the last to develop.

6. PRIMULA ANGUSTIFOLIA Torr., Ann. Lyc. N.Y. 1: 34., pl. 3, fig. 3. 1824.

*P. angustifolia Helenae* Pollard & Cockrell, Proc. Biol. Soc. Wash. 15: 79. 1902.

Leaves lanceolate-spatulate to linear-lanceolate, obtuse, entire, 1.5-5 cm. long, 2-7 mm. broad, efarinose; scape 0.5-7 cm. tall; involucre bract 1-7 mm. long, occasionally 2 present, lanceolate, falcate; corolla-tube 5-8 mm. long; limb 1-2 cm. broad, purple or occasionally white; calyx 5-7 mm. long, lobes 2-3 mm. long, acute or acuminate, efarinose; capsule ovoid, 3-5 mm. long.

Rocky alpine summits and meadows, mountains of Colorado to n. New Mexico. The following specimens are selected from many.

COLORADO: Marshall Pass, July 19, 1901, Baker 498 (M, P, Ry); summit Pike's Peak, June 24, 1912, Churchill (M); Georgetown, June 28, 1878, Jones 333 (Utah, P); alpine meadows near Estes Park, June 21, 1929, Mathias 418 (M); mountains of Estes Park, July 22, 1903, Osterhout 2845 (O, P); rocky ground near top Mt. Corona, Gilpin Co., June 24, 1926, Palmer 31,307 (M); in granite land on the highest points of the Snowy Range, Middle Park, June 6, 1861, Parry 279 (M); West Spanish Peak, Alt. 2800-3000 m., July 6, 1900, Rydberg & Vreeland 5762 (Ry); Berthoud Pass, near Georgetown, Alt. 1200, August 16, 1884, Sheldon 270 (ND); Little Ouray Mt., Sept. 3, 1896, Greene (ND). NEW MEXICO: Pecos River, July 4, 1898, Coghill 40 (M, not characteristic); without exact locality, Sept., 1867, Parry 143 (M); vicinity of Santa Fe, Lake Peak, August 12, 1926, Arsene & Benedict 16145 (F); vicinity of Santa Fe, Lake Peak, July 15, 1926, Arsene & Benedict 15615 (F).

A small plant which usually bears but one flower on each scape, occasionally two, these vary as to size, if two are present they are generally smaller than when only one is present on specimens of a single collection.

7. PRIMULA CUSICKIANA Gray, Syn. Fl. N. A. ed. 2. 21: 399. 1886.

*P. angustifolia* var. *Cusickiana* Gray, Syn. Fl. N. A. ed. 1. 21: 393. 1878.

*P. Brodheadae* Jones, Zoe 3: 306. 1893.

*P. Brodheadae* var. *minor* Jones, l. c.

Ev. *Parryi* according to Pax, Pflanzr. IV. 237: 128. 1905 as to syn. *P. Brodheadae* and locality.

Leaves lanceolate to oblong-lanceolate, 2-5 cm. long, 4-8 mm. broad, efarinose; scape 3-9 cm. tall; involucre bracts 3-10 mm. long, lanceolate,

acute to subulate, falcate; corolla-tube 7.9 mm. long; limb 9-14 mm. broad, purple when dry; calyx 5.9 mm. long, obtuse to subulate, farinose to efarinose; capsule ovoid, 4.6 mm. long.

Moist meadows, eastern Oregon and adjacent Idaho.

OREGON: heavy soil, alt. 4000 ft., early spring, 1881, *Cusick 360* (F); stony swales, eastern Oregon, April 13, 1898, *Cusick 1832* (P, M, ND). IDAHO: Ketchum, May-June 1892, *Brodhead* (P, Type of *P. Brodheadae*); Bayhorse, July 1, 1892, *Brodhead* (P); east of Boise, in 1883, *Cleburne* (P); Boise City, Feb. and March, 1886, *Solt* (F); near Boise, in 1916, *Gageby* (Ry); Boise, May 10, 1910, *Sawyer* (Ry); Boise, March 3, 1908, *Miles* (Ry).

Pax, l. c., reduced to *P. Brodheadae* to *P. Parryi* without question but from citation of specimens he apparently did not see material of the former. Perhaps it was placed here because of Jones' allusion to *P. Parryi* in his description and also in that of var. *minor* (which Pax failed to account for), that the latter might be a variety of *P. Parryi*.

#### 8. *Primula Maguirei* sp. nov.

Folia late spatulata, integra vel undulata, ad apicem rotundata; caulibus 4-10 cm. longis, gracilibus, 1-3-floris; bracteis involucri plerumque 2, lanceolatis aut lanceolato-subulatis; tubo corollae 9-11 mm. longo, limbo 14-25 mm. lato, lobis obovatis, emarginatis; filamentis 0.5 mm. longis; calyce 5-6 mm. longo, lobis 2-3 mm. longis, lanceolatis, obtusis vel acutis; capsula cylindrica usque ad 5 mm. longa.

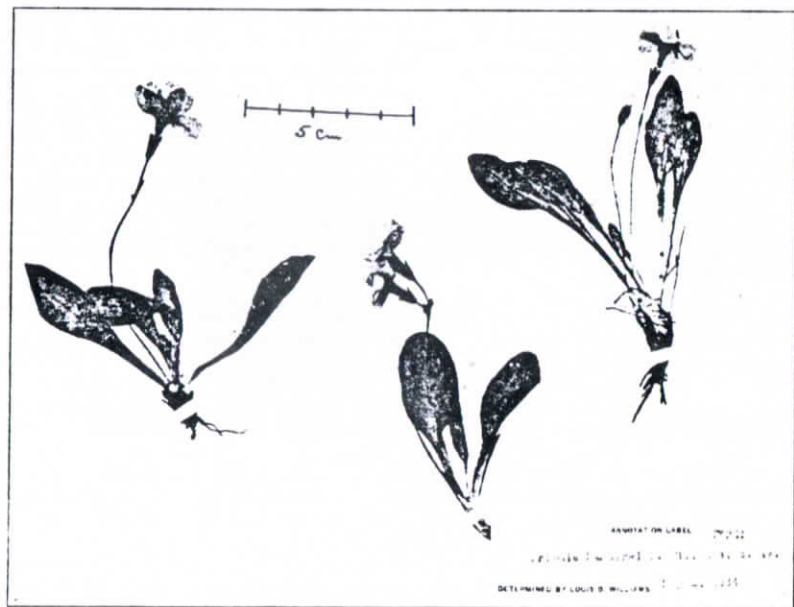


Fig. 1. Part of type specimen, *Maguire & Maguire 3650*, in Herb. Mo. Bot. Gard. x2/5.

Leaves broadly spatulate, attenuated into a winged petiole, entire or slightly undulate, rounded at the apex, 3-7 cm. long (mostly 5-6 cm. long) 8-12 mm. broad; scape 4-10 cm. long, slender, 0.7 mm. thick, bearing one to three flowers; involucre bracts usually two, the larger one 4-7 mm. long, lanceolate to lanceolate-subulate, the smaller 1-3 mm. long or vestigial, flat or falcate; corolla-tube 9-11 mm. long, about twice as long as the calyx; limb 14-25 mm. broad, lobes 6-10 mm. long, 4-5 mm. broad, obovate, emarginate, red or purple when dry; anthers 1.7 mm. long; filaments 0.5 mm. long; calyx 5-6 mm. long (to 9 mm. in fruit), the lobes 2-3 mm. long, lanceolate, obtuse or acute, farinose on both surfaces, not densely so; capsule cylindrical, 5 mm. long; stylopodium well developed and conspicuous on immature capsule; seed unknown. Fig. 1.

Wasatch Mountains of northeastern Utah.

UTAH: damp overhanging rocks, ledges and cracks, east exposure, 5 miles up Logan Canyon, Cache Co. Elev. 5500 ft., April 19, 1932, *Maguire & Maguire 3650* (M, Type, Utah); rocky slope, north exposure, 1 mile up Logan Canyon, Cache Co. Elev. 4800 ft., May 6, 1932, *Gerber 3650a* (Utah); n. exposure, Logan Canyon, Cache Co., Elev. 4400 ft., May 16, 1932, *Burke 3651* (Utah); under damp cliffs, lateral draw 4 miles up Logan Canyon, Cache Co., May 28, 1933, *Muenschler & Maguire 2399* (Utah, M); cliffs, Logan Canyon, Cache Co., May 10, 1911, *Aldons & Owen* (Ry); moist crevices in cliffs 3 miles up Logan Canyon from the University, Cache Co., Elev. 5500 ft., May 27, 1935, *Williams 2149* (M, ND).

This species is most closely related to *P. Cusickiana*. It may be distinguished by the larger, spatulate comparatively thin leaves which are broadest above the middle; the corolla-tube is twice as long as the calyx in contrast to as long or less than twice as long in *P. Cusickiana*; in anthesis the well developed stylopodium in contrast to a poorly developed or absent one. The capsule is cylindrical not ovoid. Polymorphism is well illustrated in the flowers of this species. When only one flower is borne on each scape it is comparatively large, if two are borne they are as a rule both smaller than in the former case and the first to develop, which is on the side toward the larger bract, is larger than the second one which is opposite the smaller bract, in case three flowers develop the size is smaller in each successive one to appear and generally the corollas are smaller than in both the former cases.

#### 9. *PRIMULA SUFFRUTESCENS* Gray, Proc. Am. Acad. 7: 371. 1868.

Leaves cuneate-spatulate, 3-8-toothed at the subtruncate apex or sharply serrate half the length, 1.5-3 cm. long, 4-12 mm. broad below the apex, efarinose; scape 3-13 cm. high, from a suffruticose base; involucre bracts 2-6 mm., lanceolate-subulate, flat or falcate; corolla-tube 5-8 mm. long; limb 14-22 mm. broad, red to purple; calyx 5-7 mm. long, lobes 2.5-4 mm. long, lanceolate to broadly lanceolate, acute, efarinose; capsule ovoid, 5-6 mm. long.

Rocky slopes and summits, high mountains of east central California. A few specimens from the many at hand are cited.

CALIFORNIA: Mt. Whitney, August 15, 1904, *Culbertson 4523* (P, M); Mt. Whitney, August 15, 1904, *Culbertson 4524* (ND, F, M, P); east slope of Mt. Anderson, Placer Co., August 1895, *Sonne* (M, P); Mt. Stanford, July 1886, *Sonne* (ND); mountain above cold stream, Placer Co., *Sonne 214* (ND, F); summit, Sierra Nevada Mountains, July 26, 1900, *Jones 6441* (M, P); Sept. 23, 1882, *Pringle* (F); Castle Peak, Nevada Co., August 5, 1903, *Heller 7096* (M, P, Ry); western base, Mt. Whitney, Tulare Co., *Bacigalupi 1748* (P); Sierra Valley, 1874, *Lemmon 145* (M); on Cloud's Rest, in 1872, *Gray* (M); Kaiser Peak, Fresno Co., July 19, 1918, *Grant 1147* (M, Ry).



*P. nevadensis*

## Primroses in a desert state



by Margaret J. Williams

To the casual summer visitor traveling in eastern Nevada, the rather barren, bleak-appearing mountains separated by broad expanses of grey sagebrush or saltbush hardly appear to be the places to go looking for primulas.

Yet, high in those mountains, three species of *Primula* section *Parryi* are found. Although these are closely related from a botanist's point of view, they are very dissimilar to the eyes of a gardener.

### Rare endemics

Two of these, *Primula nevadensis* and *P. capillaris*, are rare endemics and grow in very remote places. A few people had been aware of the existence of these primroses for some time; however, it was only recently that botanists officially named them. The first species was described in 1967 and the second in 1974.

The third species, *P. parryi*, is better known and more widespread in its distribution. It is found in other states to the north and to the east.

### Inhabit cool coves

The Spanish name for our state, Nevada, refers to the snow covered mountains and gives a clue as to the reason these plants can exist in this seemingly harsh environment. Tucked away, near the peaks, are a few cool coves where these treasures are locally common.

The most beautiful of them all, *P. nevadensis*, is only known from limestone outcrops near the tops of the Snake and the Grant Ranges often in association with *Pinus longaeva*. Plants flowering in crevices of the bare rocks and dotted on gravelly slopes nearby are a never to be forgotten sight.

See *P. parryi*  
on page 3

*P. capillaris*



### Berry-colored flowers

Four to eight flowers, which are large for the size of the plant, are borne in an umbel at the end of a 4" stem. The pin-eyed flowers are slightly larger than the thrum-eyed ones. The flowers vary in color from a clear pale strawberry pink to a dull raspberry, and they have a farinose calyx. The toothed leaves are about equal in length to the flower stems and are somewhat erect.

The rarest of them, shy *P. capillaris*, is known only from the headwaters of a creek in the Ruby Mountains where it grows at the edges of an alpine meadow and on a gravelly north facing slope. This is the smallest primrose in the United States. It is less than 2" tall, and usually each stem bears a single violet-purple flower.

### Difficult to find

The name "capillaris" refers to its small, narrow, almost grass-like leaves and thin stems. Because of its size and habitat it is difficult to find. Someday it may be found in some other inaccessible, so far unexplored area.

*P. parryi* is the tallest and largest flowered of the three. Often it forms long swaths of purplish-red and bright green, its feet drinking in snow-melt in rocky draws. Plants also can be found in rock crevices, in meadows and along stream banks at high elevations. It grows in both the Ruby Mountains and in the Snake Range, but not in association with the other two primroses.

### Better from afar

From a distance these plants are very handsome, but up close they are somewhat sticky and rather unpleasantly mephitic. The little pikas which live on

the same talus slopes don't seem to be bothered by the odor; however, they don't make hay out of primrose leaves.

Although *P. suffrutescens* has not yet been found in Nevada, it seems as though it should grow there. It is frequent high in the Sierra Nevada just west of the Nevada-California state line, on granitic talus slopes, snow-bound in winter. There are similar habitats in Nevada. Why doesn't it grow in one of them?

### Form huge mats

These stunning plants form huge mats, their spaghetti-like roots thrust deeply under the rocks. Their rich rose-red flowers are a sharp contrast to the glossy green, toothed basal leaves.

These lovely plants are at their best in the wild. I know of no one who has successfully cultivated the two rarest ones, although expert gardeners have tried. The only possible way they might be grown would be from seed. *P. parryi* should not demand shade in culture because it grows on the most exposed aspects of the peaks, but the finest specimens are found where they have partial shade, coarse gritty soil and roots in fast running water.

### 'Pitiful' in pot

*P. suffrutescens* apparently grows readily from seed, but a feeble specimen entombed in a pot is a pitiful sight. If you can allow your plants to grow with abandon on a talus slope, you are very fortunate indeed.

If you are ever fortunate enough to see them growing in the wild, I feel sure that you would want to leave them there.

Margaret J. Williams, Box 1530, Sparks, Nevada, 89431, is a leader of the Northern Nevada Native Plant Society and a schoolteacher.

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*P. angustifolia*

## Finding *P. angustifolia*

### by Louise Lucas

While attending an Audubon conference two years ago this June at Estes Park, Colo., my husband, sister and I decided to take a look at alpine flora as well as birds. Fortunately for us and unfortunately for skiers, the snow pack that year had been rather light. The alpine flora was coming out about a month ahead of time. At the 12,000 foot level the snow was melted enough even that first day to see mats of alpiners beginning to bloom.

One of my greatest desires had been to go to the Rocky Mountain National Park to see the alpiners, so I was thrilled all the time. One of the first things I saw was a purply-pink primula. I knew it was not either of the two I had seen before, *Primula parryi* and *Primula ellisiae*.

### It was *angustifolia*

Rae Berry and I had looked one year for *Primula angustifolia*. However, our luck was not in and we failed to find it. This time I knew it almost as soon as I had time to examine it. Later I checked it out. It was growing in mats of drabas, *Phacelia sericea*, and — one of my thrills of a lifetime — *Eritrichium elongatum*. This, too, I had yearned to see in the wild.

I remember Mrs. Berry's telling me that at the 11,000 and 12,000 foot level in Colorado it was growing by the wayside. Bob and I had failed to find it on a previous trip to the high passes of Colorado because too much snow remained. This time we were lucky. All the lovely tiny alpiners were starting to bloom.

### True alpine

*Primula angustifolia* is a true alpine and reminds one a little of *Primula minima* of

the Alps. It has much larger leaves, however; but the flower is much the same in color and habit.

The leaves seem to be leathery, and the plant was entwined in mats of eritrichium and drabas, thriving that way. Perhaps we could learn a lesson from that instead of planting rarities in splendid isolation. I believe plant association is important.

The soil at this elevation is very thin and is mostly broken rock with a thin covering of soil. Drainage is perfect, and yet there is plenty of moisture below. When we saw these plants, they were really very wet. The soil may be slightly limy here too.

### Protected in park

Fortunately these little charmers are somewhat protected by being within the confines of Rocky Mountain National Park. One may photograph them and look, but rules are strictly enforced. Possibly one could collect seed if he were there at the proper season. That would be the best way to preserve the plants.

The scenery is gorgeous and the road through the park goes right through these alpine meadows. Among other plants growing there besides *Phacelia sericea* was a woolly alpine form of *Syntherisma missouriensis* at a guess. No one seemed to know, and none of the books list it. I have seen an alpine form in the Wallows, but it was not like these.

Many other plants were there which would bloom later, but for us the primula and the eritrichium in both blue and white forms were an indescribable thrill. I hope many others will see them and be as pleased by their beauty as we were.

Louise Lucas, 392 Holder Lane SE, Salem, Ore. 97302, is a long time member of the primrose society who served her apprenticeship under the late Rae Berry.

## How not to find Cusick's primrose!

by Roy Davidson

This is a story of persistence and surprise. I was with Jim MacPhail and Bob Woodward in June 1971 when we attempted to find *Primula cusickiana* over in the Wallowa country of northeastern Oregon; Jim was most persistent and all three of us were most surprised!

The most concise directions to a station for it read: "3 miles south of Target Springs." I had scanned all available detailed maps (with a hand-glass) and found no such place indicated. We stopped with the U.S. Forest Service people to see if they could tell us. They couldn't.

### Go east, young man

Someone thought if we turned eastward off the Upper Little Sheep Creek Road

we'd find the place. So we did, running down every little spur road along the top of the ridge in order to leave no spring untried.

This late wet season snows and recent rain had left the stony ridge one huge springy seep. We had searched a lot of likely places but had found no primula when a rancher came by in a four-wheel drive. Jim quizzed him as to Target Springs.

He thought it was "that way" (north). Since that was the one area we'd not been to yet, we sloshed on our way through standing water and a few chancey mud-holes. We finally came to rest, stuck in one of them right in the road!

### Scene in the Wallowas



*P. cusickiana*

### Finding it — and how!

We'd been too busy scanning the road itself to notice a forest service sign. When we got out to push the car out of the mud, we discovered that Target Springs was what we were stuck in!

After we were out, Jim carefully measured three miles back the way we'd come, which put us right where the rancher had told us to go north! We searched anew; if the plant were here, it had certainly made itself inconspicuous as soon as it had flowered.

Bob insisted there is no such plant.

I wouldn't be that definite. Alleyne Cook found it "right there" and had had no trouble.

### Wrong season

We could only have been too late so that even the leaves and capsules had disappeared in a brief dry, warm period, followed by snow and more rain. Mid-June is said to be its flowering season at this elevation (6000 feet).

*Primula cusickiana* is more like a dryland dodecatheon in its growth, soaking wet for a couple of months, then dry until the following spring. Freezing comes

early to the ground here, and thawing comes no earlier than May, some ridges retaining drifted snow even until July.

### Just inaccessible

I am convinced that it is not so infrequent as is supposed. We found it in dry capsule in mid-August over at Hat Point (6982 feet) on the rim of Hell's Canyon. It occurs also across Hell's Canyon in the Seven Devils at mid-altitudes and also further east, toward Sawtooth country, both in Idaho. The difficulty is the inaccessibility of these places at its flowering season. Cusick himself wrote that it flowered "very early, in wet rocks."

If anyone happens to be in that part of the world in June and gets stuck in a mud-hole, he should search around for Cusick's primrose. The other stations recorded for it read: "headwaters Little Sheep Creek" and "divide between Big and Little Sheep Creeks" — all of which could conceivably be this specific place. Roy Davidson is Seattle's well-known amateur botanist. He kindly allowed us to reprint this article and added the following observation: "We went back the following year and with better luck found a little gully-side with a few plants past flower and also located a solid square-yard of violet flowers up where sheep couldn't reach them on a little knob of basalt. When we returned for seed, we found the entire area had been blasted away for ballast with which to fill the mudholes in the roads!"



lie Wagner's *P. rusbyi*

Western American primulas are not fully civilized. *P. suffrutescens* has a reputation for growing but rarely flowering. *P. ellisiae* promises to be more agreeable. A beautiful specimen was shown by Reba Wingert in Victoria this year. Herb Dickson has it flowering in Chehalis in June. *P. rusbyi* blooms in early summer in Pacific Northwest gardens and is usually the easiest to grow. *P. specuicola*, from moist areas under cliffs in southern Nevada, carries an inborn determination to survive and bloom. A large member of the Farinosae Section, it is a welcome addition to primulas in cultivation.

Reba Wingert's *P. specuicola*



*P. suffrutescens* on Ellis Peak near Lake Tahoe

## Taming the wild west

Reba Wingert's *P. ellisiae*



## B.C. alpine garden show features American species

The primula section of the Vancouver Island Rock and Alpine Garden Society show on April 20 and 21 was dominated by two beautifully grown American primulas shown by Reba Wingert of Victoria.

Primula ellisiae from New Mexico won best primula and best North American alpine plant. Mrs. Wingert's entry of Primula specuicola (from moist screes under cliffs of southern Utah) also was a rare treat for devotees of the American native species. Ian Hamilton took best polyanthus with a cream yellow—a solid cushion of flowers. Best miniature garden by Marion Espin contained, among others, an excellent P. farinosa and a dark P. rubra hybrid. Her entry measured about 18 inches by 24 inches.

A superb orange double acaulis was shown again this year by Mrs. Wingert. Diane Whitehead's clear pink double acaulis was second due only to too few open flowers.

### Popular Jay Jay

Jay Jay, the deep red juliana jack-in-the-green, was the most frequently shown variety. Mrs. Wingert's huge purple garden auricula dwarfed all others in the class. Two exhibitors brought plants of Mrs. Rae Berry's old white edged auricula, Snow Lady. Sybil McCulloch's Snow Lady entry was judged best show auricula.

An entry of four garden auriculas by Eugene Myles included a large double yellow with rather pointed petals. The

Myles entry in a class of six julianas—Schneekissen, Lady Greer, Kinlough Beauty, Jay Jay, Lavender Cloud and a cowichan x juliae was outstanding.

### Melody was there

Of special interest was a plant of Melody, a British yellow self show auricula. It was exhibited in the University of British Columbia display.

The entries of alpine plants, bulbs and dwarf conifers make this the outstanding show its kind in North America.

The usual lovely display of Emily Sartain's botanical watercolors added a tasteful note to the show. Miss Sartain will do paintings to order and can be contacted at 18-1030 Cook St., Victoria, B.C. V8Y 3Z8.

Watercolor by Emily Sartain



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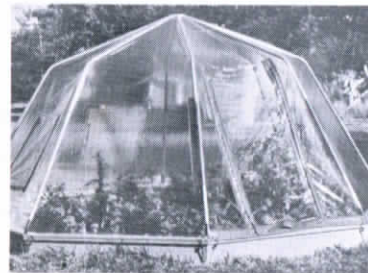
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# Spring primrose shows

by Cy Happy

The national show at Beaverton Shopping Mall in Oregon was highlighted by a lovely floor planting at one end and alpine pans and miniature gardens at the other, the latter a most welcome addition.

Margaret Obersinner was sweepstakes winner. She was awarded seven trophies and won best plant in show with a red cowichan.

Many fine plants were displayed, and the public saw a full range of primulas. The auricula and gold laced polyanthus classes were quite weak, and some unusual decisions were made.

## Judging problems

The Haddock Trophy for best seedling alpine auricula was awarded to a two-blossomed gold center with the pistil or pin hanging out beyond the anthers, which normally would have automatically disqualified it. Correctly, when owner Fred Held discovered the error, he withdrew his plant from competition.

The Bamford Trophy for best show auricula seedling was given to a grey edge. In the APS point score, Ross Willingham and I could not give it over 50 points out of a possible 100. The rules approved by Bamford and Haysom say a plant must receive at least 75 points to get even a white ribbon.



Winner



Passed over

## Photos show flaws

These were photographed in black and white and color, as was the gold laced polyanthus. The photos of the gold laced polyanthus show the winner, a coarse specimen with smeared center, and the passed-over plant, a very respectable one shown by James Menzies.

I remember how much planning went into establishing the point scores in 1955. Among others, John and Win Shuman, Ralph and Evelyn Balcom, Florence Bellis, Dale Worthington, Mrs. Karnopp, Mrs. O. Miller Babbitt, Ella Torpen and I were deeply involved in getting them just right. The old growers in England laid down the rules, and we swore to abide by them when showing their cherished plants.

These plants are a challenge to the grower and hybridizer to get them as close to the ideal as possible. The standards should never be allowed to slip; and APS judging rules, not local rules, must prevail if the national trophies are to be awarded to worthy plants.

## 'Glorious heritage'

The British system, which uses just one judge, always a non-exhibitor, has its merits as long as the judge is above influence and in full possession of all his faculties. To quote Mrs. Babbitt (1954), "Those old florists handed down to us a glorious heritage. How have we used it?"

Judging has its bad moments. In Tacoma this year the best acaulis started pushing up a polyanthus stem the second day — in full view at its position on the trophy table. The pubescens hybrid which I awarded a first in Victoria started to sag and drop its blossoms just after the judging. Goodness knows how it looked the second day!

## Review decisions

Judges should always review their final decision with the point score, or someone may do it for them. President Menzies is appointing a committee that will approve or disapprove judges' choices for receiv-

ing national trophies.

The Tacoma show, early as it was (March 31-Apr. 1), was still the largest show. Juliana hybrids did well this year.

## Tacoma winners

George Carty again took sweepstakes, showing a wide array of large polyanthus and acaulis. His seed comes mostly from a member, Allan Goodwin, of Tasmania.

The Fred Clarkes were runners up. They showed an outstanding plant of *P. rosea alba* with five bloom stalks. The John Skupens prepared a brilliant solid purple floor display using Wanda. Floral arrangement classes were full this year, thanks to the continuing efforts of Lou and Jim Herman.

Tacoma used the new schedule published in the last issue. It worked very well. A good suggestion was that the last section in each horticultural division be "seedlings as above." A few other minor revisions and it will be very good indeed.

## Washington State show

The rather late date of Washington State Primrose Society's show at Burien (April 28-29) brought out a nice display of the later-blooming species. Especially nice was a *P. polyneura* x *P. sieboldii* hybrid shown by Ross Willingham, who also won sweepstakes. To me it was more appealing than either parent.

A lasting impression was made by a pure white, green-eyed seedling juliana hybrid. This one looks really good. Congratulations, Fred and Helen Clarke.

Donna Pierce had a most unusual semi-double brown polyanthus— really brown with a feathering of yellow on the edges. The sales table was enhanced by many of Rosetta Jones' double acaulis.

# I have a question!

## Answers by Alice Hills Baylor

### Q. What fertilizer is safe to use on seedlings? Mature plants?

A. In my experience only a very mild solution of any good fertilizer should be used on seedlings. For mature plants one needs a well-fertilized soil. For a small amount: two parts soil, one part sand and two of either soaked peat or compost. To a bushel of this mixture add two ounces of commercial fertilizer rich in phosphate and nitrogen compounds. Mix well.

This is a good mix to use when dividing after blooming. For preparing for winter, a good fertilizer is one lacking in nitrogen, an 0-10-10. The composition of the soil needs more compost. If a handful of soil is squeezed and released and then falls apart, it is of good friability. Much has been written on soil fertility. A good article to consult was written by James Menzies in the fall 1977 quarterly.

### Q. What are the heat and drouth tolerance of the asiatics? Approximately at what temperature do they flag?

A. A great deal depends upon the wind factor. I have had candelabras wilt at 70 degrees in a harsh dry wind. That is why a wind screen is always suggested for primulas. They are affected by the "mini-climate." If one is planning a large planting of asiatics, it is wise to plant a few in several places to learn which is the best location. Then, too, a moisture-holding soil is important. Where there is natural moisture (brookside), they will endure greater heat. Another reason for wilting is the effect of tree and shrub roots' taking the moisture from the soil. Good drainage is paramount. Stagnant water will cause lack of oxygen at root level.

### Q. Is it possible to reprint articles of early descriptions?

A. If readers will make specific requests, the editors will be glad to put them on a list of "things to do."

### Q. Can you advise me whom I might contact (in Ohio) about old and anomolous forms?

A. There are 14 members on the APS memberships list from Ohio. Dr. Ralph Benedict is nearby in southern Michigan. There are two garden centers in Cleveland and Mansfield. You should write to Mrs. Ruth Huston, Gig Harbor, Wash., as she is chairman of the round robins. The editor has pollinated jack-in-the-green and hose-in-hose, and he may have a little extra seed.

### Q. Can auriculas be crossed with plants in the vernaes group?

A. No.

### Q. What other plants are in the family and not called primula.

A. Several genera in the Northern Hemisphere are members of the primulaceae group, including omphalogramma, cortusa, androsace, dodecatheon, douglasia, soldanella, trientalis, steironema, samolus, lysimachia, glaux, cyclamen, anagallis. They are characterized by bisexual regular flowers with five petals more or less united, one celled ovary, many seeds, one style, dihiscent. Of course, acaulis, polyanthus and auricula all are primulas—as are 161 others that are listed in Hortus, not counting all the varieties.

### Q. Why do we say "double primrose" and not "double primula"?

A. "Primrose" is the common name for primulas, and the plants are often referred to as such. The double polyanthus, acaulis and auriculas are all primulas.

Kris Fenderson has assisted with the following answers.

### Q. How real are the differences between *P. rusbyi* and *P. ellisiae*?

A. They are closely related but appear horticulturally distinct. The single most important feature of differentiation is the relative length of corolla tube and size of calyx. The calyx of *P. rusbyi* is small, only 4-8 mm. long, and the corolla tube exceeds it in length by two or three times. In *P. ellisiae* the calyx is longer, 7-13 mm., but the corolla tube is only once or once-and-a-half times as long as the calyx. In cultivation *P. ellisiae* seems to flower considerably earlier than *P. rusbyi*. *P. rusbyi* likely has a much wider distribution, having been observed in both New Mexico and Arizona. It may also occur in Nevada; and it does occur, as I recently discovered, in Mexico.

### Q. What public gardens in America feature primulas? Especially species?

A. Few gardens in this country feature a display of primula species. *P. denticulata* and *P. japonica* have been used at Wintherthur in Delaware. University of British Columbia botanical gardens at Vancouver feature many primula species. Butchart's Gardens at Victoria, B.C., is adding more primulas. The most impressive is the garden of the late Mrs. Rae Berry in Portland, Ore., which is now or soon will be made public. It is renowned for its collection, particularly of a naturalized planting of *P. rosea*.

### Q. Why has omphalogramma been split off from primula?

A. Omphalogramma was included in primula before 1928. It has a single flowered scape and no floral bracts, asymmetrical flowers, a six (rather than five-part) corolla and seeds with configurations quite different from those of primula.

### Q. In what sections of the country are plants such as *petiolaris* being grown?

A. Petiolarid primulas have been grown to some extent on both east and west coasts. They are all being grown as an alpine house plant. Of this diverse and often spectacularly beautiful group of 50 Chinese and Himalayan plants only *P. edgeworthii* (often called *P. winteri*) and its white form are grown with any regularity.

## How to get uniform plants

by **Ralph Benedict**

Many times a person has plans for a bed or row of polyanthus primroses. He expects to see them all in bloom at the same time, a blaze of some select color — vigorous plants with tall strong even stems.

The gardener buys the seeds or plants his own seed from a mixture of several plants. The next spring he is disappointed.

### Disappointment

The plants bloom a few at a time. Colors may not be good. Some plants have tall stems and some have short ones. Some plants are weak.

This sad experience happens because the genetic background of the polyanthus is made up of several species that vary in size and many other factors.

### Use one pod

To solve this problem, you can raise all the plants for each bed, row or group from one seed pod—or, at the most, from one seed cluster.

The seed can come from a single plant

hand pollinated to a single plant, which is equal in size and vigor, from a fixed strain. For a blend of color use either an unfixed strain or two colors that will blend well.

I will give a true example.

### How it works

I have two plants, now 10 years old. One is red and one is yellow. Both are vigorous.

Crossing these, I get plants from cream to yellow, bronze through red. These colors blend well. They bloom together on foot-high stems on the first year's plants.

In later years the blooms are somewhat smaller and the stems are shorter. However, the plants are long-lived and vigorous.

By growing from one seed pod or cluster you can narrow the number of factors. The plants will be more uniform in all respects.

Dr. Ralph Benedict, the society's highly capable Michigan expert, is generous in sharing the results of his experimental projects. He lives at 14 Alpine Ct., Wilson Lake, Hillsdale, Mich. 49242.

### Q. To what extent do different sections of primula hybridize with one another?

A. There are few, if any, intersectional hybrids in primula, though the possibility is not excluded, especially between closely allied sections such as *farinosa* and *denticulata*. In fact, a few crosses have been recorded between *denticulata* and *rosea*. Others are *capitata/denticulata*, *reinii/cortusoides*, *soldanelloideae/muscarioides* and some of the small rarely grown Himalayan section.

Do you have a question? Ask Alice Hills Baylor, corresponding secretary, by writing to her at Stage Coach Road, Rt. 2, Stowe, Vermont, 05672. She will select questions to be discussed in her regular column.



## Making seed pellets

by **Earl Welch**

*You know the seeds are planted, but where? They're not in your hand. They're somewhere in the flat.*

*Strain your eyes, but chances are you won't find the seeds. Anchor them with sand, sprinkle gently with hot water, cover with a pane of glass and sit back to wait.*

*Fifteen days later patience and skill pay off. Oh, yes, you knew you planted them. Now you see where.*

*A whole colony of white specks is crowded in one corner, leaving the rest of the flat a virtual no man's land. Now comes the chore of moving these seeds out of the corner and into new quarters. It's a lot of work with a small toothpick.*

\* \* \*

This little scene isn't played at my house anymore. I've found a way to enlarge my seeds four times and color them white. When I plant my seeds, I can see them. When they take up residence in the flat, I can see where they are holed up and move them before they stake a claim.

I make each seed into a pellet. This how it is done:

### Pellet process

Pour your seeds into a small pin bottle. (Did the seeds cost more than the pills?) Half fill with warm water. Add one-half drop of dishwashing detergent. Put cap on bottle and shake bottle hard.

If you are going to freeze the seeds, now is the time to do it. Pop the bottle into the freezer.

If you aren't going to freeze the seeds, pour the seeds and water into a mush bowl lined with several layers of paper towel. The toweling will soak up the excess water, leaving the seeds quite wet. Pick up towel with the seeds stuck to it and move to the kitchen table. Place a fresh dry paper towel alongside.

With your fingertips roll wet seeds onto the dry towel. Roll the seeds around and around until they no longer stick to the towel.

### Add fungicide

Now sprinkle the seeds with the fungicide Captan and keep rolling with your fingertips. As you roll and roll them the seeds will become round and grow larger and larger. The moisture on each seed is gathering the Captan and forming a tight little snowball or pellet.

Stop rolling the seeds when the moisture on them refuses to pick up any more Captan. By this time your seeds will be at least four times larger, and they will be white.

### Seeds are inside

Set the seeds aside and let them air dry until you are able to handle the pellets without crushing them. Now you have seeds you still can't see, but plant the "snowballs" anyway.

Caution: plant these right away because your seeds inside the little snowballs sense the moisture.

Earl Welch, 15234 40th Ave. S., Seattle, Wash. 98188, is a grower of fine primulas. Sometimes he is a source of good gold laced polyanthus seed and double auricula seed.

## APS members choose officers

James Menzies, a retired soil scientist, has been elected to another term as president of American Primrose Society. Action was taken at the annual meeting in Beaverton, Ore., on April 7.

Also named for another term was Ethel Balla, vice president from Greenwich, Conn. New treasurer is G. K. Fenderson of South Acworth, N.H. New recording secretary is Ann Lunn of Portland, Ore.

Dues should be sent now to Fenderson. Back issues of the quarterly will be obtained from Mrs. Lunn.

Members were reminded to send change of address notices to treasurer. Quarterlies that cannot be delivered are returned, and the society is billed approximately 40 cents each.

Board members elected at the annual meeting include Ruth Huston of Gig Harbor, Wash., and Loie Benedict of Auburn, Wash. Helen Clarke, Tacoma, Wash., was named to fill the term of Dr. Ralph Benedict, who has resigned so he could spend more time on his garden research projects.

Menzies praised former treasurer Mary Speers for her "outstanding work." Her financial report showed a total of \$5,530 in the treasury, not including \$1,300 in the seed exchange account.

Seed exchange chairman Ross Willingham urged members to donate seed to save purchase costs. A call was made for seeds from Europe and Japan.

## American Primrose Society

### Officers

President: James Menzies, 765 Tenth Ct., Fox Island, Wash. 98333  
Vice president: Ethel Balla, 189 Taconic Rd., Greenwich, Conn. 06830  
Recording secretary: Ann Lunn, 3040 N.W. Parkview Lane, Portland, OR 97229  
Treasurer: G.K. Fenderson, Grout Hill, South Acworth, N.H. 03607  
Corresponding secretary, east: Alice Hills Baylor, Stage Coach Rd. Stowe, Ver. 05672  
Corresponding secretary, west: Gus Arneson, 1004 NW 179th Pl., Seattle, Wash. 98177  
Editor emeritus: Florence Bellis, 2835 N. Oar Ave., Lincoln City, Ore. 97367

### Directors

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|--|---|
| Mildred Washburn, Aloha, Ore. 1977       | Ruth Huston, Gig Harbor, Wash. 1979             |
| Helen Clarke, Tacoma, Wash. 1977         | Loie Benedict, Auburn, Wash. 1979               |
| Alice H. Baylor, Stowe, Ver. 1978        | Presidents of affiliated societies and chapters |
| Elizabeth Van Sickle, Sequim, Wash. 1978 | Cyrus Happy, Tacoma, Wash., editor, ex officio  |

### Membership

Dues of \$7 a year are payable Nov. 15. Membership includes four issues annually of the Quarterly, cultural chart and seed exchange privileges. Three years for \$20. Life membership, \$100; garden club affiliated societies, \$7 a year; library and horticultural societies, \$7 a year; second member in family, \$1 a year. Overseas members, \$7 a year; please send by international money order. Send dues to the treasurer.

### Publications

Back issues of the Quarterly are available. Order from the treasurer. Manuscripts for publication in the Quarterly are solicited from members and other gardening experts, although there is no payment. Please send articles and photographs to the editor's office, 11617 Gravelly Lake Dr., S.W., Tacoma, Wash. 98499. Advertising rates per issue: full page, \$60; half page, \$30; quarter page \$15; eighth page and minimum, \$10. Submit advertising to the editor.

### Seed Exchange

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Photos by Mrs. K. D. Wilkins,  
Toronto



It was December, 22 degrees F. outside and I had 70 pots of primrose seedlings in my dining room.

We had moved to Toronto, an eastern climate, from the mild western climate of Victoria, B.C., in August 1978. Now I had to think of a way to get these primrose seedlings—some of my own hand-pollinated cowichan strains in pink and rose and some *P. x pubescens* from the APS exchange—through the winter.

#### Had to plant

I couldn't resist starting them in September, using vermiculite as I always did and leaving them covered on the kitchen cupboard until they germinated. They had lived happily on the sunny window sill between the storm window and the house window for almost two more months.

## Primroses under lights

by Maedythe Martin

For light frosts the protection had been adequate, but lately it had begun to get seriously cold. With continuous frost at night the seedlings looked droopy and cold.

I looked around the basement and decided that a patio table three feet by five feet was about the size for a temporary greenhouse. I hung a four-foot fluorescent light underneath the tabletop and covered the whole table and floor underneath with plastic sheeting. The light, plugged into an automatic timer,

came on at 8 a.m. and turned off at 10 p.m.

#### To the basement

Down to the basement greenhouse went the 70 pots and some new auricula seedlings that also had appeared. These sat on the plastic, directly on the cement floor, in the hopes the roots would stay cool. I waited to see if this would be a suitable environment for my primroses.

The seedlings grew. A thermometer indicated the temperature at 7 a.m. to be about 58 degrees F. After a full day under the lights it registered 64 degrees F.

The atmosphere was on the dry side, but with no air circulation that seemed best. I watered the pots from the bottom by soaking them a few at a time in a tub. Most pots remained moist for more than a week.

Sometimes I used a hand sprayer in the "greenhouse" to add humidity. In February I made the day longer by two hours.

#### Primroses — and snow

By April I had 70 primroses transplants ready to go into the garden — and it was snowing outside. So the poor plants are still under the lights.

Now it's May, and I've been on holiday at the west coast, taking in the APS national show and others. I hear I've missed spring in Toronto; temperatures are already in the 80s.

How can I put primroses out to wilt in that heat? I wonder if they'd like to spend the summer in the cool basement—under lights.

Maedythe Martin, now at 1 Wellesley Ave., Toronto, Ont., Canada, M4X 1V2, is an ardent collector and grower of primroses. She's a British Columbia native, and some of her plants are boarding there with fellow members of the Vancouver Island Rock and Alpine Garden Society.

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# Diary of a Primroses

Another primrose season is winding down. A lot of not-too-hardy (or transplanted-too-late) varieties departed during the rather severe winter. The survivors, having proved their hardiness, are excellent subjects for hybridizing and distribution.

Auriculas are survivors. So are most juliana hybrids. Cowslips, oxlips, *P. amoena*, *P. abschatica* and garryards were unscathed. Many of the big polyanthus and acaulis hybrids failed. Most of the cowichans passed with flying colors. The general consensus is that *P. juliae* should be bred into the giant acaulis strains and *p. juliae* or *P. amoena* bred into the giant polyanthus for hardiness and spreading root habit.

## Successful study weekend

The 4th Northwest Study Weekend in Vancouver, B.C., was highly successful. A function of the American Rock Garden Society and the two British Columbia societies, the gathering drew plants people from across the continent to exchange information and get acquainted. Primulas were included in many talks.

I highly recommend that you plan to attend the 1980 gathering at the Empress Hotel in Victoria, B.C., on Feb. 29-March 1. Attendance is becoming of international significance. Details can be obtained from Sybil McCulloch, 5021 Prospect Lake Rd., RR 7, Victoria, B.C., V8X 3X3.

## Exciting seeds

Just received a bit of seed from our friend in Lithuania, Mr. Zilevicius. It is most exciting. *Primula woronovii*, which is closely allied to *P. vulgaris* subsp. *sibthorpii*, the colored primrose of southern Russia. Hope we can correspond with botanists who collect in the Caucasus and northern Persia.

One of Peter Klein's last requests was to cross *P. luteola* with *P. rosea*. Maybe this year it will be successful. Two pods are filling. Sure glad I gave a plant of the tiny yellow juliana to Alta Ryan. Got some back when I lost most of mine this winter.

Mrs. C. C. (Violet) Chambers has come up with a new form of doubling. Extra petals are produced from the rose-crown, the excess tissue around the tube in some primroses and polyanthus. Anthers and pistil remain intact. They are completely fertile.

## Identifying juliana hybrids

Which is the real cream, stalked juliana hybrid Dorothy? One is a thrum and superior. The other is a pin of less merit. To add to the confusion, Lady Greer, a similar plant with a slight peach cast to the flower and dark stems (a pin), can be almost undistinguishable from "pin" Dorothy. A Victoria member, Dr. Heimburger, reports he has pin Wanda from Toronto and thrum Wanda from Victoria. The time has come for an accurate and descriptive list of common juliana hybrids (and the better imposters).

Most of the members who hybridize vernaes are working more and more with the julianas. Rosetta Jones is adding juliana strains to her doubles. She brought a beautiful lavender blue double acaulis with darker center to the May Tacoma meeting. It was a second generation cross from Jay Jay, the popular juliana jack-in-the-green.

## Making fuel shortage a plus

The fuel shortage should challenge all primrosers to help each other, carpool to meetings, shows and gardens and exchange plants freely. Not only surplus primulas but food plants should be shared. Less gasoline means more time at home. Back to simpler pleasures. Start a telephone round robin in your region using the 60 per cent discount for long-distance calls on Saturdays. Remember, the old-time growers had great success without automobiles. Let's turn our fuel shortage into a plus.

An alpine greenhouse is a fuel saver too. Heat is seldom necessary, even when the temperatures dips well below freezing. One manufacturer who knows how to build an alpine house is B.C. Greenhouse Builders, Ltd., 7425 Hedley Ave., Burnaby, B.C., Canada, V5E 2R1. Not only does most of the roof open, but each side swings out too. It is all aluminum with stainless steel bolts and screws. Customs fees are offset by Canadian exchange in sales to the U.S. I'd like to hear from other manufacturers of alpine houses.

Another fuel saver is the sun pit. Utilizing the heat of the earth, it is a greenhouse roof. The rest of the structure is underground.

## Photogenic *P. tosaensis*

Editor's award for the outstanding, most photogenic and most out-of-the-ordinary plant at the 1979 national show at Beaverton goes to Japan native *Primula tosaensis*, shown by Margaret Mason of Portland. Its heart-shaped, thumb-nail sized leaves and dozen pink, white-eyed flowers on a two-inch stem were just about perfect. Reuben Hatch agreed that it was the outstanding horticultural achievement at the show. Margaret also displayed *P. takedana* and *P. sorachiana*, two tiny rare species from Japan. We'll feature them all in the coming issue.

Those interested in the western American primulas should welcome the 1936 Revision of Western Primulas and additions by Roy Davidson and Margaret Williams, who write from first-hand experience and are tops in the field. Providing this caliber of information raises the stature of the quarterly in the world of botany.

## Rare seed sources

Rare seed sources not mentioned for some time include Jack Drake, Insriach Plant Nursery, Aviemore, Inverness, Scotland, PH22 1QS, and W. E. Th. Ingwersen, Ltd., Birch Farm Nursery, Grevetye, East Grinstead, W. Sussex, England RH19 4LE, who just published "Ingwersen Manual of Alpine Plants at L8 "the best thing since Farrer" and Corvion Fils and Cie: Jardin Alpine "Floraire," 1225 Chene-Bourg, Geneve, Switzerland.

We still have Far North Gardens, 15621 Auburndale Ave., Livonia, Mich., 48154, in the capable hands of Karen Smith, but we have lost longtime owner and friend Bob Goplerud, who died in April.

### Important translation

Strictly for the botanists among us is the translation of V. L. Komarav's "Flora of USSR," Vol. 18 (primula starts on page 86), published by Israel Program for Scientific Transactions, Jerusalem, 1967, translated by N. Landau. I am fascinated by the subspecies of vernalis, among others, that have adapted to the harsh climates of the Caucasus Mountains, the Ural Mountains and Siberia. Seeing some of them in Dr. Heimbürger's garden — and his breeding program — in Victoria, B.C., was a rare treat.

The hottest item at the sale table at the Beaverton show was the mini-primrose two-inch acaulis and polyanthus in clear bright colors went like hotcakes. I wonder if they were from Thompson & Morgan seed.

### Thanks to advertisers

Way back in 1945 one of our advertisers was Mabel Hibberson of Victoria, one of the first American sources of show auriculas (\$2 a packet). Her old friends will be glad to know she is now at Box 39, Savona, B.C. (near Kamloops). She is not a commercial grower anymore, but she is still interested in her plants.

Still advertising with us after 30 years is Alpenglow Gardens, North Surrey, B.C. Mr. Michaud, the founder, was one of the most delightful men in horticulture. Loved people, loved plants, especially tiny alpines and auriculas, and was very, very French.

Advertisers who have left us with strains of fine plants are Vetterle & Reinelt, Pacific Strain polyanthus, Hubert and Marguerite Clarke, polyanthus and julies; McHenry's, Midas Gold polyanthus; Linda Eickman, Crown Pink and Warm Laughter polyanthus; Carl Starker, juliae hybrids; and, of course, Barnhaven and Florence Bellis, all kinds of primulas. Ortho product's (Chevron Chemical Co.) first ad appeared 24 years ago, a long record of support for APS.

### Fruit trees, friends, family

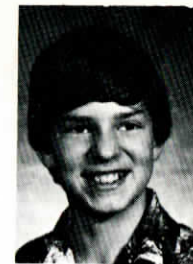
For those of you who have been planting primulas under semi-dwarf fruit trees, you should join N.Y. State Fruit Tasting Cooperative Assn., Geneva, NY, 14456. A \$5 membership includes a catalog of new fruits. The Geneva, NY, Agriculture Experiment Station is also the best source of scion wood of hundreds of foreign and very old varieties.

Been going through back issues of the quarterly with the help of the index prepared by the Baldwins. The information contained is fantastic. Where else could you find the best writings of Florence Bellis, Cyril Haysom, Ivy Agee, Ralph Balcom, Alice Hills Baylor, R. E. Kartak or Sacheverell Sitwell?

Our little Emily, now five months, complete with smiles, chuckles and twinkling blue eyes, is already learning about flowers—pretty colors, soft and cool, not for eating. Wonder how lasting these early impressions are?

Membership is growing nicely. Regular membership has passed 600, to which is added exchange, author, library and advertiser subscriptions and life memberships. Hope you bring in more. At the moment we are at the break-even point, but costs keep climbing.

## Beginner's Luck —with Tony



### What do primulas need in the way of soil?

Two things come to mind right off. Cool and sweet. Coolness is provided by moisture, shade and top dressing. The poorest soils can be made moderately suitable by putting an inch or two of top dressing spring and fall. I use old horse manure.

In the rockery the most difficult primulas are happiest on a shaded bank, sheltered by a rock which slopes in to trap the rain. There rock, bank, shade and moisture at the roots (not on the crown) give the best possible environment.

Many primulas prefer sweetness to an acid soil. Most of the Vernalis Section that I have seen in the wild were at home in their native limestone-based soil. You must study the area where species were found to determine their likes and dislikes.

Phosphate and potash should always be available, and any commercial fertilizer will supply reasonable amounts. Nitrogen is another problem. When growth starts in the spring, a little is necessary to get good leaves. If your plants have good foliage already, hold off on the nitrogen and let the phosphate and potash bring on the flowers. During the late spring lush growth period is the ideal time to give primulas a good all-purpose fertilizer containing nitrogen. A strong vigorous plant in summer will assure fine bloom the following spring.

I advise testing your soil with a home testing kit or through the local county agent. Whether your soil is sandy or heavy clay, humus will improve it. Remember, that as organic material breaks down, an acid condition may result. It should be checked and corrected when it does happen.

Cow and horse manure are excellent aids. Peat moss needs to be watched for acidity. Oyster shell is a good addition to keep soil sweet. It is sold by dealers of poultry feed.

Heavy clay soil will become open and friable by the addition of gypsum. Learn to be your own soil scientist.

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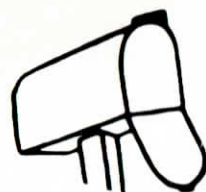
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## From the mailbox

I am a novice at growing primroses especially because of our hot summers. However, I've been having great success growing malacoides, obconica and sinensis fimbriata, along with some kewensis, for winter bloom in my cool greenhouse.

I also have some of my own plants on the north and east side in my outdoor garden. They should bloom this spring.

Evelyn Best  
105 Florence St.  
Lebanon, IL 62254

As a plant collector I have a special interest in the genus Primula, first because they thrive so well in my local climate, not unlike that of inland Scotland, and second, because it is a very interesting genus.

Sowing time can be as early as late September when weather here cools down—or even earlier with some species. But the boxes or pots will have to be kept at a shaded and cool northern aspect. Or one will have to nurse small seedlings through a long winter just above freezing point.

Kjeld O. Jensen  
P1. 1211A  
28040 Skanes Fagerhult  
Sweden

Many thanks for the auricula seed which is now germinating. We are now in our autumn, and the weather has been good for seeds and cuttings with cool misty nights and warm sunny days. Primula have done well in the garden this year; it has been a very wet summer, and no hand watering has been required, and there has been a marked absence of bugs.

About three years ago I was given a plant of P. forestii and not having a greenhouse at the time, I planted it out in the open garden in a vertical crevice and placed a limestone rock over the plant. I am pleased to say it has flowered and set seed ever since. P. rusbyi and P. ellisiae have both survived in the rock garden for many years but never set seed, as also P. viali. The fact that these primula species do not seed ensures their long life in the open garden is a subject which could well be worth further study.

I use a lot of peat in my garden and add fine gravel or sand and top dress the beds with clean soil or leaf soil annually. I have over the years grown a vast number of the

various primula sections and would place the auricula section as my favorite. They are more perennial and suit this climate best of all. My original plant of *P. marginata* is still happily scrambling through a prostrate juniper after 16 years. Each year I scan all the seed lists and apply for seed of *P. allionii*, *apennina* and *tyrolensis*, but no luck to date.

**Goldie Hamilton**  
Lora Gorge  
No. 2 R.D.  
Winton, New Zealand

I love all primroses and am planning on making beds of them in various areas in our garden, where hopefully they will be happy enough to stay and multiply. There isn't enough space to tell you about our garden. It is considered quite lovely—scented plants, the uncommon or unusual, species when obtainable, a look-into garden, wild garden, azalea and rhodo garden with paths leading to rustic benches, etc.

My husband has retired now and we are planning a small pool with water dripping from rocks above with ferns. He was given a greenhouse as a retirement gift. The prospect of adding primroses into some of these areas in the garden is enough to make my head swim.

**Catherine Huffman**  
5710 Spruce St.  
Burnaby, B.C.

At this time some primroses are coming into bloom. They are *P. x pubescens*, *P. capitata*, *P. julie* and *P. fauriae*. Last year I got *P. allionii*, *P. x bilekii*, *P. marginata* and *P. auricula alpine*, but I'm sorry I could not make flowers this spring. I'm sure I will see the pretty ones next year.

The book of Quarterly was sent to me from APS. It took 70 days for the book to reach here from Washington. I don't translate English into Japanese well, and so I need rather long time and effort to read through the Quarterly. I have just read your journal "Double Auricula = Double Fun" (Summer 1978). I'm going to give an account of the state of growing double auricula in the future.

**Tomohisa Arikawa**  
326 Koshibara  
Matsue, Shimane  
690 Japan

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# Primroses

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