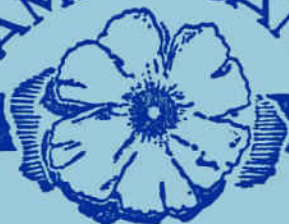


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of the

AMERICAN



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QUARTERLY

of the

AMERICAN PRIMROSE SOCIETY

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NOTES ON THE SECTIONS OF THE GENUS PRIMULA

Donald Neil O'Connell

PART TWO

Section Cuneifolia. This Section has now been placed among the Involutae as more material has become available for study. It is readily differentiated from the other Sections of this group by its wedge-shaped leaves, coarsely dentate at the apex. This is a small Section of only three species and three subspecies, all of which with the exception of *P. suffrutescens* Gray—are indigenous to the islands of Japan, with limited stations on the mainland opposite. The cuneiform leaves are fleshy, shiny, and efarinose. The scape exceeds the leaves and may show traces of farina just below the umbel. The flowers are borne on erect pedicles, which may also show traces of farina; they are of moderate size and vary from rich rose to red, with a distinct eye. One species, *P. nipponica* Yatabe, is white-flowered. The habit is tufted, with small, woody, branching stems. These may be semi-prostrate or erect. The Section Cuneifolia is an isolated one, its closest allies being probably among the Farinosae.

Only one species is now to be found in American gardens: *P. suffrutescens* Gray, the Sierra Primrose. It is found in sandy soils on rocks and open slopes in full sun in the Sierra Nevadas, from Plumas County to Tulare County and in Trinity County, at elevations of from 7000-13,500 feet. The branched rhizomaceous stems are thick, green, and woody, bearing thickly-crowded tufts of cuneate, sharply-toothed leaves from $\frac{1}{2}$ to $1\frac{1}{4}$ inches long, toothed at the apex and narrowing below to broad petioles. From the foliage tufts arise thin, 6-8 inch scapes carrying umbels of dark pink or red flowers about one-half inch in diameter, the lobes notched, with a sharp orange eye. It flowers in July. The plant is semi-prostrate in habit, forming shrubby mats, and is best in full sun with perfect drainage and moisture at the roots. Care must be taken that it is not over-watered in winter, for the rhizomes are then inclined to turn brown and rot. Increase is by layering or by seeds, which—if fresh—germinate well but are slow to develop blooming-sized plants. Division is not often feasible, as the plant forms crowns attached to a main stem, nor have cuttings been successful in the author's experience. This is a very decorative species but definitely among the more difficult members of the genus.

Two other species have, from time to time, been available to American gardens from Japanese nurserymen, and will probably soon be again so. These are *P. cuneifolia* Ledeb., subsp. *hakusanensis* Franch., and *P. nipponica* Yatabe. The former is a small, tufted plant, typical of the Section, with woody, branching stems and short, leathery leaves, more-or-less

evergreen. It bears umbels of rose flowers with an orange eye and is rather larger and looser in its habit than *P. suffrutescens*. *P. nipponica* is similar but larger in all its parts and bears white flowers. No hybrids occur in this Section.

Section Parryi. The species of this Section were included, in the 1928 arrangement among the Section Nivales, but the involution of their leaves and other features of their morphology—as well as their separate geographical distribution—suggest the rearrangement as a distinct group within the genus. All are native to North America and are in cultivation in this country, being reintroduced to our gardens from time to time. The species of this Section occur in alpine and subalpine stations throughout the mountain ranges of the Western states, probably extending up into Alaska. They all bear the facies of the type-species, *P. Parryi* Gray. The flowers, in shades of pink to red, are borne on erect pedicels and are of moderate size. The leaves are thin-textured, lanceolate to spatulate-oblong, and arise from a basal rhizomaceous crown. They are efarinose. The species grow along limestone cliffs, open rocky slopes, and alpine meadows. *P. Parryi* is even found growing in several inches of water in alpine streams swollen with the thawing of the snow at spring. Despite the diversity of their natural habitats, all—with the exception of *P. angustifolia*—are very difficult in gardens, plants for the specialist. They want water at their roots, sun, and a sandy soil. They tend to become dwarfed, scant-flowering, and short-lived under cultivation.

P. angustifolia Torr. This is a microform of the Section type and one of the gems of the genus, with the added attraction of being of relatively easy culture. Leaves lanceolate-spatulate, entire, narrow, bright green, and rarely exceeding an inch, arise from the rhizomaceous crowns. Tends to form small clumps. The scape exceeds the leaves and bears several small flowers of a bright red shade. It occurs in mountain meadows and moraines of the Colorado Rockies, at heights of 10,000 feet and better. Its roots are long and thick and appreciate a moisture source during the spring and early summer growth periods. Given this, it will not only thrive but bloom consistently as well.

P. Cusickiana A. Gray. Native to the Willowa Mountains of Oregon at altitudes of from 4000 feet. Leaves entire, oblanceolate, the apex acute, arising from the sheathed, rhizomaceous base. The scape exceeds the leaves and is from 2 to 7 inches high, bearing 1-3 half inch flowers of dark purple. Pink and albino forms have been observed, and the flowers are strongly scented. It occurs in drifts—but these scarce—in stony, open ground. A lovely, but extremely difficult plant.

P. Ellisiae Pollard et Cockerell. This and *P. Rusbyi* Greene are the moderate-sized members of the group, *PP. angustifolia* and *Cusickiana* being the small members and *P. Parryi* the largest. Leaves 5 to 8 inches, broadly lanceolate, dull green, arising from the sheathed crowns. Flowers borne above the leaf cluster, variable in color ranging from pink to red-purple with occasional white forms. Native to New Mexico at elevations of 9-12,000 feet, in dry, sunny situations, it is, nevertheless, not as difficult to cultivation as most of the Section.

P. Parryi A. Gray. Leaves oblanceolate, entire, to two feet high. The base stout, rhizomaceous. Scapes many-flowered, rising well above the leaves. Flowers about an inch in diameter, bright crimson-purple. Occurs in subalpine regions throughout the central Rockies, through Arizona and New Mexico and extending up into California and Utah, at relatively great heights. The giant of the group, it is an effective species but quite difficult of cultivation.

P. Rusbyi Greene. Leaves spatulate-oblong, denticulate, 2-7 inches long. Scape above the leaves, bearing several deep purple flowers with a yellow throat. Similar to *P. Ellisiae*, it is readily distinguished from that species by the shape of the leaves. It is native to New Mexico and is not easily kept in the garden.

Section Verticillata. A Section of winter-flowering hot-house species, the Section Verticillata is limited to the western Himalayas, Arabia, and Abyssinia. Its members are moderate-sized plants, about 8 to 12 inches in height, and occur in damp places along stream sides. The Section is intermediate between the genera *Primula* and *Dionysia*, though retained in the former. It is a small Section of some five species, none of which are in cultivation in American gardens. The flowers—various shades of yellow, with a darker eye—are borne in superposed whorls above the crinkled, membranous leaves, which are broadly oblanceolate to obovate. Mention must be made of the very remarkable hybrid *P. x kewensis* Wats, the result of crossing together *P. floribunda* Wall and *P. verticillata* Forsk. It first appeared as a naturally-occurring hybrid at Kew Botanic Gardens, in 1900. The plants produced were sterile, yellow-flowered, scented, and intermediate between the parent types. However, introduced into the trade, it threw in 1905 a single fertile inflorescence, from which seed was gathered and plants raised. These proved to be not only identical with the parent *P. x kewensis*—but fertile as well. The new true-breeding form, upon cytological investigation, proved to possess twice the chromosome number of the original, sterile form. As the first example of this phenomenon (known as autopolyploidy), the interpretation of the unusual behavior of the new hybrid form was a major contribution to our understanding of the principles of plant genetics.

The remaining twenty-seven Sections of the genus comprise the group Revolutae, the developing leaves of whose members fold outward. These Sections, in their morphological and geographical relations, may be arranged into several groups whose members are more-or-less related. The first of these affinities is comprised of the Section Farinosae and the related Sections Souliei, Minutissimae, and Denticulata.

Section Farinosae. This is both the largest and the most widely distributed of the Sections of the genus. It is composed of some eighty-two species, which extend throughout Asia into the Caucasus, Europe, and North America, with one outlying representative at the extreme tip of South America. The Section has been conveniently divided into six Sub-Sections, of which the first, the Sub-Section Eu-Farinosae, is comprised of those species which show a marked affinity with *P. farinosa* Linn. These are plants of moderate size and—with a few exceptions, such as the American *P. misstassinica* Michx., densely white-farinose on

the under surfaces of the leaves or inflorescence, or on both. This is a reliable diagnostic mark; as the other members of the Section are generally efarinose, or, if farinose, with yellow farina. The leaves are of moderate texture and vary considerably in shape from species to species. They may be entire or finely serrate and are borne on short petioles. The members of the Sub-Section Eu-Farinosa do not exhibit rhizomaceous basal growth and are, for this reason, often short-lived in cultivation. The flowers, which may be pink, mauve, lavender, or rarely white, are borne in umbels exceeding the leaves. The foliage is often lightly scented. They all bear an easily-recognized similarity to one another, and it is quite remarkable that no hybrids within the group have been recorded. They require constant moisture in cultivation, and, preferably, light shade. They resent even short periods of dry heat. The Eu-Farinosa are short-lived in gardens and best propagated by seeds, which give good and even germination if fresh. Division of the clumps is possible, with more than one crown per division advisably. Some of the smaller species—such as *P. scotica* Hook.—tend to rot at the crown if watered overhead during the winter dormancy. On the whole, they are not difficult, if one does not expect of them greater longevity than is their habit. The species in cultivation are as follows:

P. darialica Ruprecht. A species confined to the N. E. Carpathians in forest and subalpine regions, in shade. The leaves vary slightly, if at all, farinose, 1-3½ inches long, sharply toothed, obtuse, obovate to spatulate, thin-textured. Scape to 4 inches, farinose at apex, bearing an umbel of 3-5 rose red flowers with deeply emarginate lobes and pale yellow eyes. One of the easiest of the group.

P. farinosa L. The widely distributed species in the genus. Leaves 1-4 inches long, oblanceolate to obovate, apex obtuse, usually toothed, narrowing to a winged petiole, densely farinose beneath. Scape exceeding the foliage, corolla lilac to purple, or white, eye yellow, annulate, lobes deeply cut. Does particularly well on a moist moraine, but must have a cool situation to survive.

P. Fauriae Franch. From Northern Japan, a dwarf plant with a somewhat rhizomaceous habit. Leaves 1-2½ inches, broadly ovate, petiole equal to or exceeding the blade, narrowly winged, marginally crenulate. Scape 1 to 4½ inches long, Corolla rose or rose-purple, with a distinct annulus, tube yellow, lobes cleft nearly to base. A native of sea cliffs where the atmosphere is always moist, this is not easily satisfied in its cultural demands.

P. frondosa Janka. Leaves 1-3½ inches long, toothed and densely farinose, obovate or broadly spatulate, with a prominent midrib. Scape 2-5 inches, with a many-flowered umbel of distinctly-eyed rose-purple flowers with deeply-emarginate lobes. A species from Thrace, where it is found on moist, shaded cliffs. There is some question whether the form in cultivation under this name is the true species.

P. Hunnewellii Fernald. This is a native species, from the rim of the Grand Canyon, and is included for that reason, though it is probably not now in cultivation. Leaves 1-3 inches, wavy, dentate, spatulate, slightly farinose or efarinose. Scape 2-5 inches, thin and shiny. Flowers

purple, emarginate. Judging from its native habitat, this will undoubtedly prove a most intractable species.

P. intercedens Fernald. A yellow-farinose native from the Great Lakes region. Leaves ½-2 inches, obovate to spatulate, the petiole very short, the margins crenate. Scape very tall, 2-10 inches long. Corolla lilac, eye yellow.

P. laurentiana Fernald. A native of the Eastern Canadian coast regions very similar to *P. farinosa*. A heavily farinose plant with oblanceolate to spatulate leaves which are 2-5 inches long, dentate, narrowing into a winged petiole. Scape to as much as a foot in height. Corolla lilac to pink, with an orange eye, the lobes deeply cut. A very attractive native, which has been in cultivation from time to time.

P. Halleri Gmel. This is grown in gardens under the synonym *P. longifolia* All. It is found in alpine regions, meadowlands and crevices, from the Alps, through the Carpathians, into the Caucasus. It has been in cultivation for some two hundred years. Farinose, with a short rhizome. Leaves 1-3 inches, oblanceolate to obovate, narrowing below to a broadly-winged petiole, the under side densely powdered with yellow farina. Scape 3-6 inches. The corolla-tube is very long, and the corolla violet, fragrant, with deeply-cut lobes. Does best in a scree situation and is one of the best species in the Section.

P. mistassinica Michx. From the Eastern Canadian provinces and Northeastern U. S. A stoloniferous plant with efarinose leaves. Leaves 1-3 inches, broad, oblanceolate or spatulate, toothed toward the apex, with a slight, winged or absent petiole. Scape 2-8 inches. Corolla pink, lilac, purple-pink, or white, with a yellow or orange eye. A difficult plant at best.

P. modesta Bisset et Moore. A native of Japan with short, scaled, rhizomaceous base. Leaves 1-3 inches, oblong-elliptic to spatulate, serrate, with thick yellow farina. Scape 1-5 inches. Corolla long-tubed, purple-pink, deeply-cut. A very decorative species and, probably because of the rhizomaceous rootstalk, longer-lived than many of its fellows.

P. scotica Hook. The smallest member of the Section, it forms small tufts rarely an inch high. The leaves are rounded, somewhat spatulate, generally entire, and covered with white or very pale yellow farina below. Scape ½-2½ inches at bloom. Flowers dark purple or—rarely—white, with a yellow throat. A delightful miniature, but very short lived. Seed should be gathered each year to insure its residence.

P. specuicola Rydb. A native of Utah, where it is found under overhanging cliffs in the San Juan River canyon. Leaves 1½-5 inches, dentate, spatulate, thin-textured, farinose or efarinose below. Scape 4-7 inches. Corolla violet, eye yellow. This is a more than difficult plant and only for the garden of the specialist.

Of the remaining five Sub-Sections, only three are represented in our gardens. The Sub-Section Auriculatae, which was accorded Sectional status by Balfour and other earlier taxonomists, is set apart from the other Sub-Sections of the Farinosa by the fact that its members exhibit cylindrical seed capsules, superior to the calyx; whereas the other groups of the Section possess rounded capsules which do not exceed the

calyx. However the gross morphology of the Auriculatae are not sufficiently distinct from the rest of the Section to warrant its removal as a separate Section. Two species are in cultivation;

P. Clarkei Watt. A delightful, mat-forming species from Kashmir. It has the scaled rootstalk typical of the Sub-Section, the small, rather flat, leaves are rounded and about $\frac{1}{2}$ inch broad. They are borne on slender, sheathed petioles about an inch high. The leaves are firm and shiny. The flowers are generally borne singly—although an occasional umbel is found—on 1-2 inch pedicels. They are a good rose-pink with a yellow throat. This species was introduced into cultivation only as recently as 1936. The stock in cultivation does not seem to set seeds and may be a single clone. It is, therefore, best propagated by division of the clumps. It is quite easy.

P. rosea Royle. A familiar plant in many gardens, it is a native of the N. W. Himalaya, where it grows in marshes and by stream sides. Leaves efarinose, mature after the flowering-time, expanding to as much as a foot at fruiting. The leaves broadly oblanceolate, serrate, narrowing into a narrowly-winged petiole. Scape 2-4 inches at flowering, but increasing to as much as a foot and a half when in fruit. Flowers dark rose, varying somewhat in depth, with a yellow eye. A very hardy, very easy, very prolific species. Given a moist situation it will thrive in any garden. Increase is by seed or by division of the clumps.

The Sub-Section Pulchella is represented by **P. pulchelloides** Ward. The members of this group are typically farinose, with stout basal rhizomes and thick-textured leaves. They are all native to S. W. China and the adjacent regions of Tibet.

P. pulchelloides Ward. A slender-leaved species with a thick rootstalk, native to N. W. Yunnan. Leaves 1-4 inches, lanceolate or narrowly oblanceolate, with winged petioles, finely serrate at the edges, with pale-yellow farina below. Scape 3-7 inches tall. Corolla a pale blue-lavender with a yellow eye. A lovely and moderately-easy plant, but very scarce in gardens.

The fourth Sub-Section to be represented is the Sub-Section Sibirica. The members are differentiated from the Eu-Farinosae, which they most resemble, by their completely efarinose leaves, which are also entire and by minor morphological details. Two species are found in gardens:

P. fasciculata Balf. f. et Ward. A bog-plant from the province of Yunnan, with a dwarf, tufted habit very suitable for the scree. The oblong leaves, entire, efarinose, and $\frac{1}{2}$ inch broad, are borne on $\frac{1}{2}$ to $1\frac{1}{2}$ inch petioles. The solitary flowers are pale rose or pink, with a yellow eye surrounded by a white annulus, the lobes deeply emarginate, and are borne on 2-4 inch pedicels—occasionally with short scapes. This is best handled as a plant for the alpine house or scree and must have gritty, perfectly-drained soil to survive. Not easy.

P. involucrata Wall. Found along Himalayan stream-banks, this is a plant which has long been in gardens but has never become common. Efarinose, with a stout rootstalk. Leaves 1-5 inches, ovate to oblong, thick and glabrous, with a long petiole, sheathed at the base. Scape tall, 4 to 12 inches. Corolla white or occasionally tinged purple, with a yellow eye, very sweet-scented. A fairly easy plant—given a moist situation—

which will form large clumps in time. Propagation is by seed or division of the clumps in early spring.

The four unrepresented Sub-Sections are Glabra, Gemmifera, Yunnanensis, and Inayatii. The first is comprised of dwarf, efarinose plants distributed in the Himalayas and adjacent regions. The flowers are very small—seldom exceeding $\frac{3}{8}$ of an inch across—and pink—or rose-violet or purple. The second contains species typically producing basal buds, efarinose leaves, and white-farinose bracts and pedicels, otherwise similar to the Eu-Farinosae. The third contains six species native to S. W. China, all very small plants with small leaves, lilac or purple corollas, and dense yellow farina. Sub-Section Inayatii consists of only one species: **P. Inayatii** Duthie. It is a most peculiar plant, native to the N. W. Himalayas. The elongated rootstalk bears narrow, strap-shaped leaves with reddish-brown petioles, the veins very prominent. It grows to a height of 5 inches and bears lilac or bluish-lavender flowers. The leaves are sulphur-yellow with farina below. The narrow, peculiar leaves and the very long flower tube give **P. Inayatii** a distinct and rather bizarre appearance.

(To be continued)

Primula Species Seed for Distribution

The Society appreciates your spirit of generosity in the matter of seed contributions which make it possible for newer members, who might not otherwise do so, to become acquainted with some of the popularly grown species. If those of you who have seed of species, even in insignificant quantity, will kindly send same, properly named, to the Secretary, Mrs. S. R. Smith, Route 16, Box 102, Portland 2, Oregon, it will be pooled for distribution.

There are two precautions to observe. If your plants do not have a clean bill of health, both plants and seed should be destroyed. Virus is probably the major disease Primulas, especially Candelabras, are heir to. Its presence is indicated by squinny or color-streaked blooms, twisted foliage, lumpy leaf surfaces, and leaf edges deeply cut into exaggerated serrations. The only cure is to burn infected plants as quickly as possible before others are contaminated.

The other request is to make certain the seed is true to name. If there is a possibility of cross-pollination with other species which grow in close proximity, please note this fact and the seed will be distributed accordingly.

The Society is interested only in the seed of Primula species.

Correction

After going to press last March it was found that Allen W. Davis' name appeared among the Active rather than Sustaining members where it rightly belongs. Thus the Society counts thirty-eight who wish to additionally support its work.

SOME PRIMULAS OF THE FARINOSA SECTION

Clara W. Regan, Butte, Montana

Just as I had made up my mind to acquaint the Society with the merits of a Primula I knew to be easy, and I thought immortal, it passed out of life. Notwithstanding this catastrophe I still consider the plant I have grown for ten years, and have known as Primula Wardii, as one of the easiest for the beginner, and eminently rewarding for anyone.

Though belonging to the farinose group it lacks the characteristic mealiness of the type. The leaves are a bright polished green, about an inch long, and one-half inch wide, ovate in shape and slightly blunt at the tip. It grows into a dense cushion. The scapes are 4-8 inches long surmounted by rosy-lavender satin-textured flowers an inch across, centered with creamy white; with the added gift of heavenly fragrance. It has never shown any reluctance to produce these dainty blooms and flowers lavishly all through the month of June.

The root is a small rhizome. And herein, I think, lies the reason for my plants disappearing simultaneously, or rather failing to reappear last spring. Having been allowed to grow into a large mat, enervated by their super-blooming propensities, they exhausted not only themselves but the surrounding soil. A little attention in dividing and resetting the divisions would have saved them for me. But as always the good and the willing are taken for granted and passed over. As in a larger world, it is the sulky villains of the Primrose-world and the erratic exhibitionists that demand attention and receive it.

Primula Wardii is said to be a form of *P. involucrata* and is also synonymous with *P. sibirica* var. *chinensis*. All of which could be borne but now comes along an edict from the learned on Primrose nomenclature that says this dainty little flower should be called *P. yargongensis*. It is a native of bogs and streamsides at high elevations in S. E. Thibet, the bordering Chinese provinces, Burma and Bhutan. Though coming from such a warm and humid climate it does well in my semi-arid one, and even enjoys good health in a sunny place if not on a baking slope. It is not fussy as to soil; any good rock garden compost with an extra dash of leaf-mold suits it very well.

The plant is quite deciduous and disappears entirely in Autumn. It comes to life in Spring about the same time as do its kinsmen, the Dodecatheons, both having the trick of pricking through the brown earth with their little vivid green leaves, so that sometimes it is hard to know which is which.

The type plant, *P. involucrata*, is similar. I had this Primula years ago but did not make it grow and never saw it bloom. By all accounts it is a white *P. Wardii*, with like tastes and a corresponding habitat in the Himalaya Mountains.

The little Primrose from which this section gets its name is *P. farinosa*, the beloved Bird's-eye Primrose of northern England and Scotland, where it covers the moors and meadows with rosy mist at blooming time. The geographical distribution of this plant is wide-spread and forms of it crop up in many countries of the Northern Hemisphere and even in Southern Chile, where it is appropriately enough, called *P. magellanica*.



Photo: A. Haanstad, Denver, Colorado

P. Parryi, the untameable man of the mountains. Handsome in the wild it remains steadfast in its refusal to flower east or west of its native Rockies.

Primula Parryi

Primula Parryi was named for Dr. Charles Christopher Parry who botanized in the Colorado Rocky Mountains in the early 1860s. A massive peak on the Continental Divide also bears his name.

Primula Parryi is as fond of water as a duck, seldom being found more than a few inches from a running stream. The altitudinal limits of the plants is between 9500 and 11,500 feet in the central Rockies. The finest specimens are found along streams in coniferous forests at 10,000 to 11,000 feet. Although the plants are not alpine they often are found above timberline in the basins and cirques at the head of gulches.

Both *P. Parryi* and *P. angustifolia* are endemic to the inland mountains of the western United States. Theodore Holm was the author of this statement: "There is thus in the Rocky Mountains a center of development of a few species of Primula, but extremely poor in species when compared with the Alps of Europe or the mountains of Asia."

—Chester K. Strong, Loveland Colorado.

A good many varieties seem to be coming to light in the Rocky Mountains, and once could be comfortably lumped together as *P. americana*, the American form of *P. farinosa*. Now, however, we hear of *PP. intercedens*, *incana*, *decipiens* and others all of which, as near as I can make out, depend for their specific classification on how much farina they carry on their anatomies, and where, to the utter confounding of us laymen if we should ever meet up with them.

The typical *P. farinosa* is heavily coated with meal on both sides of the leaves, which are 2-3 inches long, slightly scalloped and grow in dense tufts. The small pink flowers are borne in umbels on stems 2-4 inches long. It likes a cool moist soil. The form, *P. scotica*, as you might infer, is Scottish. It lives in light turf, or even in the sand dunes near the shores of the cold North Sea. It is very tiny, very neat and trim with small bluish-purple flowers held on inch-high stems above the grey-powdered leaves. It is a delightful jewel, and like many jewels hard to keep.

The American *P. mistassinica* is somewhat like it, very small, but with pink flowers. It inhabits the northern tier of states central and eastern, and up towards Arctic Canada, in the tundra-like wastes. Just by way of contrast a friend wrote me that he had seen a farinose *Primula*, *P. specuicola*, growing inside the strange caves in the bluffs along the San Juan River in Utah. A very excellent account of this *Primula* has been given by Dr. C. R. Worth in his article NORTH AMERICAN PRIMULAS as published in the Quarterly for October, 1944.

P. Fauriae var *modesta* goes across the ocean to find its home. It lives in the mountains of Japan. It is like an inferior *P. farinosa*, and it affects a golden meal on the underside of its leaves instead of the traditional silver powder of its kind.

Another Asiatic, with which I am sure, almost all members of the Society are familiar, is the lovely *P. rosea*, another native of the Himalayas, extending into Afghanistan. It is fond of moist places and is often found on the edge of melting snow-fields. It has one of the happiest dispositions of all *Primulas* and can always be depended upon to do its duty in the way of producing the glowing carmine-pink flowers for which it is famous. The leaves are a dark leathery green coming up in huge tufts. They are said to develop after the flowers are in bloom. They do not behave in this manner here,—but then we are never orthodox. The plant is entirely without farina.

If you want only one of the mealy types, one that is entirely amenable to cultivation, trustworthy and robust in habit you must get for yourself *P. frondosa*, a Bulgarian of unimpeachable character. It is a little larger in all of its parts than *P. farinosa*, and, I think, a trifle pinker in the flower. The leaves are mealy only on the underside, being quite glaucous on the upper surface. If left to itself it can grow to quite cabbagy proportions, in a small way, but this must not be allowed. Division must be resorted to before it acquires too much *avoirdupois*. Then you can plant for yourself a cool little slope, primrosy-pink in May, with the innumerable flower-heads that this species produces.

The last of my farinose *Primulas* is one that has ambitions to be a strawberry. The seed came to me labeled *P. sertulum*. Then it was

P. Loczii; for a time it answered to *P. stenocalyx* and now is for the nonce, *P. erratica*, a name which is peculiarly appropriate. It is very tight and tufty, with smaller leaves than *P. farinosa*, and not such pretty flowers. But nevertheless it has its claim to fame—it propagates itself with long red stolons just like a strawberry producing new plants at the end of each. Even this ingenious scheme does not make it plentiful in gardens. It is definitely one that is hard to keep in cultivation.

All of the mealy *Primulas* of this type shed their outer leaves in fall and the heart of the rosette shrivels to a hard knob which is covered with an excess of powder like cornstarch. A flip of the finger sends it in all directions. This knob is very insecurely fastened to the soil by a very light system of roots, and it is no uncommon sight in early spring to see contact broken and the plant with the roots sprawling upward. They then must be carefully replanted and examined at intervals lest it happen again before root growth begins. This happens more frequently where there is thawing and freezing of the soil. The knob later expands into leaves with the flower-buds packed inside.

The plants of the Farinosa Section, without farina paradoxically, insure their well-being during winter by a safer method. They simply disappear under ground and do not emerge until their sixth sense tells them it is safe to do so. *P. rosea* is a very early riser and the buds are sometimes blighted in my garden by late frosts.

To be truthful these efarinose *Primulas* are easier to keep than the powdered types, except *P. frondosa*. They have a reputation for skittishness in the garden that goes back several centuries. As Parkinson said of *P. farinosa* then "It will hardly abide to be nursed up."

Dividing and Watering

Late May, June or July, depending upon weather and locality, is the seed-maturing season for *Polyanthus* and *Acaulis* which simultaneously completes the old perennial cycle and ushers in the new. At this time a sudden spurt of new root growth begins at the crown barely below soil surface and continues throughout the summer and fall until cold weather suspends activity. During this period of active root and top growth, vitality is stored in the plant for the flowering season which begins with favorable temperatures at winter's end. Thus the spring bloom is in direct relationship to summer care. Crowded plants are best divided as soon as new growth becomes apparent in early summer. These divisions should be kept watered and cultivated so that by fall each is a husky, deep-rooting plant ready to enter winter and give its best when the spring season permits. Division of plants is a simple procedure which is outlined on page 10 of Volume 1.

New Control for Red Spider

Hexaethyl tetraphosphate is a new product which is said to successfully combat this pest whose control, once it develops, is difficult. See page 7, July 1946 Quarterly for appearance and habits.

Control of the Strawberry Beetle and Its Larvae

At this season larvae of the strawberry beetle have pupated and emerged from the soil as adult beetles ready to inaugurate the new life cycle. Eggs are deposited in and around crowns of certain plants, including Primulas, and at the base of shrubs. Upon hatching, larvae work down among the roots upon which they feed to the damage and at times complete loss of attacked plant life. Presence of the beetle is indicated by chewed foliage, leaf edges frequently scalloped. Primrose growers are wise to take precautionary measures by placing any of the standard baits for the purpose beneath the foliage in small mounds throughout plantings before signs of the pest are apparent.



Photo: J. G. Bacher

Introduced in 1905 from the Chinese-Tibetan border at 9-13,000'. *P. vittata* is at home in any cool, moist, leaf soil. Lively purple blossoms with darker longitudinal ribbon stripes within and silver-striped calyces scent the June air.

Should an infestation occur, control is effected by spraying attacked and surrounding vegetation with arsenate of lead used in proportion of four tablespoons to one gallon of water. Extensive Rhododendron and Primula plantings—especially attractive to the strawberry beetle—have been kept pest free by lead arsenate spray used as a preventive measure

(Continued on page 15)

A DISAPPOINTING HUNT FOR PRIMULAS

Dr. C. R. Worth, Groton, N. Y.

Plant hunting in the Rockies was singularly disappointing in 1946. Extreme drought in the southern ranges, with late freezes from Colorado north into Montana, produced a desolation unequalled even in the drought years of the 1930's. Many plants could not be found at all, others were coming into bloom two months late, and the harvest in general was extremely scant. Fortunately Penstemons had fared less badly than most plants, so that my main duty of collecting their seeds for the American Penstemon Society was less unsuccessful than had at first been feared, but the tale of alpine and Primulas is one of failures.

One of the first regions visited, the home of several rare Penstemons, brought me within striking distance of *Primula specuicola*. At the nearest village I tried in vain to obtain a horse on which to travel the six miles through blistering desert heat to the hidden canyon of the Primrose. As there was nothing to do but go on foot, I delayed my departure till late afternoon, so that the return trip could be made in the cooler evening, although by so doing I was able to spend only a brief time admiring the Primula, and photographs were impossible.

The narrow entrance to the canyon, among towering red sandstone cliffs, is screened by shrubs, but otherwise as unpromising and arid as the surrounding desert. As one penetrates the depths of the canyon, other plants appear, but the Primula is not found until the very end. There, in a gloomy half-circle of overhanging cliffs, down which a veil of water constantly drips to end in a dank pool without visible outlet, the Grotto Primrose clings to the sandstone cliffs, mostly out of reach, though an occasional attenuated specimen grows in the sand below. For company it has yellow *Aquilegia micrantha* and an orchid now in green seed, apparently a *Habenaria*. I looked in vain for flaming red *Mimulus Eastwoodiae*, which in more southerly stations forms dense mats on the cliffs that it shares with the Primula.

The Grotto Dweller is in effect a larger *Primula frondosa*, with narrowly to broadly ovate leaves densely coated with white farina, growing into clumps a foot or more across, composed of many crowns. The fairly large flowers are borne in loose clusters on stems of six inches or more. I have never seen them in bloom, but wilted flowers suggest that some, at least, may be a fairly pure blue. Although I was a month later than in the very late season of 1941, at which time seed had been mostly shed, in this perverse year the seed was just beginning to ripen, and the most promising capsules were on plants clinging to the cliffs far out of my reach, nor could I knock them down with a long pole. A few fairly good seeds were obtained, and a few plants sent home, where they appear to be settling down to cultivation in a sand bed, though as yet there is no indication that they will grow as luxuriantly as on their chosen cliffs.

The unfavorable season forced me to abandon plans for visiting *PP. Maguirei* and *Brodheadae*, both of which go dormant in early summer, and after unfruitful explorations of familiar regions in Montana, I turned toward Nevada. Years before, I had seen a herbarium specimen that seemed definitely an undescribed species of the section *Parryi*, and

my entire plan for the summer had been built around the hope of arriving there when seed was ripe. Through the kindness of a rancher living near the canyon in which the original specimens had been found, it was possible to visit this still little-known region. Although he had spent his entire life in that valley, Jim was unfamiliar with the canyon, and decided to make the trip with me. We drove some fifteen miles, as far as the car could go with much encouragement and frequent changes of water, then took off on foot through dense stands of mahogany. In the aspen zone we reached the canyon that was our goal, and there bitter disappointment awaited us, for a winter or two before a tremendous snowslide had stripped the canyon of all vegetation. Having come so far, we were unwilling to give up, and struggled for hours over tangles of fallen timber, a task made more than normally difficult for me because of newly shod boots that were both heavy and slippery. The only plant remaining on the lime walls of the canyon was a tiny *Heuchera* that in some way had escaped the avalanche. At last we came to a tiny cliff that had offered some shelter, and at its foot a bit of green. I groaned—all these miles, and nothing but *Primula Parryi*! Yet surely I could not have been mistaken in those specimens? I went nearer, and found, not the *Primula*, but a pink *Dodecatheon*, new to me, that almost exactly mimicked the *Primrose*. Up and up, till I balked at more climbs over sheer cliffs, and still nothing but another stand of the *Dodecatheon* and a tiny yellow *Mimulus*, while far above on the cliffs two plants of a miniature *Aquilegia* bore a couple of blooms, one deep blue, the other red. At last we reached the base of the great cliffs guarding the summit, far beyond where the original collector had stopped. There was no other place where the *Primula* could hide, and sadly I turned back, resolved to revisit the region another season, when perhaps the *Primula* will have reestablished itself.

The only other *Primula* encountered was *P. Parryi*, and that not of my seeking. In southern Utah I revisited one of my favorite ranges, for seed of *Aquilegia scopulorum calcarea*, and there in a canyon I had never before visited, found *Parryi* in great quantity along a mountain stream. The still green seed was beginning to shed, a character that so far as I know has never been attributed to this species. Half-heartedly I gathered a small amount, for its refusal to accept garden conditions remains an unsolved problem. Yet I do not see why, if handled as a bog *Primrose*, and set in suitable positions while still very young, it should not succeed somewhere.

Much as I wished to procure *Primulas Ellisae* and *Rusbyi*, by now the season was too far advanced for their presumably even more parched mountains, and their reintroduction must wait for another season.

Report of the Sixth Annual *Primrose Show* with list of award winners will appear in the October Quarterly as will reports of shows held in Bremerton, Napavine and Longview, Washington.

Seedling Care

Aphids and the possibility of damp-off develop as the weather warms. Together or singly they constitute the greatest threat to the safety of seedlings. Sparsely sown seed for uncrowded conditions and best possible ventilation, aerated soil, a moist but not wet growing medium are preventive measures for damp-off. Regular dusting or spraying under-surface of leaves for aphids is necessary. An insecticide-fungicide which may be used as a dust or spray containing 5% DDT, fermate, sulphur, rotenone and pyrethrum has been tested and found valuable in control of aphids and fungus. As a dust it has been safely and effectively used over a period of a year on seedlings in various stages of germination without burning. A routine dusting every ten days with an inexpensive dust gun equipped with short projecting tube to blow powder beneath leaves and among seedlings at soil surface acts as an efficient preventative against insects and fungus.

In the matter of watering, a paradox exists. Whereas mature plants in the garden must have more or less constant watering throughout the summer, the watering of seedlings must be done more judiciously and with reasonable care until the thread-like primary root stage is bolstered by the development of the first permanent roots from two to three months after germination. Overhead sprinkling is a dangerous practice since in this way the soil surface is saturated. A safer method is to place container in water and remove before surface becomes soaked.

Hardwood sawdust as a seeding medium, outlined by Professor A. H. MacAndrews on page 58 of the April, 1946 issue has been tested and found outstandingly satisfactory for sowing seeds in every season. Being a non-conductor of fungus, sawdust is especially valuable for summer sowings.

(From Page 12)

several times during the late spring and summer.

Reports on the use of lysol are encouraging in the eradication of larvae, commonly known as grubs or weevils. Used as a puddling-in solution when planting in combination with nicotine, a tablespoon of each to the gallon, two cups to the plant, it is highly recommended. Lysol without nicotine has also been reported a thorough exterminator.

Corrosive sublimate is used by some for killing the larvae in the ground and to dissolve slug eggs. A solution as strong as one ounce to eight gallons has been used without burning *Primroses* but was found to be too strong for certain other plants indicating that a milder mixture would be safer. One-half teaspoon to a gallon has been used successfully for both weevils and wire worms. Mix in non-metal container and pour one cup around the crown of plant holding up foliage and taking care to keep solution from direct contact with top growth of the plant.

As a repellent, tobacco dust worked into the soil when planting has been proved effective.

The adult strawberry beetle is dull black and about one-half inch long and is figured, together with the larva and pupa, on page 25 of Volume 1.

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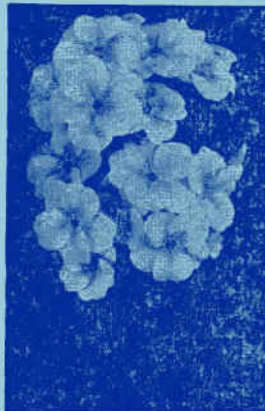
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