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Published by The American Rock Garden Society and entered in the U. S. Post Office at Plainfield, N. J., as third class matter.
THE LEWISIAS

CARL PURDY

THIS genus comprises a large group of widely varying species, among them some of the finest rock plants in the world. So wide are the variations that Howell, the Oregon botanist who wrote the first Flora of the Northwestern States, may have been right when he set off the evergreen species as a distinct genus, Oreobroma. Since, however, I dislike the disturbing of names in general use, they will all be Lewisias with me.

The first species to be discovered was Lewisia rediviva, found by the Lewis and Clark exploring expedition about 1805. From time to time other species have been named; and in the last ten years a bewildering number of additional species or forms have been found.

One often sees the term "alpine" applied to Lewisias, but in my opinion this is incorrect. It is true that some of the deciduous species have been found at rather high elevations. Some years ago I saw one, subsequently described as a new species, above tree line on Mt. Dana in Yosemite National Park, and another, L. triphylla, but little below tree line in the same region. L. pygmaea is often found close to tree line too, while L. yosemitana goes higher than 8000 feet (tree line in that region is about 10,500 feet). On the other hand, I know of colonies of L. rediviva down to barely 1000 feet, and L. columbiana rosea is near the coast in Oregon at not over 2000 feet; while a fine evergreen species grows at only 1000 feet in Trinity County, California.
Most of the evergreen Lewisias are found in a highly interesting region that lies on both sides of the California-Oregon border. If a point thirty miles east of the Pacific Ocean is taken, and a parallelogram described northeast to southwest forty by eighty miles, it includes nearly all the evergreen species. Moreover, the same region is the exclusive home of three species of *Erythronium*, two of *Brodiaea*, one each *Calochortus* and *Lilium*, as well as of the Weeping Spruce, and indeed many notable species in other genera. Floristically this is one of the most wonderful regions in the whole United States. Its geology varies greatly, and each *Lewisia* tends to favor a certain rock formation.

I have spoken of Lewisias as “rock plants” and if there is such a thing, most of the species will surely qualify. I have found them on almost perpendicular cliff faces, sometimes with their roots in what appears to be entirely solid rock, or in the thin veneering of moss and soil there; others might be in pockets filled with dust or chips, but always with rock immediately surrounding. On the other hand, where I saw *Lewisia tecedyi* at home in Washington, was in a region of big rocks and many of them, yet the Lewisias were not on or even necessarily close to the rocks. The plants were rooted in a fine material looking like sandy loam, but unquestionably a volcanic dust. They had very large and long roots, but these did not go down, instead extending laterally at little depth; it was actually possible to take some of the plants by the crown and lift the entire root-system, so shallow did it lie.

The home of the deciduous species is very different. *L. rediviva*, with us, follows serpentine formations; the soil is a sort of blue clay, wet and sticky in winter, but in summer bone dry. I have seen *L. nevadensis* in many places, and always in a finely comminuted dark soil mixed with gravel, in depressions which are saturated with water when the snow is melting. *L. pygmaea* grows in like pockets, in a region of deep snows, and flowers soon after the snow melts. *L. yosemitana* is found in what seems to be pure granitic sand, at rather high elevations; and *L. brachycaulos* also high, but in soils more like those of *L. nevadensis*.

The deciduous species may be divided into four groups, which will be discussed separately.

**Group 1.** These are chiefly plants of the high mountains. They make small tufted rosettes, and the leaves disappear soon after the flowering period. All are found in depressions where it is very wet while the snow is melting, and extremely dry later. In this group we have *L. pygmaea*, a white flowered midget found in the high mountains from Colorado northward and westward, to Oregon and California, where it extends the whole length of the Sierras. I am sure that there are several distinct species aggregated under this name, but they have not yet been studied technically. *L. nevadensis* of central California to southern Oregon has like habits but does not go so high; it is as much as four inches tall, with spatulate leaves and pink to white flowers. *L. glandulosa*, the one I found on Mt. Dana at 11,000 feet, is pinkish flowered, and closely related to the next-preceding. *L. triphylla* of the high Sierras is tiny, slender, and white-flowered.

**Group 2.** *L. oppositifolia* of southwestern Oregon and adjacent California does not make much of a rosette, but has stems five to ten inches high with few spatulate leaves, and as many as five flowers, which are white or pale pink and very lovely. My information is that it grows much like *L. nevadensis* and occurs between 3000 and 4000 feet elevation.
GROUP 3. This is the group of _L. rediviva_, the most widespread of all the species. It occurs in many parts of California, both in the Coast Ranges and the Sierras, though not high up. From Oregon and Washington it crosses the Rocky Mountains to the high plains, where it ranges from Wyoming well up into Canada. Its altitudinal range is from about 1000 to 5000 feet. It grows in full sun, on serpentine barrens in California, and elsewhere in shaly soils or pockets in rocks. The drainage usually seems to be perfect, although in recent years I have found it in places where conditions are decidedly wet for much of the winter.

In this species a dense rosette of narrow leaves proceeds from a crown whose top lies perhaps an inch below ground level. The large and lovely flowers vary somewhat from place to place. They may be white, pink, or deep rose, and indeed all three colorings may occur together. Soon after flowering the foliage disappears, leaving a tiny pit in the ground.

GROUP 4. _Lewisia yosemitiana_ has spatulate leaves and white flowers, the general habit being much as in the next preceding. It is known only in granitic sands in the Yosemite region. _L. kelloggii_, which continues on farther north in the Sierras, I know only in the herbarium. It too has spatulate leaves and a handsome white flower; it is likewise found in granitic sands apparently at an altitude of about 5000 feet. _L. brachyclada_ groups its spatulate leaves in a close flat rosette, from which arise many fine white flowers. It is found in the high mountains of southern California in gritty stretches which are snow covered in winter. Here it is not particular about soils, but I suspect thrives best when water is fairly abundant during growth. This is one of the easiest of all the species to grow, and is a veritable floral treasure.

The groups remaining to be discussed comprise the evergreen species. As above stated, the larger number of these are confined to the region along the California-Oregon border; three of them, however, are more widely distributed, and these may well be treated first.

GROUP 5. _L. tweedyi_ is confined to a small region east of the Cascades in Washington, and toward the northern side of the state. It has large rosettes with long spatulate leaves; there may be several crowns at the top of the rootstock. The flowers come either singly on short scapes, or a few together in a cluster; the petals are a soft salmon rose, and most lovely. I have seen as many as 300 flowers on a single clump. The account given above of finding it with the roots extending horizontally and very shallow will suggest how it should be planted.

_L. columbiana_ is found through a large region in Oregon and Washington, but only in widely separated colonies; it has several forms, differing decidedly in aspect. The form most often taken to be the type is strong growing, with forking crown, spatulate leaves, and a branching panicle of small white flowers tinted with rose. That known as variety _rosea_ has, on the other hand, a compact rosette of dark green leaves and flowers of a deep rose, almost magenta hue; it has been found only on a single mountain near the coast of northern Oregon. On another mountain in the same region grows one much like the last but with white flowers, and this I have termed the Neeman variety, after its discoverer.

In the Sierra Nevada for some distance south from Yosemite National Park we find _L. congdonii_, characterized by narrowly spatulate leaves and small rosy magenta flowers. Occurring thus far from its nearest relatives, it has developed a rather distinct aspect, and is notable for this rather than for its beauty. It grows at 3000 to 4000 feet altitude, on rocks only.
GROUP 6. In the California-Oregon region already outlined there are three fairly distinct groups of evergreen Lewisias. Within each of these groups there is so much intergradation, that I am not at all sure but that crosses exist between every pair of species.

*Lewisia leana*, in its typical form, has rather dense rosettes of linear terete leaves and a panicle of many small magenta-rose flowers. There are also forms with narrowly spatulate leaves, and even some approaching other species in leaf width. In its native home, it is confined to a talcose rock formation, growing not so much in solid rocks as in broken down splintery material.

\[\text{Photo: Lewisia tervedyi has long spatulate leaves. The petals are a soft salmon rose, and most lovely.}\]

*L. eastwoodiana*, which the writer had the pleasure of naming, is related to the last. Its leaves, too, are terete, but its paniced flowers are pure white. Lewisias in general are often characterized as stemless, but in this species there are real stems, rising to a height of as much as six inches. The small flowers, with petals little over a quarter inch long, confirm its distinctness. I am not informed as to its native habitat, but it probably grows also in talcose soils.

While *L. whitae* has been described as an independent species, its features suggest its origin by hybridization between *L. leana* and one of those treated below. Its leaves are more broadly spatulate than in any of the forms of *L. leana*; its flowers are twice as large as those of the latter, and of a deep rose hue, making it a really fine rock garden subject. One plant I received had the petals apricot colored, with rose bands.
GROUP 7.—Links in a remarkable series are formed by the four named respectively \textit{Levisia cotyledon}, \textit{L. finchii*}, \textit{L. purdyi}, and \textit{L. howellii}.

Each of these is fairly uniform and well-marked in a given locality, but varies widely from place to place. This variation appears in leaf characters, in the type of inflorescence, and in the number of flowers. Remarkably enough, although fluctuation in the details of the flowers is usually shown in such series of plants, in the present case the flowers are much alike in form and size from one end to the other. All have glandular bracts and sepals, and a central band of deeper color running down the petals. It would puzzle the most expert to distinguish between the flowers of, for example, \textit{L. howellii} and \textit{L. finchii}, yet the appearance of the plants is quite different. So much do these species vary from place to place that I have come to expect the forms from two localities never to be exactly alike. All of the series are rock plants, growing most often in black volcanic formations. While they occur over a vast territory, they are never widely scattered, but form isolated colonies separated by considerable distances.

The first to find a member of this series was Thomas Howell, the Oregon botanist; he named it \textit{Oreobroma Cotyledon}, but it has since been transferred to the genus \textit{Levisia}. This botanist certainly deserves a tribute here. He was a school teacher, and as was customary in those days, taught in different school districts. An indefatigable field worker, he somehow managed to explore for plants the whole of Oregon and much of Washington. Years ago, when a Botany of California was desired, and leading botanists volunteered to carry out the necessary work, there were public-spirited San Franciscans enough to furnish an ample fund to publish a superb volume. But no such help was at hand in Oregon in Howell’s day. Determined that his work should be published, he learned to set up type and to run a press: between times he earned money by his teaching, in order to buy paper. Then at intervals he was able to bring out, one fascicle at a time, his splendid volume on the Flora of the Northwest.

Howell had a theory that in time all the plants considered as mere varieties by the authorities of his day would prove to be independent species; and he described many as such. It is interesting to note that his forecast has in many instances proved to have been correct.

While teaching at Waldo, Oregon, Howell came across the plant which he duly described as \textit{Oreobroma Cotyledon}. His description, though excellent, would not of itself identify one species in what we now find to be a continuous series. I have indeed received plants from his original locality which proved not to have the features of his species, but to represent one of the many forms of what I later described as \textit{L. finchii}. He himself found another species there too, distinguished by having narrowly spatulate leaves with crisped margins, and this was named in his honor, \textit{L. howellii}. Its leaves are certainly distinctive, yet its flowers are not.

Other species of \textit{Levisia} will be described in later issues of this Bulletin, together with Mr. Purdy’s recommendations as to how to grow them in the rock garden.

*While this name was apparently first published with the spelling “Finchiae,” the describer later changed it to “Finchii,” and this form is accepted by Hortus II. The plan of S.P.C.N. to drop the final “i” in such names is not accepted by botanists generally. On the other hand, the decapitalization of species names is followed by the more progressive ones. Ed.