

BULLETIN

of the

AMERICAN ROCK GARDEN SOCIETY

Vol 9

January-February, 1951

No. 1

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Published by the American Rock Garden Society and entered in the United States Post Office at Bound Brook, New Jersey, as third class matter; sent free of charge to members of the American Rock Garden Society.

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TINY DIANTHUS

STEPHEN F. HAMBLIN, LEXINGTON BOTANIC GARDEN

FOR long life, evergreen basal foliage and charm of fragrant flowers, no group of flowering herbs can equal the pinks—*Dianthus*, the flower of Jove. They revel in heat, drought and sun. Some are frankly annual in cold climates; the cluster-heads, from Sweet William to Sweet Wivelsfield, are frankly biennial or soon bloom to their death. The Maiden Pink and her kin creep madly like a thyme and must be pruned with a spade or rare neighbor plants are smothered.

Best are the carnation types, the foliage grass-like, blue-green, the flowers solitary on forking stems. For a rock garden the true carnation, the Allwood hybrids, the usual Grass Pink and many more are too tall and weedy in age. Without a close haircut after each spring bloom they soon are big untidy masses of stems. The very dwarf species in this series are best for a rock garden. The problem is to get the plants.

Once I had the Cheddar Pink group in single rose, single red, single white, a semidouble and a double rose, and grandiflorus, the true Cheddar, all from seed from the firm of Thompson & Morgan in England. Whether seeds of these can be found is a question. My plants were lost during a war. The Cheddar now offered by many dealers seems to be ordinary *D. plumarius*, of which anyone can soon have plenty. In old lists, or Bailey's Garden of Pinks, there are described many dwarf species of showy bloom—*D. alpinus*, *callizonus*, *brevicaulis*, *glacialis*, *zonatus*, etc. but seed from American dealers or foreign botanic gardens germinate to other sorts, as annual species, the cluster-heads, or just plain *D. plumarius*. It is a tax on your patience to plant purchased seed, unless you do it on a large scale and by chance get a good dwarf of unknown parentage.

Our dealers do offer some very dwarf tufted named sorts, to be propagated by division or cuttings. Once you get a little tufted mound the plant will live for many years and when it becomes a large mat it is dividable. Several special clons are in the trade, and get these as a start—as plants, rather than fool around with seeds.

- Ariel—bright rose; 2 inches
- Crimson Startler - crimson; 8 inches
- Inchmary- pink; double
- Little Joe - dark red; single
- Mrs. Dina Weller— lavender pink; 6 inches
- Rose Cushion - bright rose
- Rocknoll Imp - double rose
- Rose Queen - rose pink; double

Tiny Rubies - red; double
 Uinta- rosy red
 neglectus roysi - carmine pink; 4 inches
 superbus nanus- lilac

Mostly these are not mentioned in "Standardized Plant Names", which gave all its *Dianthus* space to the carnation.

With all due respect to such loveable groups of rock plants as *Campanula*, *Gentiana*, *Saxifraga* or *Primula*, in the hot dry summers expected in our northeastern states the smaller kinds of *Dianthus* win out for longevity and ease of culture. The problem is to get them, and they are worthy of extended search. This is not even a partial report, but a suggestion that many of us should watch our seedlings for good dwarfs, and encourage our dealers to stock up with the truly tiny tufted pinks.

CUSHION ASTRAGALI

CLAUDE A. BARR, SMITHWICK, S. D.

CUSHION or "bun" plants of the Great Plains and western mountain regions are apparently evolutionary developments of the characteristic climates, elevations and soils. These tight low pads or mounds show a surprising uniformity of structure, though occurring in many diverse genera. In the genus *Astragalus*, some five, following Rydberg, are known under the group name of *Orophaca*. Three of them, perhaps four are rock garden prospects of outstanding charm.

What surprise to wander out along an almost barren bad land ridge in late May, toward a vague patch of color, and come upon a colony of *Astragalus tridactylicus* glowing in pink-purple or lavender-rose, the edges of the buns a soft silvery green of tiny sharp tipped tri-part foliage. First there is a delighted contemplation of the perfection of form of this gem, its color, its harmony of setting on the light gray clay, more or less mulched with lighter limestone rubble — then of the novelty of beauty in isolation. Companion plants if any are a few stunted



Orophaca caespitosa (*Astragalus gilviflorus*)
 a white flowering bun plant of the western wastes.



Astragalus tridactylus in its typical habitat of clay with limestone fragments.

weeds, now and then if the footing is a bit more loam-like, a tuft or two of unthrifty grass. Very old specimens may appear to be raised on little eminences, partly because the surrounding soil has weathered away, partly because these plants gather and hold soil that blows or spatters in.

Finally to one interested in possessing such plants comes the query, what is this rooting medium that seems so adapted to the one species, and how might it be imitated in the garden? That soil — imitated? Extremely palpable and slimy when wet, though with much apparent grit, very tough and hard when dry, sometimes with a close-textured hard shale a few inches below the surface. But knowing *tridactylus* for some time, you discover that the most important factor in its native environment is freedom from competition, and that when taken small it transplants with fair ease and thrives, even self-sows occasionally, on the plains, in one-third sand, one-third clay loam, and one-third gravel including limestone. In the East it has been found to do well in one part sand, two parts loam and two of peat.

This kind is indeed more often found growing where it has some competition, also some modification of the soil, but does not there attain to such proportions as the larger plant pictured. A frequent measure of spread for the crown is five or six inches. Under optimum conditions, rarely observed, it may reach sixteen.

Oraphaca caespitosa (*Astragalus gilviflorus*) is a plant of closely similar habit and appearance in leaf, a bit looser textured, with larger, white blossoms borne singly and almost sessile, whereas those of *tridactylus* are borne one to three on a brief stem. If *gilviflorus* be advanced rapidly by a favorable season, the blossoms banners erect, will completely hide the leaves in April and May. When after unfavorable weather they come later, sometimes lasting into the season of *tridactylus*, the leaves may somewhat overshadow the flowers, a different and hardly less attractive picture.

At times mingling along the borders of *tridactylus* colonies, *gilviflorus* is

bound by no close restrictions as to soil type, but may be expected in almost any gritty or gravelly clay or shaley spot. Cushions eight to ten inches wide are frequent, but every member of the family, down to babies of but an inch or so, takes part in the gala days of blossoming.

The third lovely member of the quintette is *Orophaca sericea*, or if you prefer the less lyrical name, *Astragalus sericoleucos*. The plant has a distinct individuality, smooth and silky like its name, sericea, and though it start as a very modest and flat bun of tiny tri-part leaves, its somewhat sinuous branching stems continually enlarge the mat, and may extend to sixteen inches or so. At no season do the leaves stretch up, but remain very low, the whole plant about an inch high, even when covered with the hundreds of tiny round bannered flowers of royal purple, varying to lighter in some plants. This kind, very abundant in its chosen places, may be found on a nearly flat limestone gravel-mulched ridge top, in wide open sunlight, or on a somewhat less stony terrain with steeper slope. Its time is mainly June.

In the garden sericea has been a puzzle to grow. It transplants readily enough as a small seedling, but a midsummer or fall drought, a dry open winter, or a hesitant, dry or wet spring may signal its departure. One plant, after many trials, is now carrying a thrifty mat of foliage into its third winter, and it has flowered well. A portion of its accustomed powdery sand, with limestone, on a slight slope two inches above a path, and with the added benefits of a bit of rock drainage, and high lath shade, does the trick — thus far.

Orophaca argophylla, a rare kind, is a close textured neat cushion or bun, to eight or nine inches wide, with a bluish silvery cast. In the garden its sojourn has been brief and its blossoming even more a frustration, the flowers being narrow-bannered, sparsely borne, and a mere nothing in color, pale lavenderish straw.

On the other hand *Orophaca aretioides* is reported as cluster-flowered, purple and in size of blossom and length of stem intermediate between tridactylus and sericea. One fancies it an attractive plant. Still another *Orophaca* of garden appeal grows in southeastern Montana, with flowers that are said to be definitely blue. From the appearance of plants received — and with intense regret lost before blooming — it may be a form of tridactylus.

These fascinating bun plants with the exception possibly of aretioides, whose exact dwelling place is not known to me, are inhabitants of the high plains. *Astragalus gilviflorus* is to be met with from Saskatchewan to Kansas, while the others are credited to extreme western Nebraska and South Dakota, Wyoming, and portions of Montana and Colorado, where under light rainfall and usually with sharp drainage, their rather barren footing provides some reserve of moisture.

TABLE MOUNTAIN - 1950

FRANCES KINNE ROBERSON - SEATTLE, WASH.

FAR places beckon most people who like to search out plants in their native haunts, but the more I see of the Northwest in which I live, the more positive I am that enough plants grow here to interest me all of my life without leaving the State of Washington. Early this past summer we explored Cougar Gulch near Blewett Pass in the Cascade Mountains but could not get up very high on Table Mountain - whose flat top surfaces rise above all the lesser hills - because a huge larch tree lay prone across the road. The latent power in the old tree was splitting the knobby leaf buds, and chartreuse needles were thrusting forth to give a false impression of life so that we were aware of its strength in two ways: it had power to continue some of the evidences of life and power to thwart man's progress along the road.



Astragalus tridactylicus with lavender-rose flowers on foliage of silvery green.

The first of July found us returning and the mammoth larch removed from the road and further clearing done as far as a famous rock slide. We were compelled to actually make road here, since the grader of the forest service crew had turned back after a bad slide off the side. Snow and ice had to be removed, mud holes filled, and the side of the road bolstered with rock removed from the roadway. A couple of hours work made the slide barely passable, but we crept safely along its whole half mile length, and then drove alternately in muddy and dry ruts, the first car over the road in the 1950 season.

The patches of *Erythronium grandiflorum pallidum*, which had glorified the needle-strewn ground at the level where the larch marked our earlier terminus, were faded and in seed. The yellow bells (*Fritillaria pudica*) had turned to brown and then had shrivelled and fallen, and their seed pots were swelling also. The broken sunshine of yellow violets greeted us with their customary modesty while the more unusual *Paeonia Browni*, flourishing also in the shade, had not yet opened its odd greenish flowers. This was probably the highest elevation at which grew the Wild Onion, *Allium Cusicki*.

As we ascended, the *Fritillaria* and *Erythronium* were in various stages of development according to their elevation and exposure. The freshly opened flowers at the higher, colder locations were being whipped by the cold winds which whistled down over the steep slopes and tore through any sort of open area. Pictures were next to impossible even when the light proved favorable.

The heavy patches of snow increased as we ascended. A fellow traveller in a jeep, which is by far the most satisfactory vehicle with which to negotiate these rough mountain roads, caught up with us as we labored to remove a fallen fir tree from the road and he helped with the clearing. It was to this spot where we met the jeep that we returned to camp after forging ahead a few hundred feet only to be stopped by mud and too many fallen trees. The melting snow made a river of the roadway in many places and elsewhere kept it soft as a bog.

The choice of campsite was simple. The first recommendation that it had was a running stream bordered by *Valeriana sitchensis*, *Romanzoffia sitchensis*, and a fairly low growing lupine. The rivulet wandered from one grove of alpine firs to another with occasional clear pools, one of which served as a cooler, for our food during the hot hours of the two days we made this our headquarters. Another inducement was a bed of straw left by hunters of the previous fall and so located as to catch the morning sun, a welcome specification for high elevation camping. A level area in which to park and open space for a fire, a permit for which we had to secure beforehand, completed the physical comfort arrangements. But the aesthetic side of camp life was not to be neglected. The near view looked down a steep slope where ground squirrels scurried through lupine and pentstemon, into a deep valley where we could hear a rushing torrent of water. Trail signs bespoke of elk and deer and we were certain that a salt lick in the valley must have been visited by large animals during our sojourn, but we were never fortunate - or quiet - enough to witness their movements there.

Mission Peak seemed to call to us to travel farther as we glimpsed the far vista through the eastward pass. South of us the vast reaches of standing timber - larch and fir and hemlock - covered the rising mountain side and obscured the actual summit of Table Mountain which is a long series of plateaus and small valleys blended into two levels or "tables" from which the mountain gets its name. The outermost tip of the second table is capped by Lion Rock Lookout. We hiked or "sloshed" from our camp to the end of the first table, a distance of three or four miles, rested in the pass which the game animals use for a trail, and decided to return without besting the second table. When we kept to the roadway we encountered snowdrifts up to seven feet in depth but, at the edge of the tables where scab rock crumbled away for a thousand or two thousand feet, mountain grass camouflaged the sharpness of the rocks in which bloomed *Draba*, *Arenaria*, several small legumes with orchid to cream colored flowers, *Eriogonum*, and, in the less grassy areas, *Spraguea multiceps* (pussypaws). Jagged rocks, left by natural erosion, sometimes held enough detritus in the crevices of their fantastic shapes to support a clump of feathery *Heuchera glabella* or some yellow-or orange-tipped *Eriogonum*.

The stunted forest land of the crest of the table gave way to this open rocky ground for distances varying from a few feet to a hundred yards before the scab rock sloughed off into the deep chasms and valleys. The crest forest consisted of dense thickets of alpine fir, edged with kinnikinnick. The glades and hillocks and roadsides, somewhat protected by these thickets, were a continuous bower of *Sisyrinchium Douglasi* - the purple grasswidow; *Erythronium grandiflorum pallidum*, the white anthered, yellow flowered glacierlily; *Dodecatheon alpinum*, a very short stemmed Shootingstar; and a juicy-leaved *Montia* or *Claytonia*.

Seedlings of *Abies lasiocarpa* grew by the hundred and thousand along the roadway and seemed to be contesting, by natural reforestation, man's right to usurp any land for passageway.

Three crows battered their wings against the strong winds as we stopped to rest, and a lonely eagle soared disdainfully overhead. As we returned to camp,

a hoary porcupine sought refuge in a tree while we endeavored to get the right light for a picture. The next day we saw the same one, or a good counterpart, near the same meadow, stuffing itself on flower heads of lupine and Phacelia as though it realized how short the summer season of plenty would be. Dying trees bore mute testimony to the winter depredations of these interesting foragers. Huge patches of bark were missing at a height of seven to ten feet - the probable height of winter snow. The previous winter had been a long and severe one and food must have been very scarce.

Each of the two mornings of our stay on the slopes of Table Mountain, snowshoe rabbits paid early visits to nibble off the heads of lupine. One elk at least passed along our road during the first night. We saw it faintly and marvelled at the quietness of such a large animal.

One of the many plants we were unable to identify on this trip was a lovely thick-stemmed anemone which grew in the very wettest spots. Solitary flowers of white, with greenish yellow centers, appeared first. Then came finely divided leaves of light green. Since these grew only at the high elevations we found none in seed and were unable to learn more about them.

A side trip through the old pass to Wenatchee brought us past a lush meadow of high grass to a rocky outcrop where a galaxy of *Phlox caespitosa* in white, orchid, pink, lavender, rose and purple made the chief display. Never have I seen any greater variety of color of phlox in so small an area, and, as is the habit of this one, each plant was covered solid with bloom.

This digression from the high places seemed less fruitful than we had expected. But not so our homeward journey! It was filled with delightful experiences which we will save for another writing. But Table Mountain will remain literally and figuratively the high spot of that particular trip.

CALIFORNIA ANNUALS FOR ROCK GARDENS

EDWARD K. BALLS, RANCHO SANTA ANA BOTANIC GARDEN, CALIF.

IN advocating the use of annuals in rock gardens it must be recognized that they should be used with due regard to suitability and effectiveness in the landscape. Even so there may be room for considerable question in some minds as to their real suitability in such company. Yet, even in the alpine garden it may be quite right to grow certain of the smaller annuals without real incongruity. I am personally inclined to draw a clear distinction between rock and alpine gardens, more especially so as in Southern California, where I am settled for the time being, it is nearly impossible to grow the old alpine favorites from the high hills around the world. But, throughout the region there are many natural rock formations and a rock garden is as suitable, and as attractive, here if rightly planned, planted and cared for, as elsewhere in more genial climates. Our difficulty in cultivating plants is not so much cold and winter damp as drought and summer heat, often with "smog" over much of the coastal areas, smudge in the winter in citrus regions and cold fogs at unpredictable times. All these conditions have helped to turn my thoughts towards the possible use of annuals in the rock garden. Not, of course, as the principal plantings, but as additions to the shrubs, succulents and perennials which can be grown here. Whilst I am perhaps immediately concerned with the use of annuals for rock gardens in this part of California I see no reason against extending the idea to other areas. The flowering season of many rock gardens might be lengthened considerably by the use of annuals.

California is particularly rich in annuals of many and various types. By no means all of them are suitable for garden use but there is an extremely wide field

from which to choose and many of the plants are at present completely unknown in any gardens.

When I speak of California annuals for the rock garden I am thinking of species native to the State and not the improved garden varieties of double Clarkia or such favorites as wallflowers or snapdragons. These belong in the borders or the cut flower garden.

Do not be misled by the idea that annuals are all easy to grow. It is not just a matter of scratching the ground, scattering a little seed and then sitting back to watch results. Many of the annuals need just as much care and thought in the selection of their soil, situation and their immediate neighbours as do the most exacting of alpines and to succeed with them is just as much a triumph as to have grown a fine plant of *Eritrichium nanum* or some of the Himalayan primulas. It is also true that to succeed fully with them is likely to give just as much satisfaction to the gardener, for very many of them have a delicate beauty which can hardly be excelled. Naturally all annuals will not require the same arrangement in the garden. Some should be grown in drifts or masses to get the maximum effect, some can well be treated as individual specimens or scattered among other plants. Where drifts are used it will be necessary to remember that after the flowers are over and the dead remains cleared away there will be an empty space in the garden until the next season's planting. This does not seem to be bad as such open spaces do certainly occur in nature and with a well constructed rock garden it is not essential, or perhaps even desirable, to have every portion completely filled with growing plants.

Many of these annuals can be raised in flats and transplanted to their eventual sites when weather conditions are suitable, though in general it is preferable to sow seed directly where the plants are to grow. If you have faith and patience it is a good plan to sow seed very thinly or you will need to drastically thin out the seedlings when they come up too abundantly as they assuredly will if you are not very stingy with the seed in sowing. Of course, where dwarfing is planned, overcrowding, often with very poor soil and lack of water, will sometimes help to achieve this end. A case in point is *Baeria maritima*, which, treated on the above prescription in poor, sandy soil will make a lovely, golden carpet an inch or two high, where given fatter soil and not much more water, it will grow into rather rank, green bushes a foot tall and more though with apparently fewer flowers. In general we find, in southern California, that seed planted in the fall, from November onwards, is most satisfactory, though we continue our sowings through February and March if necessary. Seeds usually germinate after the first rains, but do not begin to grow vigorously until the days begin to lengthen. The young plants appear to be somewhat strengthened by the light frosts which we get here, rarely more than 8° Fht. and neither frequent nor of long duration. How they would react to a more severe winter I cannot say. Possibly seed lying in the ground would be satisfactory where young plants would be unlikely to stand prolonged freezing and would certainly go under a treatment of repeated freeze and thaw, such as is the normal state of affairs in the winter in many areas. It would therefore seem more desirable to sow California's annuals in early spring or even to raise them in flats as is done with most garden annuals, in areas where the winters are at all severe and late spring frosts can be expected.

The size and lay-out of your rock garden will have to determine what annuals can suitably be grown there. It would be a pity to use such species as *Lupinus succulentus*, a handsome species which can grow to four or five feet tall and as much through, in a garden of anything less than acres, since it would completely dwarf the landscape and overgrow anything in its vicinity. The familiar California Poppy, *Eschscholzia californica*, which is in truth not an annual though it is most satisfac-

torily treated as such in most areas, is really also too large-growing for most rock gardens. Yet, individual plants will look extremely beautiful hanging from a cliff face or a chink in a dry wall. But, there are a number of other *Eschscholzias* which are really better suited to the rock garden in both size and habit. The more dwarf forms of *E. caespitosa* are lovely, with flowers of a very deep, brilliant orange, in the best forms, and leaves as blue-gray and fernlike as those of *E. californica*, though not so large. *E. caespitosa* var. *hypocoides* has smaller flowers of a paler orange, held upright on stiffish, slender stems some inches above the green-gray foliage. In the mid-day sun, in full flowering time, the foliage disappears under a spread cloth of gold as the hundreds of blossoms open wide to overlapping. This is a species to be grown in masses and drifts to obtain the most striking effects from its attractive flowers. *E. californica* var. *maritima* should be grown if possible. This too is not an annual, but, except in mild, coastal areas it will probably behave as such. It makes a completely flat mat of intensely silver leaves with an encircling ring of flowers of pure yellow, with orange centers. To keep it in this habit it probably needs a frequent but judicious burial in sand, to remind it of its native home in the sand dunes along the California coast, where there is a constant drift of sand to cover up, and hold down, any growths which may be getting too long. There are some delicate, pale yellow little *Eschscholzias* such as *E. Parishii* from the desert or *E. Lobbii* from the Sierra Nevada foothills, up to 2000 feet, and from the Great Valley. Both are neat, tufted plants with light yellow flowers, slender stems holding them well above the leaves. These two species would be satisfactory either as scattered plants or in masses, if you can get them to grow at all for you. Both are probably best suited in scree-like conditions. All the *Eschscholzias* like plenty of sun and good drainage.

Several of the *Nemophilas* make good subjects for rock garden use. *N. Menziesii*, Baby Blue Eyes, frequently known as *N. insignis*, is fairly easily available in cultivation. The plant varies enormously in nature (and possibly that is the reason for its having received various specific names in the course of its history) with flowers which range from very deep blue to almost white. Both light and dark forms are desirable, though poor, weak forms exist, which should be discarded as much as possible. As might be expected of a plant which naturally grows under such widely varying conditions it can be suited in almost equally varying places in the garden. In general it should have a well drained, rather sandy soil and will appreciate some light shade in hotter, drier climates. In more northerly gardens it undoubtedly will enjoy full sun. The habit is inclined to be prostrate, or almost so, and it may grow to eighteen inches across. It is usually a good-tempered plant and has been grown in borders and window-boxes for generations. The forms in cultivation are usually light, bright blue-flowered and often rather larger in flower than most of the wild forms. *N. maculata* is also a good plant for rock garden use. This comes from the meadows of the Sierra Nevada foothills from 1500 to 6500 feet. It should be grown in poor, rather dry conditions in sun where it will make a neat, mounded plant a foot across, covered for weeks with its comparatively large, white cups, each petal bearing a large, deep blue dot on its outer edge. If too well fed it tends to lengthen its stems and to make a poor, straggling plant, losing its real charm and its better habits. Here it grows in heavy adobe soil in full sun. It is one of the earliest of the native annuals to come into flower. Plants from seed sown in late November will begin to flower in the first days of February. It is generally over before the grilling heats of summer commence. To germinate the seed satisfactorily very heavy watering seems to be necessary, but once it is really growing the water supply should be drastically cut.

In this same family there is a long, and generally dull, list under the name

Phacelia. However, there are some members of the genus which are worth a place in the rock garden. Little *P. curvipes* is a delightful plant, with low, spreading habit and delicate china-blue flowers. The leaves are gray and hairy, and the slender, branching stems, raying from the root-crown, curve upwards for about half of their length, making plants rarely more than a foot across. It prefers a light, sandy soil and can be comfortable in some shade in the hot areas of southern California where it is native to the mountain ranges, often growing under pines, from 4000 to 8000 feet altitude. *P. Douglasii* is another semi-prostrate species from sandy places in the interior valleys of the central and north-southern parts of the State. It has small, ferny leaves and pale blue flowers, verging onto purple, rather large in the genus. Usually about nine inches tall it will carpet large areas in its native places. *P. Parryi* is a fine plant with rich, deep purple, flattened bells, sturdily upright in habit. If too happy it may become two feet tall, or more. Even here it seems to stand all the sun it can get. A dry, sandy situation, with infrequent water after it is well started, will usually keep it from growing too tall. It is one of the last of the annuals to flower here and lingers full of color into the heats of late June and early July. *P. campanularia*, California Blue-Bell, sometimes *P. minor*, is a fine species with deep blue bells, and a habit rather like *P. Parryi*. It too, is apt to be rather large but could be used with discretion. *P. viscida* is in the same class with the two preceding species, but it is handsome if kept within bounds. It has deep, gentian-blue flowers with white centers (Beware of the poorer forms in which the flowers tend to a washy purple) an inch across. I have heard of its growing to six feet tall, though I believe this to be decidedly unusual. Jepson gives its height as "eight inches to two feet".

The family Polemoniaceae probably opens the widest field from which to select annuals for the rock garden. The small species of *Linanthus* are nearly all excellent for carefully selected places. *L. dianthiflorus*, from the open fields of coastal southern California, will make a lovely mounded plant twelve inches across, completely covered with inch-wide white, pink or pale lavender flowers. In the meadows it is apt to be a single-stemmed plant bearing a few flowers, and whilst still very charming is not so effective as when grown with less competition, more attention and in a richer soil. *L. androsaceus* is a more delicate-looking species from the moister coastal ranges from Monterey Co. northwards. It makes a loosely bushy plant with white, stary, yellow-eyed flowers on long, slender tubes. In its places it is inclined to grow under the protection of low shrubs or stronger-growing herbage, which would indicate some measure of shade and a cool medium. *L. parviflorus* has a wider range than the preceding, from Mendocino Co. south to San Diego Co., from 200 to 2000 feet. It is more independent than *L. androsaceus*, growing in open, gravel areas in hot sun and parched conditions. In habit it is more erect growing and stiffer and its flowers vary in colour from purple, pink and yellow to white. There is available through seedsmen, a plant derived from *L. parviflorus* under the name *Leptosiphon French Hybrids*. In this the colour range of *L. parviflorus* has been increased and intensified to a remarkable extent, providing an instance of outstanding improvement on the natural species. This will make a most attractive addition to the list of annuals available for rock gardens. Like the type, these hybrids, do best in a hot, gravelly or sandy soil in full sun. They should be grown in drifts for maximum effect. Grown too, with the smaller forms of *Lupinus nanus* they make an extremely beautiful combination. Not so showy, but of particular interest, *Linanthus dichotomus*, Evening Snow, is a plant to be tried. It is almost invisible during the day in its native places where it grows among sparse grasses in dry, gravelly or sandy spots. Its particular charm is its delicious evening scent, which is rare in the family as a whole. The flowers roll up tight during the

day but open wide, white chalices as the sun sinks westwards. It should be grown in fair sized patches and if it really likes what you have done for it you will then see the reason for its familiar name. Going further into the desert, following the trail of *L. dichotomus*, *L. aureus* is another of these little plants which should enrich the rock garden, where it would seem best suited in scree conditions. Its flowers are a rich, clear, golden yellow. The plant is often a tangled little bush of fine, wiry stems covered with bloom which, when I first saw it reminded me of a golden-flowered flax. In nature it seems to vary in size from almost prostrate dwarfs of two or three inches across to bushy plants a foot tall and as much through. Like most of the plants from the deserts of the southwestern states it will probably only grow in the driest, hottest exposures, in more northern areas.

Langloisia Matthewsii from the same regions has attractive flowers, speckled or mottled, but in general effect a rather curious crushed raspberry-and-cream colour. Its white, angular stems are very brittle and its leaves though small are spiny. The plant is a little hedgehog to handle. It too varies in size of growth, at its best making a dense, domed plant, almost a cushion, a few inches across. At times whole acres of the desert floor are pink with its blossoms between the scattered creosote bush. Companion to the last two, *Eriastrum (Hugelia) eremicum* is of the same family. In general habit it is taller and looser than the *Langloisia* and its flowers range from a pale, lavender blue to a milk-white. It is a dainty species and like most of the desert annuals is much more effective in large numbers than as individual plants. Among the larger species of *Linanthus*, *L. grandiflorus* could be used where there is space to grow it. It will get to eighteen inches tall and as much through under horticultural treatment. It comes from the coast ranges of the central part of the State, up to 2500 feet, and will certainly take considerably more water than the desert species. There is a pure white form which has gradually been selected out from the original collections here, growing taller and with more branched heads making a very handsome plant. These should both be grown in fair sized drifts to be most effective and therefore really require quite a large area to themselves.

Of the Gilias perhaps the Bird's Eye Gilia, *G. tricolor*, is the most suitable for the rock garden. This is a very variable species in habit and stature and is, in nature, spread over a large area in the coast ranges, and the Sierra Nevada foothills, and might be expected to settle down in an equal variety of conditions. Seed is probably very easily available through commercial channels. *G. tricolor* will grow to eighteen inches or two feet tall, given space to develop, though under its natural conditions it is generally much smaller. Its dark-eyed flowers are particularly attractive. Such species as *G. G. achilleaefolia*, *capitata* and *chamissonis* are likely to be too tall and rank, especially in garden conditions where they may easily reach three feet tall. They are all three blue-flowered, with dense, clustered heads of rather small flowers, effective but perhaps not sufficiently restrained for the rock garden.

Among the desert flora there is really a wonderful selection of annuals to be found, and in the matter of size and habit many of them are particularly suited to rock garden use. Also the fact that they are most likely to need particular care and individual attention in growing, makes the rock garden the most satisfactory place in which to try them. *Mentzelia involucrata* var. *megalantha*, from the Colorado and East Mojave Deserts is an exquisite plant. Rarely more than fifteen inches tall it may make a spreading plant up to half as wide again. The flowers are large for the size of the plant, up to four inches across. The colour of the satin-textured petals is hard to describe, a delicate, champagne-cream colour shot through with faint vermilion-red. The cup is filled with a crowd of long, slender stamens. There is a form of *M. gracilentata* var. *pectinata* in Kern Co. which should be well

worth growing on a hot, gravelly slope. It is a stiffish plant, to eighteen inches tall, with burnt, copper-orange colored flowers, with the regal satiny petals of most of the genus. The flowers are well over an inch across and produced in great numbers. This species should, by all means, be grown in drifts as large as your space will allow.

Monoptilon bellioides should make an interesting and attractive scree plant, either scattered or in drifts. It is absolutely prostrate in habit making an interlacing mat, perhaps eight inches across. In May it is completely covered with stemless, yellow-centered white daisies which often have a pink tip or reverse to the rays. The effect is of a congested collection of decapitated English lawn daisies, without any leaves. Fit companion to this is *Nama demissum*, from the same hot, sandy localities. Also a completely prostrate, tangled mat this is covered at about the same time as the daisy, with small, bright, cherry-colored trumpets, a strong contrast to the other. Mingled in the same scree they make a delightful picture.

The annual Buckwheats, Erigonums, from the deserts are multiple and confusing. None of them is individually showy but almost all of them, when gathered together in multitudes as they usually are in the wild, provide a dainty filminess which is decidedly charming. They may give a pinkish or white or a greenish-yellow tinge to the landscape. Some of them are quite dwarf, only a few inches tall, and a few will grow to a foot. But, if there is room and you can grow them they are certainly attractive. *E. dasyanthemum* is perhaps the best of the annual buckwheats. It does not come from the deserts although its haunts in the inner coast ranges are often nearly as dry. It will grow to two feet high and more through, a delicate, lacy bush reminding one vaguely of Gypsophila, in general habit and at a little distance. *Chorizanthe staticoides*, Turkish Rugging, which may be no more than an inch or two tall on the desert, may be a foot tall elsewhere, making a good hearty bush where happy. In July - August it will be completely covered with rather harsh pink colored flower-heads. The flowers themselves are small and pale pink and the real color of the *Chorizanthe* is in its tangled, brittle stems and its calyces. This color remains until the whole plant dries up and is blown away to scatter its seed in other spots. *C. Douglasii* is a smaller and more delicate-looking plant of a softer pink coloring. It is more suited to general rock garden treatment, needing just as much sun and heat as it can get, in a poor, sandy or gravelly soil. It is a very excellent little plant for scree. In some of the herbarium material I have seen this species is twelve inches tall and rather leggy, but the short, dense plant, perhaps three inches tall and as much or more through, is the one to be grown. This plant is also pink all through, the small green basal leaf rosette disappears as soon as the flower heads really begin to develop.

For cooler areas, partly shaded from the heat of the Summer suns, *Collinsia heterophylla*, Chinese Houses, is an excellent plant. It will grow large and loose if richly fed and over happy, but on the whole it needs humus and reasonable moisture. There is a good deal of variation in the shade of its bi-colored flowers, from pale lavender, almost white, to a deep, velvety purple in the lower petals. The strongly contrasting color forms are the more striking, though a whole, shady bank covered with the pale form under the high spreading branches of some giant live oak is very lovely indeed.

Papaver heterophyllum, the Wind Poppy, is another good annual for slightly shaded situations. It is a dainty, attractive four-petalled poppy with a boss of cream-colored stamens and anthers. The flowers will open quite flat and face you instead of looking up at the sky. The plant may grow to two feet but it is slender and delicate and except in competition with taller-growing plants, is not likely to get drawn up so tall. Closely related to the poppies, *Platystemon californicus*, Cream

Cups, is a plant of the coastal swards and also of the inland valleys. It seems happy under such a variety of conditions that it should surely be amenable to garden culture. In moist areas, growing with other, ranker herbage, it may get to be eighteen inches tall and two feet through, but in more open, drier places it is a small, tufted growth six inches or so through. The flowers are very attractive, cream-colored little goblets, sometimes with a yellow tip to the petals, to three quarters of an inch across, filled with a fluff of creamy stamens and anthers. On the whole it seems to prefer growing in a mixed company, being of a gregarious nature. Seed of this species may look entirely unsatisfying, as the glossy, black seeds are often encased and will not separate from the dead capsule, but they will germinate just as readily in that condition as the bright, beady little seeds which look so good. A smaller, neater plant, really to be grown in scree-like conditions or sand, *Meconella linearis*, is much like Cream Cups except that its leaves are all in a basal tuft and it has a neat, compact habit, with all its flower stems growing up among the leaves, from the root crown. Here, seedlings sent up their first flowers on stems not more than an inch tall, when the plants were yet doubtful if they would pull through, but the flowering continued for two full months, the plants developing to a proper stature, about six inches tall, as they progressed.

With the exception of a few of the desert species of *Lupinus* most of the annuals in this genus are too large to include in any average rock garden. Some, however should be tried. *L. nanus* is perhaps the first both for its habit and its brilliant colors. It is the lupine which brings the sky down onto acres of California's hillsides, in happy seasons. And, because it doesn't appear in like numbers every season one feels that failure in cultivation is not always completely the fault of the cultivator. I have found *L. nanus* thrive best in dry, sunny spots in gravel or sand with a pretty good supply of water at the time of germination and early growth, though a cold, damp period soon after germination may wipe out the whole stand. Birds and rodents of all breeds, have a passion for the seed and young seedlings of all lupines, and special protection is therefore a necessity. With us, the protection is necessary from the day of planting to the final day of the seed harvest, as the rabbits love *L. nanus* at all stages and will shear off a whole bed in full flower just as readily as they will take the seedlings one by one when these appear above the ground. *L. Benthamii* is such a lovely plant that it too should find a place. It is stiffly upright in habit and will grow to three feet tall with several side spikes of lesser stature. It is a deeper, rather more purple blue than *L. nanus* but its dense, pointed spikes of bloom are well worth having. If you should ever be lucky enough to grow a pure albino I am sure that you will continue to raise *L. Benthamii* again and again in the hope of re-capturing that treasure of loveliness. This past spring in the Tehachapi Mountains I came across an albino of wonderful purity and it was truly beautiful. To my regret it was so very far from seeding that there was no chance of getting seed from that plant, which would have given hope for possibly continuing its beauty in cultivation over other seasons. A third of the annual lupines to be tried in the rock garden is *L. Stiversii*. This is a very attractive pink-and-yellow-flowered species. I must admit that I have not yet succeeded in growing it satisfactorily though seed germinates reasonably well. I have tried it both in the open and in pans under glass, and whilst some of the plants have even come to flowering they have been poor, small representatives of what the plant should do. Usually it is about nine inches tall (but may grow to eighteen) and forms a bushy, attractive plant. Its native place is in dry, sandy or gravel foothill meadows on the west slopes of the Sierra Nevada and the San Bernardino Mountains, at about 5000 feet.

In the genus *Oenothera* there are a number of attractive annual species which are worthy a place in the sun. *Oe. brevipetals*, with pale yellow flowers and a dusting

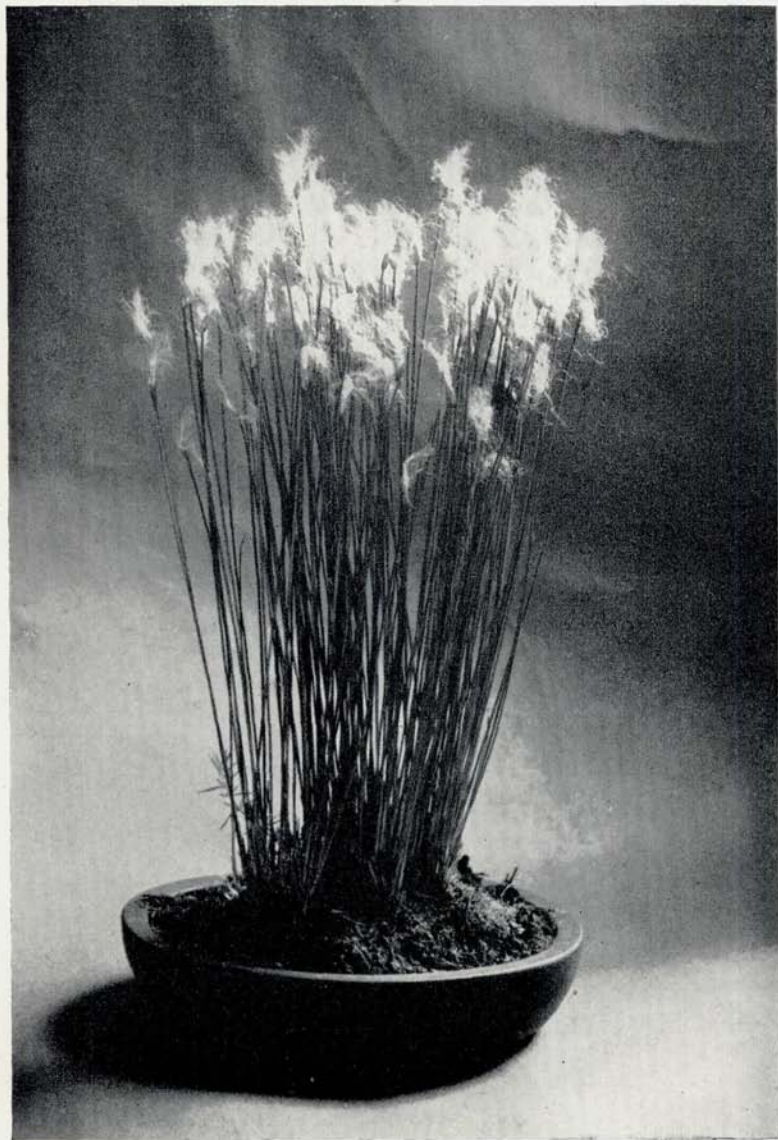
of white powder round the center of the flower, will grow to fifteen inches tall with a central, upright stem and several side branches. Its irregular leaves are grayish and mottled with red. Grown in fair numbers it makes a delightful splash of color, but it is also a useful plant to grow scattered, the way it is apt to occur on the deserts. *Oe. dentata* var. *Parishii* is a wiry, tangled little bushlet, four to ten inches tall, with deep yellow flowers in great abundance. Also from the desert this needs a good sunny position in sand or scree. *Oe. brevipes* is not so particular in respect to soil. I have seen it appear voluntarily in quite heavy, well watered loam. *Oe. bistorta* var. *Veitchiana*, Sun Cups, is inclined to be woody when fully developed, either semi-prostrate or bush-like in habit, to about a foot tall. The flowers are a deep yellow and often have a dark brown spot at the base of each petal. This species will do well as scattered individual plants or in larger groups. It needs a well drained soil and plenty of sun, coming from the interior of southern California from Ventura Co. south. *Oe. clavaeformis* is a white-flowered species, one of a group which has small and crowded flowers on curving stems that straighten as the flowers open in succession. This needs a light, sandy soil and full sun and should be grown in good numbers for the best effects. *Oe. decorticans* has somewhat the same appearance but the flowers, opening white, turn pink as they age. Both of these species are interesting and effective though not, perhaps, so showy as the large flowered evening primroses.

Of the daisies, which are legion, and often beautiful, the early-flowering *Coreopsis* species are really worth a place. *C. C. calliopsidea* *Bigelovii*, *Douglasii* and *Stillmanii* are all rather similar species with a basal tuft of fleshy, much-divided leaves and brilliant golden-yellow flowers on naked stems up to fifteen inches tall, perhaps taller if in rich well-watered soil. In dry, sandy and sunny desert conditions they will be about six or eight inches tall and so are completely charming. The *Coreopsis* species should, by all means, be grown in drifts, as large as your garden will allow. (As a footnote, they make the most excellent cut flowers). *Layia platyglossa*, Tidy Tips, might be used if the area available is ample. It should certainly be grown in quantities and by no means used as individual planting, being essentially gregarious. The clear yellow flowers with white-tipped rays are extremely attractive, and the plant has an exceptionally long flowering period. But, it is large and overflowing, and should be used only where meadow-like areas are available. *Baeria maritima* is certainly admissible if kept very dwarf and carpeting, by reason of poor diet, little watering and a good deal of over-crowding. *Monoptilon*, which belongs here came in under the Desert species, so needs no further remark. *Baileya multiradiata*, though by no means an annual, should be treated as such and is therefore included in this list. It comes readily from the most unpromising looking of seed, and will flower in about six weeks from germination if conditions are right. Here we have found that seed sown in the open in mid-June, and watered freely for a short period, does the best. Plants from seed so sown have flowered on into December, by dint of keeping the dead blossoms rigorously cut. It makes a handsome plant with gray, woolly leaves in a rather low bush, the light yellow flowers held on slender stems twelve inches above the leaves. Once grown, too much water will speedily kill off well established plants. Watering once in two or three weeks is sufficient through our dry summers here. *Baileya* needs a well-drained soil and plenty of sunshine. It is a desert species, and its gray woolly leaves object strongly to any surplus of water. It is, also, an excellent cut flower.

On the whole the *Godetias* and *Clarkias*, though showy and beautiful plants, are too large for the rock garden, but given ample space the shorter, bushy species such as *C. Bottae* or *C. concinna*, would be welcome. With these plants too, if completely starved many of them will grow no more than six inches tall, and are quite effective, but one cannot be sure that they will turn out that way. There is a

dwarf form of *Godetia Dudleyana* which is very attractive if well grown. *G. D. compacta* unfortunately has a rather poor constitution and is very uncertain so that one recommends it with reservations. When doing well it will make a neat, bushy plant rather less than a foot tall, completely covered with rather small (for a *Godetia*) pale pink flowers. But, hearty, good-looking plants of this form have a discouraging habit of suddenly wilting and dying for no apparent reason.

This is but the beginning to the list of annuals from California which could be considered for rock garden planting. There is included here a smattering of biennials and perennials which are really better treated as annuals, especially in colder



BEAUTY IS WHERE YOU FIND IT

climates. A few are in cultivation already, many more have been at one time or another but have dropped out for various reasons, mostly wars, but it is to be hoped that many more will become available to gardens before too long. The difficulty is not so much in selecting suitable material as to find where the seed is available. At present the only source for many of these species is in their native places, which are, in the nature of things, available only to few individuals.

BEAUTY IS WHERE YOU FIND IT

Motonosuke Ozawa, a member in Tokyo and a contributor to the seed exchange, sends this remarkable photograph of a sedge. "*Eriophorum alpinum*" he writes, "is a noble perennial plant, of which the blade is shining like a silk thread, forming a nice contrast with its green stalk. I got it from Mt. Hakkota."

We have this same sedge in Canada and the mountain bogs of northern New England, but we have failed to see in it the qualities which our Japanese friend detects. In matters of rock gardening we must still bow to the experts beyond the Pacific, with their centuries-old background.

Our *Eriophorum alpinum* is creeping rather than tussock-forming, while *E. callitrix*, of similar stature, and growing also in Asia, makes tussocks of the type shown in the illustration.

GERMINATING HARDY CYCLAMEN

CHARLES G. CRAWFORD, TOLEDO, OHIO

I have always wanted to have a lot of hardy cyclamen, and to find out which species do well in Ohio. Seeds planted in years past however have always given poor germination. When seeds that do not sprout are left a year or two in the pots or boxes, as they seem to require, they have a hard time of it, with interference from chipmunks, squirrels and cats digging into the soil during their long wait, and other mishaps.

Of course I always knew that the cause of the slow germination was old seed, and recently I have found out that cyclamen seed ages very quickly. January, February or March have usually proved the earliest months during which it was possible to obtain fresh seed. Finally I heard about some seed of *Cyclamen neapolitanum* offered ahead of harvesting in the Northwest.

Reading everything available about hardy cyclamen, especially in the *Bulletins* of the American Rock Garden Society and the English Alpine Garden Society, with many useful cultural directions, I decided that *C. neapolitanum* should be hardy enough to try first. So I sent for an ounce of the type and $\frac{1}{4}$ ounce of the white form. This seed arrived no doubt very soon after it was gathered, since it was still quite sticky when received. That was what I wanted, fresh seed, very fresh seed.

This was sown at once, October 20, 1950. I used a sandy loam that had been treated six months before with Dow-fume to kill weed seeds and insects. Fearing germination might not be good even with the fresh seed, I sowed eight flats thickly, covering about $\frac{1}{4}$ inch, while in pressing down the soil some seeds worked almost to the surface. The flats were watered well and placed under greenhouse benches, where they were expected to stay at about 50 degrees F. till some time in February, when they should be ready to transplant.

In two weeks some of the seeds at the surface showed signs of germination. In another week I was startled to see what I thought were some very small beads on top of the soil. Trying to imagine how anyone could have broken a string of beads there,

I looked closer to discover that each bead was a bulb or corm connected by a slender sprout to an amber seed.

Two weeks later I had a bigger surprise, each row in the flats humped up into a ridge, showing almost 100% germination.

The top of the soil is carried dry. About the middle of February I plan to transplant into a soil with plenty of leaf mold, some seedlings into very small pots, some spaced one inch apart in flats. Then I shall go back and re-read all the articles on the care and culture of hardy cyclamens.

WHAT TO DO WITH EXCHANGE SEEDS

TO members blessed with greenhouses and all the complicated paraphernalia which man has invented for the handling of plants, no advice regarding the care of seeds and seedlings is offered. Each will have his pet theories and practises, many of them contradictory to the practises of the other fellow, and most in the main successful. But among our nearly 600 members are a number who, while devoted to plants for ornamental value, have little practical knowledge about growing them, little or no equipment for the purpose. It is to these small-scale and often diffident gardeners that our remarks are addressed.

On receiving the seeds, do not lay them on a shelf and forget them. The spark of life in too many of them dies out after only a few months or even weeks. If it were practicable to mail them to you the day they were collected, much loss would be avoided. When they arrive in the mail after unavoidable delays in listing, handling, packaging, there is no time to lose.

Even before their coming, prepare yourself by reading all available information on the particular species and varieties you have asked for. Some may be plants of the desert, others of the bog. Some germinate almost immediately on sowing, others may wait a year or two or three. Even an apartment dweller in a metropolis will understand how differently to treat these extremes of vegetation, but in the seed itself there is nothing to warn you of its predilections. That is why we have books.

Be prepared with various soil elements, a bucket of sand, a bale of peat moss, a basket of screened leaf mold, another of rich loam, plenty of stone chips, broken pots or crushed bricks, all frost free and ready to use. Sowing seeds is like painting a picture. You can't stop to grind your pigments when you need them. They must be ready to hand.

The great majority of seeds will germinate well in a potful of sandy loam, if barely covered and kept moderately moist. Others must have drainage, as the broken pots or other coarse material is styled. Now the function of "drainage" is not primarily to drain. That is done by the hole in the bottom of the pot or the cracks in the flat. Few gardeners understand exactly what the drainage does, but they do know from experience that difficult seeds will germinate better, and the seedlings grow better, with this "drainage" under them, especially in the case of high alpine.

For the rest, you naturally include acid peat (not chemicals) in the soil for acid-loving plants, lime chips or crushed mortar (not fresh lime) for limestone plants. Fertilizers should be used sparingly or not at all. The time for them is after the plants have started growth.

Where to put the pots or flats? If you have no greenhouse, a cold frame will do, and is usually better. If you have no cold frame, one can be built, or a wooden box with a pane of glass over it will do. Or the pots may be stood on a windowsill in a well lighted cellar or not too well sunned sun porch. The sun can burn up young growth or make it "damp off." Plenty of light with little or no direct sun is best. If the pots stand in the open, a pane of glass over each will help.

Some say you should let the pots freeze up after sowing, cover them with snow and so on. This is probably good advice in most cases, but is usually not necessary. The main thing is to get the seeds sown, keep them moist, not wet, and wait for spring, when other troubles begin, these to be dealt with in their time.

CORRECTION

On page 96 of November - December 1950, the tenth line should read: *Aster spectabilis* is the first of my asters to bloom, and I am describing them.

By an unfortunate printer's error, the first line of the paragraph following had to be corrected, and the correct line was substituted in the wrong paragraph, making no sense at all to the reader.

Line 40 of the same page should start: pink-flowered and white-flowered ones. The words "and white-flowered" were unaccountably lost.

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