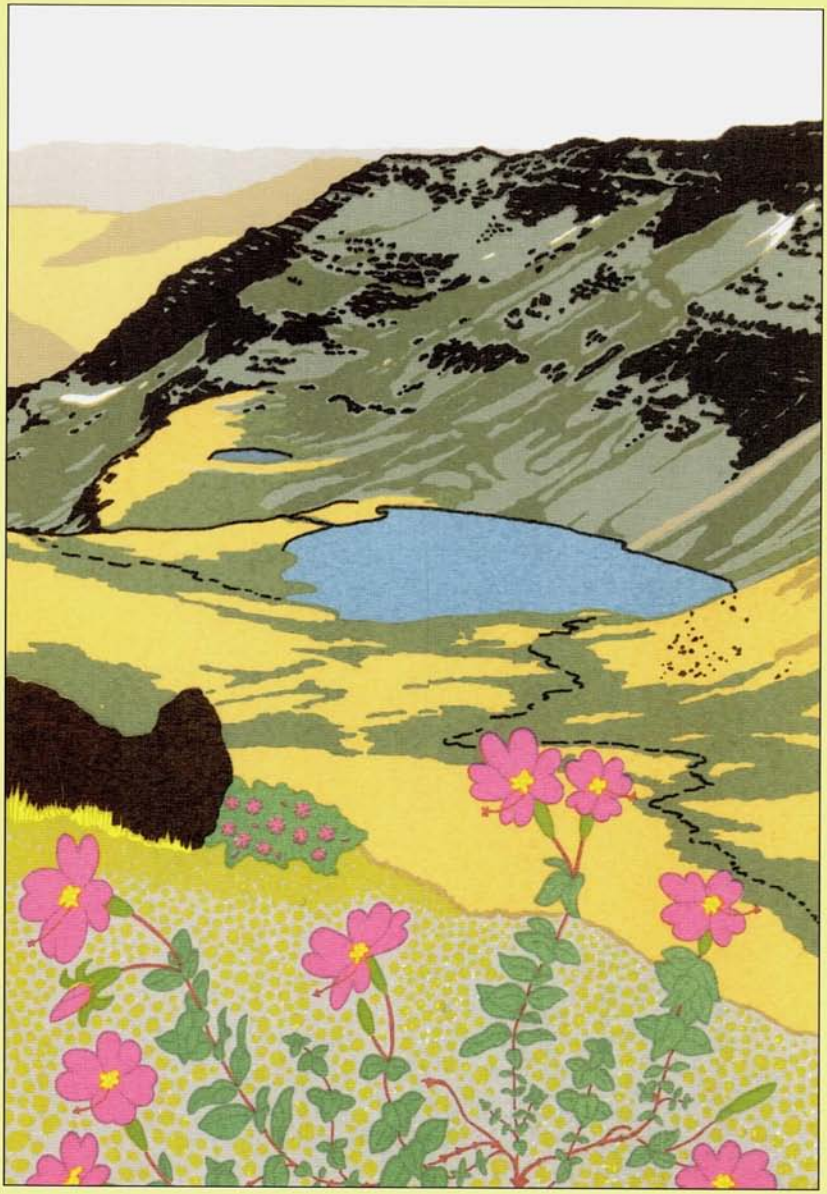
ROCK GARDEN *Quarterly*



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COVER: *Epilobium obcordatum* above Wildhorse Lake, Steens Mountain, Oregon. Serigraph by Sue Allen, Brightwood, Oregon.

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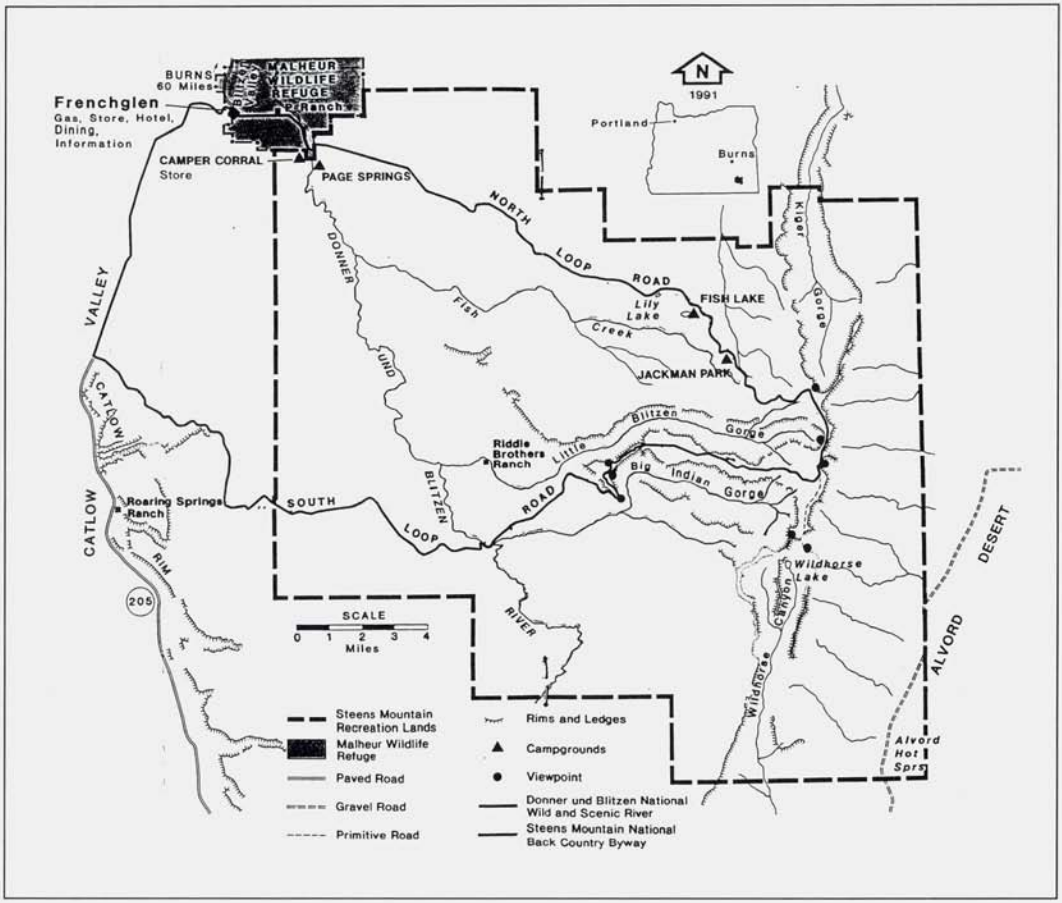

The Steens Mountain area in south central Oregon (map courtesy of Bureau of Land Management, U.S. Department of Interior).

Steens Mountain

A Love Affair

Christine Ebrahimi

My love affair with Steens Mountain began about 20 years ago, when a group of botanically minded friends informed me that they were going on a trip to Steens Mountain in far southeastern Oregon. For a "webfoot" (local jargon for a rain-loving creature indigenous to western Oregon), the prospect of traversing hot sagebrush steppe for 7 or 8 hours in late July was anything but enticing. I was perfectly happy with my own wet, lush, green vegetation, thank you. My friends' insistence that it would be "good for me" and "an experience" failed to alleviate my skepticism. Reluctantly, though, I agreed to join them, reserving my very low expectations. But what I discovered was a shocking surprise!

For someone who has never visited Steens Mountain, it is hard to envision the grandeur and expansiveness of this place. It is like trying to explain the ocean to someone who has never left the Midwest. Millions of years have lifted, gouged, and shaped this remarkable desert "island." Today, it exists as a 50-mile-long mountain range that rises to an elevation of 9,733 feet (about 3,000 meters), possessing half-mile-deep glacially carved canyons, breathtaking vistas, jewel-like lakes, and flowers. Oh, the flowers! But I will get to them later.

Even for Northwesterners, visiting Steens Mountain is not just a hop in the car for a quick weekend getaway. From almost any population center, this remote region is a 4- to 8-hour drive, mostly through desert. To see the best flowering, this drive must be undertaken during the hottest part of summer. The range is situated in the far southeastern corner of Oregon. Although comprising one fourth of the state's area, this corner supports only 1 percent of the state's population. Broad, open vistas with little or no sign of habitation are common out here. The few roads that do exist are mainly dirt or gravel; many are hardly more than two ruts in the desert. Fortunately, there are good paved roads to Frenchglen, a very small community at the western base of the Steens. As a result, Steens Mountain is more a destination than a side trip, but it is well worth the effort.

To appreciate Steens Mountain, one must understand something about its geology. The present range developed as a fault block uplift 5 to 7 million years

ago. Over the millennia, the western side gradually rose nearly a mile (about 1,600 meters) above the eastern side. This has the effect of creating what appears to be two altogether different ranges, depending upon one's direction of view. From the west, the gradual rise is deceptive, and one hardly notices that a mountain range even exists. The eastern view, in contrast, is towering from the base and downright dangerous from the summit. The precipitous drop of almost one vertical mile is enough to make anyone tread carefully near the summit viewpoint. If you are a camera buff, don't forget your wide-angle lens: you can't do this country justice without it. (Photos, pp. 93–96.)

Adding to the geological interest and biological diversity are the immense gorges of Steens Mountain. During the last ice age, huge glaciers formed on the Steens and sculpted five U-shaped canyons. In this arid region with little precipitation and erosion, the gorges are remarkably well preserved. And since Steens lacks high-elevation conifers, the canyons—half a mile deep and 2 miles wide—are easily visible. Kiger Gorge is the best known and the most photographed. This is also the gorge that is home to the resident Kiger mustangs; these "wild horses" are thought to be the purest herd of Spanish mustangs in the wild today.

In floristic terms, Steens Mountain occurs within the Intermountain Region of the Great Basin. This is expansive, open country of high desert sagebrush steppe, dotted with many small mountain ranges running north to south. The Steens range is just one of 200 or more such "islands" occupying this region. Within this area between the Cascade-Sierra and Rocky Mountains, the small amount of moisture that occurs does not flow to the sea but instead empties into low, flat "playa" lakes. Many of these shallow bodies of water evaporate every summer, creating alkaline playas high in salts and mineral deposits. The Alvord Desert, lying in the rain shadow just east of Steens Mountain, is one such place. This is the driest location in Oregon, with annual precipitation of less than 7 inches (140 mm).

Over the 20 years that I have been visiting the area, I have found that late July to early August offers the best flower shows, especially for alpine plants. Of course, this is strongly dependent on winter snowpack. And unless you are a runner, I recommend that you avoid the first full weekend of August. An annual event, "Steens Mountain Run", occurs during this weekend. Camping sites are often difficult to find, and things can get a bit rowdy, as we discovered by accident one year. Fall hunting season is also a busy time; mule deer and bighorn sheep are plentiful, and Steens is a popular destination.

Accommodations other than camping are rather sparse. The very small communities of Frenchglen and Diamond provide a minimal number of hotel rooms, but these are usually booked far in advance. The Bureau of Land Management, which manages the public lands on Steens Mountain, operates three very pleasant campgrounds with drinking water and pit toilets along Steens Mountain Backcountry Byway. Generally open from July 1 to October 31 (weather permitting), this well-maintained, 65-mile-long gravel loop road allows almost any vehicle with decent clearance to reach the highest point in Oregon

that one can drive to, around 9,700 feet. In addition, many people simply pull off and camp along small side roads off the main loop. Our family enjoys camping at Page Springs, 4 miles east of Frenchglen and at the beginning of the Steens Mountain Road. From here it is about 26 miles to the summit ridge drive and alpine areas.

To visit Steens Mountain, you need to allow a *minimum* of 2 days. We spend an entire day just driving the 26-mile section to the East Rim Viewpoint. There is so much to see, explore, and photograph along the way! Another day is needed to hike the two short trails that begin at the Summit parking area. The first is an easy half-mile (<1 km) walk up to the summit of Steens Mountain and some breathtaking views. A slightly longer trail travels down to Wildhorse Lake from this same spot. Although this is more difficult going, it is well worth the time and trouble if your knees are up to it. The trail is only about 1 mile (1.6 km) long, but it drops a good 1,300 feet in elevation. Steep, slippery, and precipitous in places, this is not a trek for the weak of heart or stamina. To my pleasant surprise, my 5-year-old son managed the entire hike down and back one year. Of course, 5-year-olds possess boundless energy and little fear, which is more than compensated by a mother's anxiety.

Now I'll turn to the flowers of this unique botanic area. Steens's five vegetation zones support nearly 1,200 taxa; 6 of these are endemic to Steens Mountain or Steens and nearby mountains, and almost 80 are listed as rare. The zones range from the alkaline desert scrub of Alvord Desert to true alpine tundra. With so much diversity in elevation and habitats, there is almost always something in flower or seed anytime from late May to September. Lower-elevation species begin flowering in May and include such beauties as *Clarkia pulchella,* the dwarf yellow *Oenothera caespitosa*, and tall lavender-flowered *Calochortus macrocarpus*. With rising elevation, we begin to encounter vast fields of yellow on the sagebrush hillsides. This is the ubiquitous orange sneezeweed (*Dugaldia hoopesii*, formerly *Helenium hoopesii*). Scattered in the sagebrush are several paintbrushes (*Castilleja* spp.), a lovely relative of Phlox called *Linanthastrum nuttallii*, several species of *Lupinus*, and the locally endemic Steens Mountain thistle, *Cirsium peckii*. Rocky outcrops are home to *Allium acuminatum,* the fern *Cystopteris fragilis, Pyrrocoma* (*Haplopappus*) *carthamoides* var. *cusickii,* and *Arenaria aculeata.*

Halfway up the mountain (near 7,000 feet/2,150 meters), an unusual feature of the landscape is noticable: the complete absence of coniferous forest. Instead, we begin to encounter scattered aspen groves surrounding small lakes and along wet seepage lines. These groves offer a rich combination of more moisture-loving species. Bouquets of blue *Geranium viscosissimum,* scarlet and gold *Aquilegia formosa,* and purple *Penstemon rydbergii* occur in the aspen understory around Fish Lake. Moist lake edges and vernally wet sites support species like *Gentiana affinis, Gentianopsis simplex, Horkelia fusca* var. *capitata, Mimulus primuloides, Veratrum californicum, Sidalcea oregana, Swertia radiata* (formerly *Frasera speciosa*), *Gentianella tenella, Pedicularis groenlandica,* and the rare *Pedicularis attollens.*

Near Fish Lake is a lovely meadow and aspen-girt lake with a colorful history. For over 100 years, Steens Mountain has been extensively grazed. Cattle

have foraged the western slopes and valley floors since 1872. Sheep grazing under the care of Basque and Irish shepherds occurred until it was banned in the 1970s because of severe overgrazing. In 1901, there were as many as 140,000 nomadic sheep grazing Steens Mountain. With all these lonely shepherds, a smart entrepreneur saw an opportunity, and thus this meadow received its name: Whorehouse Meadows. During the recent period of political correctness, it was decided that the name should be changed to "Naughty Girl Meadow." Howls of protest from all corners shortly restored both sanity and the original name.

Somewhere around 8,000 feet (2,460 meters), alpine vegetation begins to appear. For me, as a rock garden enthusiast, it is the alpine plants that are the true treasures. Steens Mountain possesses the most extensive contiguous alpine area above 8,000 feet in elevation for some 200 miles in any direction. All six of the Steens Mountain endemics can be found in alpine rock outcrops or gravelly soils. At peak flowering, the summit ridge drive is a rock gardener's paradise. Ranging in elevation from 8,500 to 9,700 feet for nearly 3 miles, the roadsides are an immense carpet of diverse colors.

Steens's rarest and narrowest endemic, the Steens Mountain paintbrush (*Castilleja pilosa* var. *steenensis*), can be found on these dry, gravelly, windswept ridges. The beautiful Steens Mountain penstemon (*Penstemon davidsonii* var. *praeteritus*) also grows here, along with *Sedum lanceolatum, Ivesia gordonii, Phacelia sericea,* the prostrate *Phacelia hastata var. alpina, Polemonium pulcherrimum, Heuchera cylindrica* var. *alpina,* and *Oxyria digyna*, a monotypic circumboreal plant. The most extreme sites, which lack any shelter at all, support *Astragalus whitneyi* with its silver-blotched, inflated pods, the very dwarf *Eriogonum caespitosum* var. *hausknechtii,* and three species of mustard: *Lesquerella occidentalis, Draba paysonii* var. *treleasei,* and the endemic Steens draba, *Draba cusickii* var. *cusickii.*

At this altitude, there is a beautiful natural rock garden in every direction. Several species of *Eriogonum* literally clothe certain gravelly flats. The most common are *Eriogonum umbellatum* and the fascinating *E. ovalifolium,* which can vary in color from pale cream to a striking deep rose. *Ranunculus eschscholtzii* populations turn the ground yellow at the edges of receding snowbanks, while roadsides are often blue with large populations of *Lupinus lepidus* var. *lobbii.* With so much beauty, a camera enthusiast can easily use up 5 or 10 rolls of film, so come prepared.

Although the alpine rock gardens are wonderful, to fully appreciate the diversity of plant life and habitats, I *highly* recommend taking the Wildhorse Lake Trail, if you are up to it. From the summit, the trail and lake appear to lack much vegetation, but as you walk along you see that the distant view is quite deceptive. There is something new and wonderful to see every step of the way, and the flowers around the lake itself are spectacular. Along the trail, large vertical rock outcrops and talus slopes support extensive populations of *Epilobium obcordatum,* the rock ferns *Pellaea brewerii* and *Polystichum lonchitis*, and *Monardella odoratissima*, a pungent mint. Every small creek and rivulet is filled with cascading masses of hot pink *Mimulus lewisii* and clear yellow *Arnica mollis*. Surrounding

the lake itself are *Swertia perennis,* the large-flowered *Parnassia fimbriata*, several species of *Potentilla, Kalmia microphylla,* and the lovely cream-flowered *Caltha leptosepala.* Wildhorse Lake is the perfect lunch spot to observe the beauty around you and to refuel for the difficult return hike. Be sure to take lots of water and plan to stop frequently.

The unique characteristics of Steens Mountain and the surrounding areas have not gone unnoticed over the years. Various types of protection measures were proposed in the past, but it was not until the year 2000 that the U.S. Congress passed the Steens Mountain Cooperative Management and Protection Area Act of 2000. This act sets aside 179,000 acres as "Steens Mountain Wilderness," including almost 100,000 acres of mostly high-elevation sites designated as "No Grazing Areas," making Steens Mountain the first place in the nation where federal law actually forbids grazing. Although some lands within the wilderness boundary are still private, the goal is to purchase or exchange for these parcels in the near future. Wilderness designation will undoubtedly alter the mountain and its uses, but those of us who love Steens Mountain are pleased that it is now protected for future generations to enjoy and fall in love with for themselves.

Christine Ebrahimi, a botanist, has been president of both the Siskiyou and Columbia-Willamette chapters of NARGS. Her recently constructed garden near the Columbia River northwest of Portland, Oregon, features hundreds of species grown on raised beds.

A review of the new *Flora of Steens Mountain* by Donald H. Mansfield appears on p. 137 of this issue.

Five Choice European Campanulas

Graham Nicholls

I grow all the western North American *Campanula* species, mostly in pots and with varying degrees of success, but I also grow many European species. Some of these are not just suitable for exhibition but also grow quite happily outdoors in an alpine raised bed or trough. Wearing my nurseryman's hat, I have to be able to propagate them—sometimes in large numbers, since they are very popular. By "popular," I don't mean that the average customer stopping at my sales table would necessarily buy one of these species; it's the grower looking for something a little out of the ordinary who picks up one of these plants with a cry of delight and thrusts money into my hand. I take pride in being the only mail-order nursery grower in the United Kingdom presently offering these campanulas.

Campanula choruhensis (photo, p. 97) is a species that some of you may already have. It's wonderful and easy to grow—almost as easy as the closely related *C. betulifolia*. The leaves are deep green and hairy, and its white flowers, sometimes flushed with pink, can be huge. Plants vary in growth habit: some have a number of fairly short stems branching off and hanging down, carrying clusters of as many as 6 flowers; others grow upright, with the bells massed together in a huge bunch. Unfortunately, though they look well in pots, in the alpine bed the flowers that hang down tend to be spoiled by dragging on the ground. In her 1993 Rocky Mountain Rare Plants seed catalog, Gwen Kelaidis described this species as "sensational," and she wasn't kidding. At the AGS Summer Show South in 1997, both my plant and one grown by another member of the Wiltshire AGS group were awarded a Preliminary Commendation by the Royal Horticultural Society Joint Rock Garden Plant Committee, and a note on this campanula appeared in the *Quarterly Bulletin of the Alpine Garden Society* (65.4:434-435, Dec. 1997).

My original plants were grown from seed purchased from that catalog, soon after *C. choruhensis* was described. Josef Halda collected it at that time, and a year later another Czech seed collector, Vaclav Holubec, also started to list this species. It comes from Tortum and Kargapazari Dag in Turkey, where it inhabits rotten schist and volcanic rock crevices at elevations around 2000 meters (6500 feet); it loves a cool northern exposure.

Propagation is straightforward by seed, which is quite abundantly set most years. Like most campanula seed, it is very fine and must be collected from the base of the dried capsules before it is dispersed to the four winds. Sow your seed thinly, or you will end up with masses of seedlings which just love to damp off. I sow mine on the surface of a pot of compost topped with grit, which allows it plenty of light to speed germination. Seed-grown plants vary in growth habit from upright to drooping, and leaf size may also vary; nevertheless, so far all my seed-sown mature plants have the large flowers of their parents. If you have a particularly nice specimen that you want to duplicate, you can take cuttings in spring when the new shoots are growing vigorously.

Campanula choruhensis grows well in a range of soils despite the rigors of its native habitat. After flowering in May or June, the stems die back in autumn to a central rootstock, and during winter plants growing outside look quite bare. In the alpine house, however, plants usually have a little green showing.

***Campanula hercegovina* 'Nana'** (photo, p. 97) is an absolute gem for a trough. The small, bell-shaped, deep lilac flowers are borne on slender, decumbent stems 7–10 cm (3–4 in.) long. These stems are branched and arise from a woody rhizome. The plant slowly forms a clump, never becoming invasive. It dies back in winter and reappears in late spring. Flowering is from late May to June and sometimes continues sporadically into autumn, especially in the alpine house or coldframe. It is a very easy plant to grow, either in an alpine bed or in a trough. In the wild, *C. hercegovina* inhabits limestone crevices and cliffs in Bosnia-Hercegovina.

I inherited my original plant in 1990 from a nursery that was going out of business at the same time as I was starting up, and it is still going strong in one of my raised beds, now about 15 cm (6 in.) across. Propagation is very easy: literally pull the plant apart and pot up the rooted pieces. This can be done from the time the new shoots appear above ground in spring right through the growing season until early autumn. In the nursery, it is far easier to grow half a dozen plants in plastic pots and use them for propagation stock than it is to keep digging up the garden specimen. In this way I can divide the stock plants at least three times in one year. I have never found any seed in the capsules, but several self-sown seedlings have appeared in pots where sale plants had been kept in the alpine house. These grew very quickly, flowering and filling a 7-cm-square (3-in.) pot in the first season.

My third choice, ***Campanula jaubertiana*** (photo, p. 98), is a lovely, free-flowering, vigorous species which has intense violet-blue flowers on stems to 12.5 cm (5 in.) tall. (A photograph of it appears in the *Quarterly Bulletin of the Alpine Garden Society* 63.4:379, Dec. 1995.) This is another ideal plant for the trough, if you can keep the slugs at bay. It also revels in growing in pots, and in the UK it is often exhibited at the summer shows.

I obtained my first plant of *C. jaubertiana* in summer 1994 as a swap after I saw it exhibited. From that one plant, I have since produced more than 100 plants for the nursery, and the original is still good enough to exhibit. Although the species was described as long ago as 1868, at the time I obtained my plant it had

just been reintroduced to cultivation. It is another a limestone-dweller, this time from the screes and rock crevices of the central Pyrenees at over 2000 meters (6500 feet) elevation. There are reports that it also grows in isolated sites on the high southern slopes of the foothills of the Spanish Pyrenees and at one station in Andorra; at the latter it is identified as *Campanula jaubertiana* subsp. *andorrana*. Although in the wild it normally flowers from July to August, in cultivation it blooms about a month earlier.

Propagating *C. jaubertiana* is even easier than increasing *C. hercegovina*. In fact, it just cries out to be split up. Very vigorous, it dies back in winter, even in an alpine house. It comes into growth very early in spring, and at that time I knock the previous year's unsold plants out of their pots and pull them to pieces, using scissors to cut off any piece of stem that has a root on it. All pieces are then repotted and put into a coldframe. The larger pieces quickly grow to a size for planting out, usually by late spring, and the smaller pieces later the same year. Right up to October, whenever any unsold plants show tufts of new growth around the edges, I divide them in the same way, so I am never without this jewel. My plants have never set seed, and I have not heard of other plants doing so either.

Cultivation of *C. jaubertiana* is simple in a scree or a raised bed with very gritty soil, with some shade on hot summer days. In winter, outdoor plants usually disappear below ground, but those in the alpine house stay green and break into growth earlier. With alpine-house specimens, it is best to clip over the stems in fall, removing the spent flowerheads and any stems that appear dead. A gritty compost with lime in it suits this plant down to the ground. Slugs are the worst problem it encounters. If you haven't grown this plant yet, then give it a go!

Some years ago I was browsing over a nurseryman's sales table and spotted a campanula I didn't know much about: ***Campanula petrophila*** (photo, p. 98). It looked promising, and anything unknown is worth a try. This has turned out to be another wonderful species for the garden. It comes from the Caucasus, where it grows in cool rock crevices at around 3600 meters (11,700 feet), forming tight clumps of small, ovate basal leaves that are sometimes toothed. The stems are prostrate, to 10 cm (4 in.) long, and carry clusters of large, blue-purple, bell-shaped flowers.

If you grow *C. petrophila* under glass, as I did at first, you will find that the stems elongate and the charming compactness is lost; but put it outside in a trough, gritty alpine bed, or sand bed, and it becomes a wonderful alpine bellflower. As soon as it got into one of my alpine beds, a dramatic change took place. As you can see from the photo, it made a tight clump with huge, almost stemless blue-purple bells.

This is not one of those beautiful plants that flower once and die with no possibility of propagation. In spring or fall, dig it up, remove rooted pieces, and pot them up. If you do this in spring, you will have a small potful by fall, ready to split again. There has to be a downside, though, and once again it's the slug problem. Nevertheless, *C. petrophila* increases quickly enough to keep it going in several places around the garden, and it's certainly worth the trouble.

Finally, the choicest of these five gems: ***Campanula zoysii***, the campanula that is always mentioned by rock garden writers and speakers discussing campanulas for troughs (photo. p. 99). (I always suspect that the majority of these people have never grown the plant and are just cribbing from other authorities, but perhaps I'm wrong.) I grow a clone of *C. zoysii* which—luckily for me—is vigorous and free-flowering.

Campanula zoysii comes from the southeastern European Alps, where it grows among limestone rocks. Its unique and lovely flowers are crimped at the mouth, making it very difficult for bees to enter. Last year (and by good fortune, after the shows), I noticed two different types of bees flying around my plant: a small one that burrowed into the closed end of the flowers to obtain the pollen, and a very large one that must have thought "To hell with all that!" and just drilled a hole straight through each flower. Half an hour later, all the flowers on my plant possessed an extra hole. No seed was set, which made it a pointless exercise as far as I was concerned.

Having whetted your appetite for the typical *C. zoysii,* I'll tell you about one I obtained in exchange for *Androsace bryomorpha*. It is a white form with the clonal name 'Lismore Ice'. This plant was raised by the nurseryman Brian Burrow from wild-collected seed from the Julian Alps distributed through the AGS seed exchange (don't look so amazed!) about 13 years ago. It's an exquisite plant, documented in a photograph in the *Quarterly Bulletin of the Alpine Garden Society* (57.1:82, Mar. 1989). Much more compact than the usual blue form, it also has much smaller leaves. The tips of the leaves are slightly yellow, but this is a natural characteristic of the plant and not, as some writers have said, a sign of chlorosis. I have yet to grow this plant in a trough open to all the ravages of the weather and slugs, but I have no doubt that it would be fine outside, provided ravening mollusks were kept at a distance. Like the blue form, it increases by underground runners.

Propagation of these forms of *C. zoysii* is easy, either by cuttings in spring or as described above for other campanulas with underground runners. When shoots appear around the edge of the plant, don't be frightened of it; take it out of its pot and remove any rooted pieces, potting them up as described above. The white form is much slower to increase than the blue and takes longer to build up into a large plant. It seems that continual disturbance and a deep top-dressing of grit encourage it to survive and produce side shoots. From the small plant I obtained in 1995, I had propagated enough plants two years later to list 'Lismore Ice' in my autumn catalog. If it hadn't been for that swap, 'Lismore Ice' might have been lost entirely; as far as I know, that plant was the only one in existence. It was gratifying when I was able to return one to Brian Burrow, the original raiser. This is what conservation is all about. It has now become more widely available.

The blue form of *C. zoysii* builds up over about three years into a power-packed plant that blooms tremendously, hardly any rosette without a flowering stem. Unfortunately, after flowering, these stems and their rosettes die back, sometimes resulting in the death of the entire plant. You must make it a

priority to propagate *C. zoysii* before this happens so that you have smaller plants coming on to replace the "big one"—which inevitably dies.

Graham Nicholls is the proprietor of Graham's Hardy Plants near Bath, England. His book on North American alpines is soon to appear from Timber Press. Write to him at <Graplant@aol.com>.

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Mt. Tahoma Nursery
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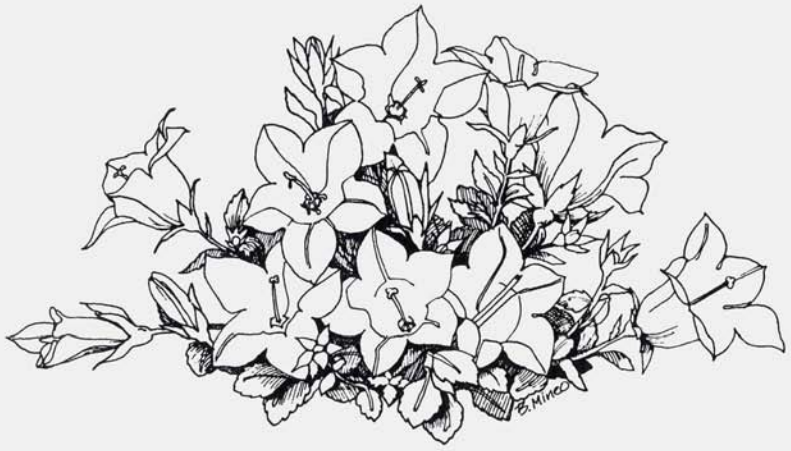


Campanula 'Joe Elliott'
(drawing by Baldassare Mineo)

Penstemon caespitosus and Its Mysteries

Robert Nold

It is hardly the most original observation to say that the trouble with rock gardeners is that they always want to grow plants whose native homes are in some of the worst climates in the world. The conditions in which the desired plant grows are almost always the exact opposite of those available in the garden; the less appropriate the garden climate, the more desperately the gardener wants the plant.

A corollary to this is the coveted native plant that lives in a deceptively similar-appearing climate and habitat; the rock gardener then feels perfectly justified in thinking that the plant ought to be easily grown in the garden. The potential for humiliation is, of course, endless.

Yet another situation—and one so improbable I mention it with considerable trepidation—is that of finding a desirable plant that grows better in one's garden than in the wild. This can lead to all sorts of scenarios, initially laden with triumph, then eventually disintegrating into a miasma of retribution, self-incrimination, and utter despair.

The last case is exemplified by *Penstemon caespitosus*. It grows within a couple hours' drive of my house, in a similar but even worse climate than the one that torments our garden 12 months a year, snowier in winter and drier in spring, summer, and autumn. I tried it several times before I (sort of) figured it out.

Penstemon caespitosus (photos, pp. 100–101) is a low (around 1 inch, 2 or 3 cm high), mat-forming penstemon. It has more or less linear green leaves with fine, backward-pointing (retrorse) hairs, and blue flowers about 5/8 inch (15 mm) long. Its native habitat is generally the sagebrush-covered flatland between mountain ranges—the area of Colorado north of Interstate 70 and west of the Continental Divide, southwestern Wyoming (the botanist David Keck speculated that the type locality was somewhere in Sweetwater County, Wyoming), and northeastern and eastern Utah. Keck wrote that it was "occasional" throughout its range, but in parts of Colorado, the plant grows by the thousands in suitable locations, often forming mats 6 feet (2 meters) wide.

"Suitable locations" in this case means between or under shrubs of sagebrush (*Artemisia tridentata*) in "soil," probably decomposed shale, with a surface the

consistency and color of talcum powder; this is a very heavy, retentive growing medium, almost completely devoid of organic material. Regardless of attempts by the straggly sagebrush to provide a modicum of relief from the always intense sun, the penstemons bake in the summer, and by early autumn they often show distinct signs of having been toasted around the edges. Rain may come during the spring and then occasionally during summer, but again, it may not.

One June a few years ago, my wife Cindy and I saw populations of these plants growing by the hundreds, if not thousands, covering a wide valley floor near Kremmling in northern Colorado. The sagebrush flats were carpeted with large, ancient mats of *Penstemon caespitosus*; the oldest ones had thick, gnarled woody stems buried in the powdery surface of the soil. We walked for some time looking for seed but found only two shriveled flowers, no doubt the result of an unusually dry spring. It certainly had been a frightfully dry spring in my garden, with almost no rain in April and May; for plants growing in areas where the only moisture comes from precipitation, this must have been a miserable growing season indeed. (Habitat photo, p. 100.)

In fact, I have never seen *Penstemon caespitosus* in the wild carrying enough flowers to excite even the most devoted grower of recalcitrant and desiccated native plants. Last year, visiting what amounted to a lawn of the plants, crisped and only obscurely green, we counted fewer than a dozen flowers. The plant obviously has another means of increase: the stems root at the nodes, allowing it to creep along the dusty crust of its chosen habitat. During seasons of ample rainfall (when they occur), the plants must have some energy available for producing flowers.

Two rooted cuttings borrowed from the plants near Kremmling established quickly in our rock garden in compacted, heavy clay in full sun. Growing drought-tolerant plants in a fast-draining soil medium means either parched roots and death or constant supplemental irrigation, especially in a garden like mine, where the past two summers have brought so little rain I finally threw the rain gauge in the trash.

The one thing I could provide my plants that they lacked in the wild was a steady supply of water in March, April, and May. The sole plant that survived grew quickly. Within a year, it was smothered in flowers in May. My plant continued to grow and flower, even fighting off an infestation of pittosporum pit scale, and then suddenly, just as I was meditating on my superiority over nature, it was dead.

I imagine that garden life was too much for it—like eating chocolate and drinking champagne every day. Even though the summers were suitably dry, the rigors of profuse flowering probably exhausted the plant. The sort of wet springs I was creating artificially in the garden come perhaps once every 10 or 20 years in the wild, so the plants are adapted to a life of perpetual drought, but they are equipped to respond when nature provides an extra bounty of moisture.

There are other forms of *Penstemon caespitosus* worth seeking out, and some of them can even be grown in the rock garden. A white-flowered form, *P. caespitosus*

'Albus' (a favorite of Claude Barr), is offered by some nurseries, and then, of course, there are the botanical varieties.

The taxonomy of *Penstemon caespitosus* is confused, like that of the section in the genus *Penstemon* to which it belongs (Section *Caespitosi*). No, not confused: labyrinthine, impenetrable, full of dark corners and incomprehensible relationships. When W. A. Weber lumped all the *Caespitosi* species in Colorado into *P. caespitosus* in the 1996 edition of his *Colorado Flora*, it created the usual furor that doing anything different tends to do; I see this act as a gesture of resignation in the face of the unknowable. To simplify things, I think we should name as *P. caespitosus* all the plants with linear leaves (while acknowledging some troublesome herbarium specimens, especially some with annoying obovate leaves collected by C.W.T. Penland near Gore Pass, Colorado, that are clearly and plainly the flattest plants in the genus, and call everything else . . . something different.

Obovate leaves are troublesome in *Penstemon caespitosus* because *P. caespitosus* has linear leaves—or at least it does until it moves farther south into Utah. There, the leaf color changes from green to gray, the leaves become shorter, and the plants get various new names. *P. caespitosus* var. *perbrevis* (type locality, Castle Gate in Carbon County, Utah) is the name given to plants of central Utah that have shortened, almost stubby obovate leaves and cinereous-pubescent (ashy-downy) foliage. These are vaguely reminiscent of another species, *P. thompsoniae* (type locality, "southern Utah"), which is found in sagebrush and pinyon-juniper communities in Utah, Nevada, and northern Arizona; it has cinereous-pubescent foliage in which the hairs are appressed on the foliage. The beautiful, bluish, ash-colored leaves of *P. thompsoniae*, at least those with which I am familiar, are more consistently upright and more obovate to almost round; thanks to this, *P. thompsoniae* is one of the great miniature foliage plants for the rock garden. (Photo, p. 102.)

Farther south, in southern Utah and northern Arizona, we find *Penstemon caespitosus* var. *desertipicti*, the Painted Desert penstemon (type locality, "near Cameron, Arizona"). If we were not bothered by microscopic leaf hairs, it would look a lot like a *P. thompsoniae* that has had an unhappy encounter with a steamroller. This is, naturally, a flat, mat-forming plant, with more linear leaves than var. *perbrevis*. I find it surprisingly willing to accommodate itself to cultivation in an unirrigated trough. Not that it flowers much, of course; but when it does, the flowers are relatively large and a lovely shade of reddish-violet, looking quite fetching nestled in the silver-gray foliage. (Photo, p. 101.)

A fourth variant of *Penstemon caespitosus* is found on and around the Tushar Mountains in south central Utah. This form has much more upright stems, actually becoming a tiny shrub about 4 inches (10 cm) tall (imagine a fat-leafed *P. caespitosus* that has been scared stiff). The leaves have retrorse hairs tightly pressed to the leaf surface. To my feeble eyes, at least, the foliage is darker than that of the other two Utah forms of *P. caespitosus*, and the flowers are a really gorgeous shade of violet.

I realize that this will come as a shock, but there has been some disagreement among botanists over the name of this little shrub. Holmgren in *Intermountain*

Flora (New York Botanical Garden, 1984:401-2) calls it *Penstemon tusharensis*; Neese in *Utah Flora* (Brigham Young University Press, 1987:586) gives it its old name, *P. caespitosus* var. *suffruticosus*. Since utter flatness is a hallmark of *P. caespitosus*, it seems unnecessarily perverse to maintain the classical concept of species in this case, even if mindful of intergradation and continua. Therefore, I prefer to keep the name *P. tusharensis* for this little shrub.

Penstemon tusharensis (type locality, "Utah, near Beaver") is the only one of these penstemons (*P. thompsoniae* included) that has any real inclination to flower in the wild, so seed is occasionally available. In the garden, it seems to resent Denver's intense winter sunlight with a loathing so great that I have difficulty reminding myself that the thing comes from mountains in Utah; it is so quick to turn brown and shrivel up to nothing after a few weeks of bright winter sun that it might as well be a banana plant or a coconut palm. The plants burst into flower in their second or third year and then die, without warning, usually the day before a photo session is scheduled.

Horticulture is no less guilty of mischief in the quest to identify *Penstemon caespitosus* by its proper name. The Utah and Arizona forms, being on the outer fringe of cultivation, have remained untouched by fake cultivar names or plain misidentification, but in nurseries and in photographs, the name *P. caespitosus* has often been misapplied to *P. crandallii*, an extremely variable, mound-forming species of central Colorado with glabrate (hairless), linear leaves. Possibly as a result of the exhaustion attendant on growing in a relentlessly unforgiving climate, *P. crandallii* lies down and looks very mat-like; however, its relatively hairless leaves and geographical location (central and not northern Colorado) ought to be diagnostic. (Photo, p. 102.)

Another form of *Penstemon crandallii*, which I prefer to call by Pennell's old name *P. procumbens*, has round or obovate leaves and is found on Kebler Pass west of Crested Butte, Colorado. Keck changed Pennell's perfectly acceptable name to *P. crandallii* subsp. *procumbens* on the basis of a peculiarly mystical vision of the analogous relationship between this and "extreme forms" of *P. tusharensis*, although on first sight (even second or tenth sight) the plants seem clearly distinct.

The mere presence of glabrous leaves makes it difficult to rationalize any kinship between the greenish-gray, linear-leaved *Penstemon crandallii* with its ascending stems, and the lolling, draping, round or obovate-leaved *P. procumbens*. Keck's musings and idiosyncratic nomenclature may well have been the result of an often-remarked habit of botanists when treating a large genus: they tend to split when working close to home, and as their reach extends into ever more distant territory, they tend to lump everything in sight.

Claude Barr, who was the first to promote penstemons for garden use in the semi-arid regions of western North America, grew this plant under Pennell's name, *Penstemon procumbens*. In my mind's eye I can envision a label in an old garden, replacing one lost years earlier, with "penstemon" and "Claude Barr" written on it; this may be the way the plants got so confused. In any event, today *P. procumbens* is commonly offered in the trade as "*P. caespitosus* 'Claude Barr'."

Appropriately enough, this plant—the one that is not *Penstemon caespitosus*—is the one that does the best in the garden, flowering year after year, eventually forming a mat of sprawling branches that drape themselves over nearby rocks in perfect emulation of its secret life high in the Rockies.

Robert Nold of Denver, Colorado, is the author of *Penstemons* (Timber Press, 1999), a complete survey of the genus. He and his wife, Cindy, who took the photographs illustrating this article, have spent many years investigating the flora of the Rocky Mountains and nearby regions.

When the term "serious gardeners" was used in the Internet forum of the International Bulb Society, correspondent Diana Chapman of Telos Rare Bulbs offered this response:

Serious gardeners? Actually, I find the whole idea of gardening quite hilarious. Just think: full-grown adults spending all their leisure time, energy, and resources to grow plants where they don't belong! Plants that without constant and unremitting attention would be dead within a week or two! People lying awake on frosty nights worrying about their botanical babies, until they finally jump out of bed at 2 a.m. to run around throwing blankies over their precious ones. People turning to lumps of jelly over a teeny, tiny, little flower that others can barely see (but it's rare!). People refusing to take a vacation and leave their darlings in the hands of a heartless mercenary. People abandoning careers and risking divorce to spend more time gardening . . . the absurdity of it all makes it even more wonderful.

Southeastern Peru and Adjacent Bolivia

High Lakes and High Mountains

David Hale

My favorite plant-hunting areas combine all the elements of travel that my wife, Donna, and I enjoy: wonderful vistas, soaring mountains, alpine flowers, cultural variety, and good local cuisine, along with more typical tourist interests. The one that we have missed the most in Peru is local cuisine; fried chicken and French fries 30 nights in a row is rather tiresome. In recent years, however, under the presidency of Alberto Fujimori, the country has prospered even in remote areas, and the food is now both good and varied. I always say that when we run out of areas to visit that have all these desiderata, we'll go on to places with less variety, but we're in no danger of this happening.

Southeastern Peru offers many beauties. Lake Titicaca, at 12,400 feet, is the highest navigable lake in the world. (Never mind that there is no place to navigate to!) In the later nineteenth century, a huge boat—no, a ship—was brought piece by piece from the coast by mule transport to Lake Titicaca and reassembled there. Now it is accompanied by another just as big, about 100 feet long. However, Puno is the only city on the lake, and day-trippers must sail out and back. On the way they can view the Uros islands, known as the "floating" islands.

A one-day ride by car, bus, or train takes you to Cusco, which I think is the most interesting city in Peru. Culturally and structurally, it is much as it was in Inca times. Even the same language is spoken. From there, it is a one-day round trip by special train to the well-preserved remains of Machu Picchu, the famous abandoned city of the Inca.

Most of the territory in Bolivia and southeastern Peru is on the altiplano, or high plain. In many places, the Andes split into two parallel ranges with a high plain or valley between, lying at an almost constant elevation of 12,400 feet. Visitors do get a little lightheaded at times, but they usually adjust in a day or two and then just have to breathe faster. At this latitude, the weather comes from the east—the jungles of western Brazil and eastern Bolivia. Most of the moisture is captured by the eastern range, here the Cordillera Real Norte of Bolivia, resulting in a drier climate the farther west one travels. The western

range at this latitude is quite dry. The areas between the western mountains and the coast form a coastal desert.

Puno is not an exciting town but has quite adequate accommodations and services, and its cultural and floral wealth make it a choice destination for the botanically inclined traveler. To the southwest is a 14,500-foot mountain pass crossed by a road to the coast. It was unpaved a few years ago, when we hired a driver to take us to the pass, only to be caught in a heavy hailstorm. I discovered that pushing a van at 14,000 feet while sinking to mid-calf in mud was even worse than eating French fries every night. The next time we visited, we rented a four-wheel-drive vehicle, only to find that the road had been beautifully widened and paved! However, when we got to the first bridge—a brand new one—it had fallen into the river. Our third visit was uneventful: almost too easy.

The reward for visiting this pass is the many fine alpine plants. The most spectacular are two species of *Nototriche*. I haven't been able to find the species names, if indeed they have been published. The first is a mat of beautiful blue-green foliage with sessile 3-cm (1.2-in.) flowers, candy striped on the reverse and snow white inside, thus appearing white when fully open. (Photo, p. 103.)

The second has perhaps the most spectacular flowers even among nototriches. Donna, who spotted it first, yelled, "I don't know what that is, but it's the reason that we came to South America!" When John Watson viewed a slide of the plant in full bloom, he exclaimed, "Oh my God, what is that!" This *Nototriche* species forms a tight, bright silver bun dotted all over with sessile, 1.5-cm (0.5-in) flowers of shiny mahogany red, dotted with small golden drops (photo, p. 104). We're still working on its cultural requirements.

Puno is only about 30 miles from the Bolivian border. Just on the other side is Copacabana, a small city on the shore of Lake Titicaca. Although few people live there, there is an enormous Catholic church built in a striking Moorish style, so this is a "must" stop for the night. Some of the hotels have lake views, and the weather was always splendid during our visits.

In the morning we resume the trip to Sorata. Already we have changed vehicles several times to cover the distance to the border, cross the border, and get to Copacabana. Now we have to take a bus, a ferry across an arm of the lake, then another bus; after five hours, we arrive in Sorata, which the Lonely Planet guidebook says is the most beautiful town in Bolivia. The town is small and pretty enough, but the setting is almost indescribable. The town sits in a tiny intersection of the mountains by a winding river; towering over it is Iliampu, a 21,276-foot massif. The traditional activity of the town's few European visitors is to hike straight up from the town at 9,000 feet to the pass at 15,000 feet and circumambulate the massif in six to eight days—often engulfed in cloud, as we are now on the rain-collecting side of Bolivia. We took a ride in a four-wheel-drive vehicle to the pass, which was no less exciting. The Toyota sank in ruts full of mud to the level of the windowsills! Luckily, someone was riding in the back who could turn the locking hubs in, or we would have had to crawl out the windows over the mud that had trapped us in the vehicle.

We quickly got past this bad area and began botanizing. In the moist areas there is a large variety of ericaceous plants and other moisture-loving shrubs, including various species of *Gaultheria* (formerly known as *Pernettya*) and their hybrids.

The alpine pass lies at 15,000 feet. There are rocky outcrops, turf, screes, and cliffs, each habitat with its own flora. Among the saxatile plants are many *Nototriche flabellata* (photo, p. 104) forming mats dotted with cerise flowers about 3 cm (1.2 in) across; they have thick woody stems. Our driver, who had been pounding around on the rocks on the other side of the hill, proudly displayed a small pile of the nototriche that he had dislodged from the cliff. He said the stems are good for the treatment of coughing!

Also present are a couple species of *Perezia* (a blue-flowered "daisy"), two species of *Acaulimalva* (a close relative of the nototriches), and a large, nodding *Senecio* that is frequently seen in the Peruvian Andes, covered with a thick coat of silver-gray wool.

On the way down, there are many turf plants. My favorite is *Gentianella primuloides*. Even the name is intriguing. It is a small plant with linear basal leaves which are dark green. The stems are from 3–8 cm (1.2–3 in) tall with flowers resembling pure white balloons with vertical crimson stripes. Some of the flowers open wide in bright sunshine. These seem to grow well in the alpine house but as yet haven't bloomed.

We finish our day back in Sorata with wonderful food in a restaurant run by an Italian immigrant. In the morning, it's off to see the sights of La Paz.

David and Donna Hale's gardens in Portland, Oregon, and on the Oregon coast feature a great range of plants, many of them brought back as seed from journeys abroad. David gives slide lectures to NARGS chapters and other meetings and writes a regular column in the *Rock Garden Quarterly*. See more of their travel and plant photos at <http://www.photos.yahoo.com/bc/davidhale2000>.

Looking from the east rim of Steens Mountain (pp. 74–79) eastward over the Alvord Desert. (photos, Christine Ebrahimi)

Wildflower meadow at Wildhorse Lake, Steens Mountain.

Penstemon davidsonii var. *praeteritus* (p. 78). This variety is endemic to Steens Mountain. (photos, Christine Ebrahimi)

Castilleja pilosa var. *steenensis* (p. 78), another Steens endemic, growing with *Penstemon procerus* and *Lupinus lepidus* subsp. *lobbii* at the head of Little Blitzen Gorge.

A natural rock garden at the head of Little Blitzen Gorge, Steens Mountain, with blue *Lupinus lepidus* subsp. *lobbii*, pink *Eriogonum ovalifolium*, and yellow *Sedum lanceolatum*.

Astragalus whitneyi (p. 78) with its striking mottled and inflated seedpods at the summit trailhead on Steens Mountain. (photos, Christine Ebrahimi)

Ranunculus eschscholtzii (p. 78) flowers below melting snows on Steens Mountain.
(photos, Christine Ebrahimi)

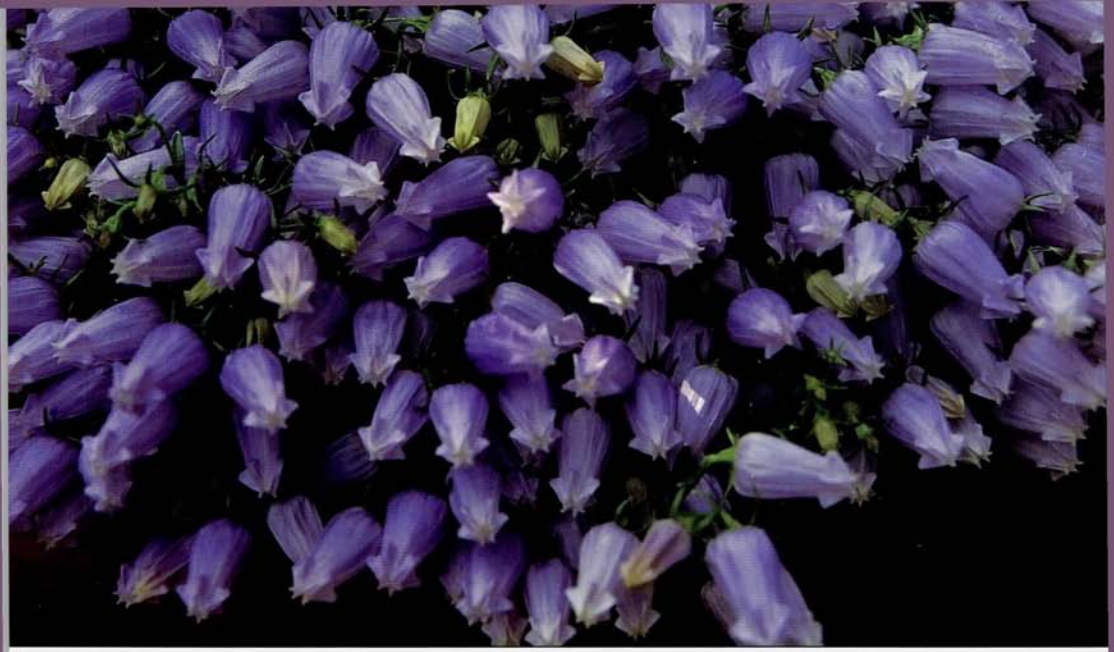
A superb red form of *Eriogonum ovalifolium* (p. 78) near the junction of Steens Summit and Steens Loop roads.

Campanula choruhensis (p. 80) is a denizen of shaded Turkish cliffs. See "Five Choice Campanulas," pp. 80–84. (photos, Graham Nicholls)

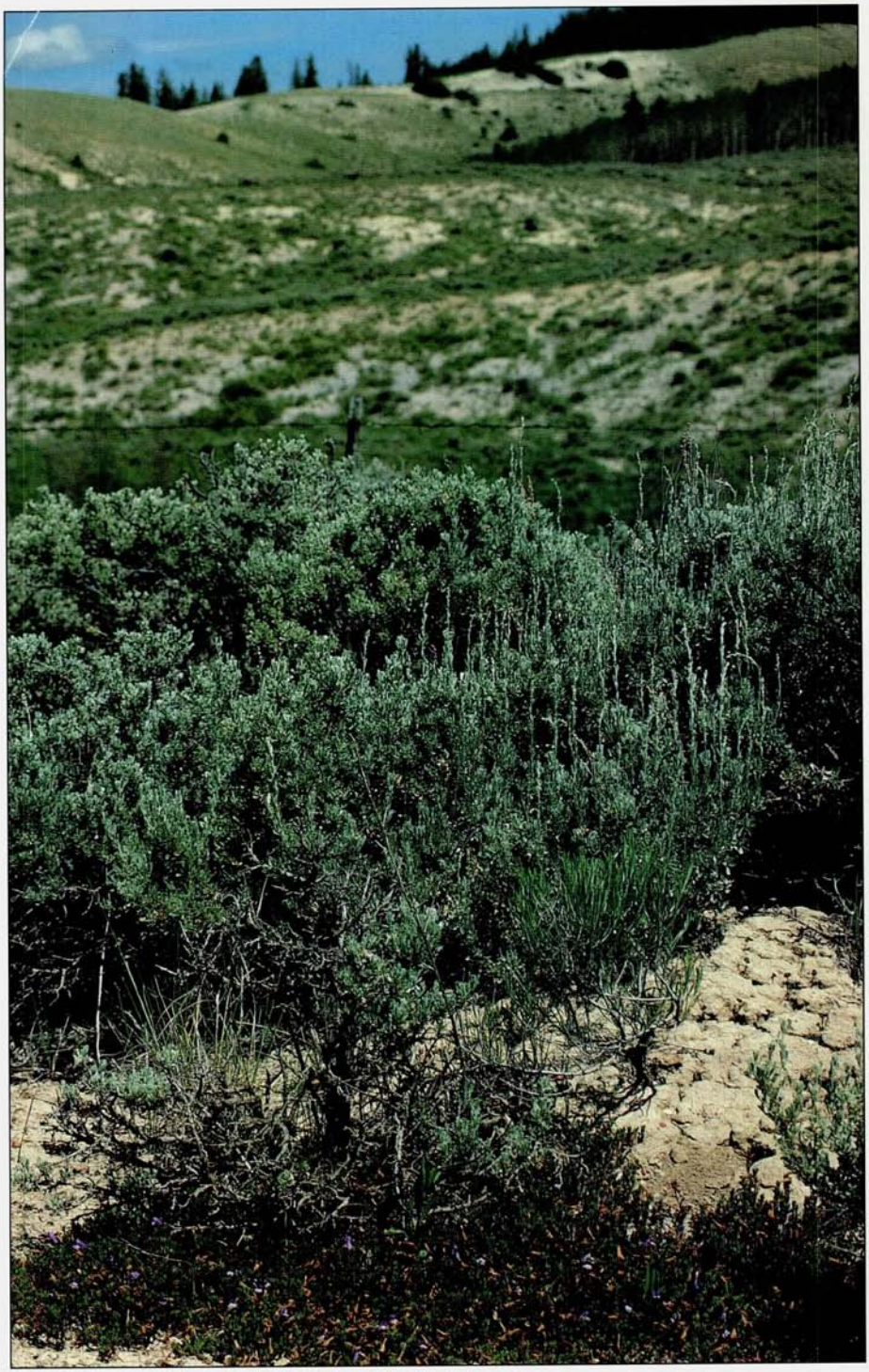
Campanula hercegovina 'Nana' (p. 81) flowering in a scree bed.

Campanula jaubertiana (p. 81), a free-flowering plant from limestone areas of the central Pyrenees. (photo, Robert Rolfe)

Campanula petrophila (p. 82), a high-altitude species from the Caucasus. (photo, Graham Nicholls)



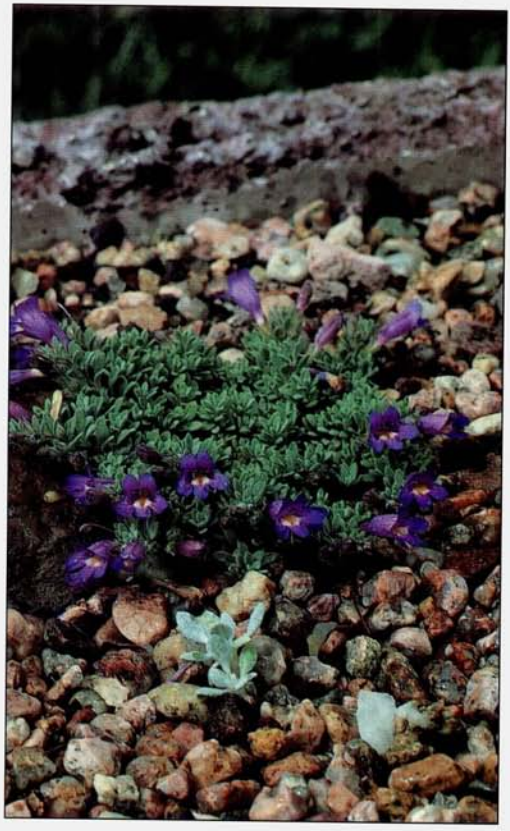
Two forms of *Campanula zoysii* (p. 83): above, the typical blue form, showing the unique flask-shaped flowers; below, 'Lismore Ice', a compact white form originally grown from seed by Brian Burrow. (photos, Graham Nicholls)



Penstemon caespitosus var. *caespitosus* in its arid habitat, forming few-flowered mats at the base of *Artemisia* shrubs. See pp. 85–89. (photo, Cindy Nelson-Nold)

Penstemon caespitosus var. *caespitosus* in cultivation in Denver, Colorado, flowers more freely than in the wild. (photos, Cindy Nelson-Nold)

Penstemon caespitosus var. *desertipicti*, named for its origin in the Painted Desert of Arizona, is a good trough subject.



Penstemon thompsoniae (p. 87) can be grown for the beauty of its dense gray foliage. (photos, Cindy Nelson-Nold)

Penstemon crandallii (p. 88) on Keebler Pass west of Crested Butte, Colorado.

Llama mothers and young graze at 14,300 feet elevation near the road to Choquijerani Pass near Puno, Peru. See "The Botanical Traveler" (pp. 90–92). (photos, David Hale)

An unidentified species of *Nototriche* on Choquijerani Pass at 14,700 feet (4,480 meters).

A yet unidentified *Nototriche* species (p. 91) found on Choquijerani Pass by Donna and David Hale in 1995—"the reason we came to South America." (photos, David Hale)

Nototriche flabellata (p. 92) on Chuchu Pass above Sorata, Bolivia, at 15,500 feet (4,725 meters) elevation.

Acaulimalva nubigena var. *bipinnatifida* on Chuchu Pass, Bolivia. (photos, David Hale)

Gentianella primuloides, one of several strikingly striped Andean species, on Chuchu Pass.

Penstemon pinifolius 'Magdalena Sunshine', a clone found in the wild and described on p. 128. (photo, Jay Lunn)

Spiranthes cernua var. *odorata* 'Chadds Ford', described on pp. 129–130. (photo, Barry Glick)

Tulipa humilis cultivars (see p. 131). Above, 'Odalisque'; below, 'Lilliput'. (photos, Jay Lunn)

Iris unguicularis produces perfumed flowers in midwinter. Cultivars illustrated are 'Walter Butt', above, and 'Winter Snowflake', below. See p. 132–134. (photos, Pamela Harper)

Making Troughs in the Kitchen

Joyce Fingerut

Troughs have been heralded as the answer for apartment dwellers who dream of having a rock garden, and as a design solution for the odd corner of the small terrace garden. As I thought about this, however, I began to feel that I had been unreasonable when I wrote about using troughs in small quarters like balconies and townhouse terraces without considering the fact that these very same apartments and small homes are unlikely to have garages, driveways, basements, or other large spaces for making the troughs.

In response, I've worked out a procedure, with a sample recipe, for bringing the operation indoors, into the close quarters of a kitchen, bathroom, or laundry room. Even those who have plenty of space outdoors might like to try this when the weather is hostile to outdoor activities.

The instructions below will produce a 12 by 12 inch (30-cm square) trough, which is large enough to hold up to half a dozen small alpine plants, or fewer along with an ornamental rock. Assuming that restricted quarters have deterred the reader from trough-making until now, I will outline all the steps involved. More detailed instructions are available in Mike Slater's clear article in the NARGS *Rock Garden Handbook for Beginners*. Fuller explanations of the whys and hows of troughs, with information on choosing plants and caring for them, are available in *Creating and Planting Garden Troughs* by myself and Rex Murfitt. (Both publications are available from the NARGS Book Service; see the advertising section of this issue.)

Limited space can also be compounded by limited time. To juggle all the various steps within our busy schedules, you can do the whole procedure in small, discrete operations, one stage at a time: shopping and gathering; preparing the materials—sieving the peat, fluffing the fibers; mixing dry ingredients, which should then be double-bagged and can be stored dry indefinitely; mixing the wet hypertufa and forming the trough; finishing the trough with surface textures.

Supplies and Tools

When you're working on this smaller scale, the ingredients remain the same, but quantities are proportionately reduced. This facilitates transport and storage, since you will be looking for smaller sized-packages. It also solves the problem of schlepping bales of peat and 94-pound sacks of cement on a high-rise elevator (and of the lengthy explanations to its other occupants). Shopping for the ingredients will still take the same amount of time, though, even for smaller amounts.

If ingredients are available only in packages too large for your needs, consider splitting costs and containers with a friend. You may even be able to strike a deal with a store owner to bring your own containers and take away some of the spilled ingredients from the broken bags that inevitably litter a garden center or construction yard.

You'll need long, sturdy **rubber gloves**, an absolute necessity for anyone working with cement, which has a high proportion of lime and can cause fierce skin burns. Good-quality household rubber gloves are adequate. Heavy-duty gloves designed especially for concrete work may be too clumsy, and they are rarely obtainable in sizes small enough for women. A **dust mask**, also sold in hardware stores, is advisable while you are measuring the dry ingredients. Once the cement, peat, and perlite are moistened, the dust settles and it is safe to remove the mask **Safety goggles** are useful for keeping dust out of your eyes, especially if you wear contact lenses.

Collect the following materials and tools:

- Portland cement, Type I: Be certain to purchase *cement*, not a concrete mix (e.g., Sakrete) that has stone and sand incorporated with the cement. Unfortunately, I have yet to locate a source for cement in sacks smaller than the standard 94 pounds, so you'll have to resort to the suggestions above—or use your own ingenuity.
- Peat: Instead of the garden-size 2- or 4-cubic-foot bale of peat, look (perhaps in the houseplant department) for a smaller size; some suppliers stock a 1-cubic-foot size with a useful handle in the plastic wrap. Be sure to buy *compressed* peat, not fluffy peat. You'll need to remove all the solid, rough bits by hand or sieve, a dusty job; indoors, you may want to do this in a tub or shower stall with precautions to keep the peat out of the drain.
- Perlite: Comes in a plastic bag, at least 2-cubic-feet size; it will not expand as the peat does and is the major component of hypertufa by volume.
- Synthetic reinfor. ement fibers: Available in nylon, acrylic or polypropylene; all add enough reinforcement for a garden container. These need to be separated and fluffed in order to be easily distributed through the hypertufa.
- Cement colors (dry or liquid): Available in shades of tan, red, brown, and black to match or complement your native stone and soil colors.
- Liquid acrylic bonding agent: Buy the non-rewettable type.
- Water supply: Watering can or hose that can be attached at the kitchen tap.

- Storage containers for sieved peat and fluffed fibers: Garbage cans and waste-baskets with lids are suitable.
- Mixing container: While wheelbarrows work well outdoors, they don't move neatly into a high-rise kitchen. The best container has a wide opening and is wider than deep. Home centers sell 10-gallon plastic bushel baskets with rope handles that work perfectly for this task.
- Measuring containers: The choice is vast. I use a 1-pound coffee can. Just be certain to use the same container to measure all the ingredients. In the instructions below, a scoop is one can, full to the top and leveled (much like a baking measurement).
- Mixing tool: A short-handled shovel can be maneuvered indoors, but I prefer to use a sturdy trowel.
- Styrofoam insulation board (1½ in./4 cm thick) for the trough form. These come in sizes of 4 by 8 feet and a more manageable 2 × 8 feet. If this still will not fit comfortably in your car, it can easily be cut down to size with a utility knife in the store. If you are planning to make a trough of the size described in this article, cut the 8-foot (2.5 meter) board into two pieces: one 4½ feet long, the other 3½ feet. There will then be less wasted styrofoam.
- Utility knife or sharp kitchen knife for cutting the styrofoam board.
- Pencil, pen, or marker.
- Nails, 3-inch long: You'll need twelve nails for this trough. You can buy nails by weight, but a full box of nails is probably the least expensive item on this list.
- Duct tape: I can't imagine a home that does not already have this on hand.
- Drainage: The forms for the drainage holes can be made of anything sturdy and waterproof. Use an empty tuna or catfood can with the top and bottom removed, or with just one end removed and the other punctured with a great many holes. Alternatively, the plumbing supply section of a home center has a PVC drain cover, a short cylinder with a built-in grid on top.
- Wire screen: Cut this into 6-inch squares to cover the drainage holes and keep the planting medium from washing out.
- Plastic sheeting: Use sturdy 4-mil PVC plastic, not dry cleaners' bags; buy enough to wrap each trough (a piece 3 by 3 feet/1 meter square works for this sample), plus extra for protecting work surfaces.
- Sturdy plywood or other board: This should be somewhat larger than the planned trough and is used to move it to the curing site.
- Scissors for cutting the plastic sheeting.

Mixing the Hypertufa

Begin the trough form by cutting four pieces of styrofoam: two measuring 8 by 15 inches, and two pieces 8 by 12 inches (20 by 37 cm, 20 by 30 cm). Attach the four pieces at their corners: lap the 8-inch ends of the longer pieces over the ends of the shorter pieces to make a square form; secure the boards with three

nails pushed (not hammered) into the styrofoam at each corner. Complete the form with a wrap or two of duct tape (what else!) around all four sheets to further reinforce it.

Other possibilities for trough forms include many household items, which must all be covered with plastic to prevent the hypertufa from bonding with the form: oval baking pans (sturdy metal pans, not disposable aluminum ones); pressed-peat hanging-basket liners; other plant containers (bonsai or bulb pans, for instance); or plastic bins and other storage containers. If you have a supply of sand and a suitable workspace, you can use packed, moist sand as a free-form mold.

You can work on a countertop or sturdy table, but it may be easier to work on the floor. To set up for the trough-making, lay the supporting board on the work surface with the sheet of plastic on top of it, followed by the trough form. Place one drainage-hole form in the center of the trough form, directly on the plastic.

Although we will be using some high-tech ingredients, making troughs relies on decidedly low-tech methods. Mixing hypertufa is much like making bread dough: achieving the proper level of moisture plays large role, and so do a sense of balance and feel; it's largely a tactile thing.

To make one hypertufa trough, 12 inches square and deep, use a one-pound coffee can as your measure, and combine:

- 3 scoops Type I Portland Cement
- 4 scoops well-sieved peat
- 5 scoops perlite

If you wish to color the mix, add about 1/4 cup (60 ml) of ground pigment to tint the cement, not color it brightly. Put on your rubber gloves and mix all these ingredients thoroughly until color and texture are even throughout.

Now combine 1 cup (237 ml) liquid acrylic with 2 cups water and drizzle the mixture over the cement mixture. Combine thoroughly, moistening all the dry ingredients, especially at the bottom and corners of the container.

Sprinkle a handful of very, very well-fluffed reinforcing fiber over the surface of the mix and again mix thoroughly.

Mix 2 cups acrylic with 5 cups water and add this to the cement and fiber mixture. Mix this all in very well.

Test to see whether the hypertufa mixture has achieved the right degree of moistness by squeezing a handful of the mixture, then opening your hand. The lump of hypertufa should maintain its shape and show no excess water on its surface.

This recipe makes enough hypertufa to raise the four walls to a height of about 6 inches (15 cm). If you want to increase the height of the walls and the depth of the planting area of the trough, you will need these additional ingredients for each additional inch of height:

- 1 scoop cement
- 1⅓ scoops peat

- 1⅔ scoops perlite
- 1 cup acrylic
- 2 cups water
- Coloring and fibers proportionately

Building the Trough

Now you can build your trough, beginning with its floor. Pack the hypertufa into the trough form, laying the floor directly on the plastic sheet and compacting it as tightly as you can pound it down, working all around the center drainage hole. The finished height of the floor should be level with the top edge of the drainage hole form.

To build the walls, begin by piling handfuls of hypertufa in the corners and pounding it into the corners as tightly as possible. Once the corners are secure, begin building the connecting walls by working all around the form, adding only enough hypertufa to increase all the walls an inch at a time, compacting tightly as you go. Do not complete one wall to the top before moving to the others.

Finish the trough to the height that suits your eye and your planting needs. When you are satisfied that it is as tightly packed as possible, fold the plastic sheet around the trough and board and secure it closed (duct tape, again). Remove it to an out-of-the-way spot with no temperature extremes—not near a heating vent or unheated place in winter.

The hypertufa now needs a period of at least two days in order to set and consolidate to the point that it is firm enough to hold together when carefully unwrapped, but still workable enough for "distressing" to a stonelike texture.

Finishing the Surface

You will need a few tools for finishing and texturing the trough's surface to make it more attractive and naturalistic. Suitable are sturdy household utensils with dull blades that are past home use: broad-bladed knife, screwdriver, asparagus fork, putty knife, stone chisel, mallet, pull-type paint scraper, claw hammer. Essential are a stiff wire brush, a whisk broom or sturdy fiber brush, and a hand-held propane or butane torch, or even a butane cigarette lighter.

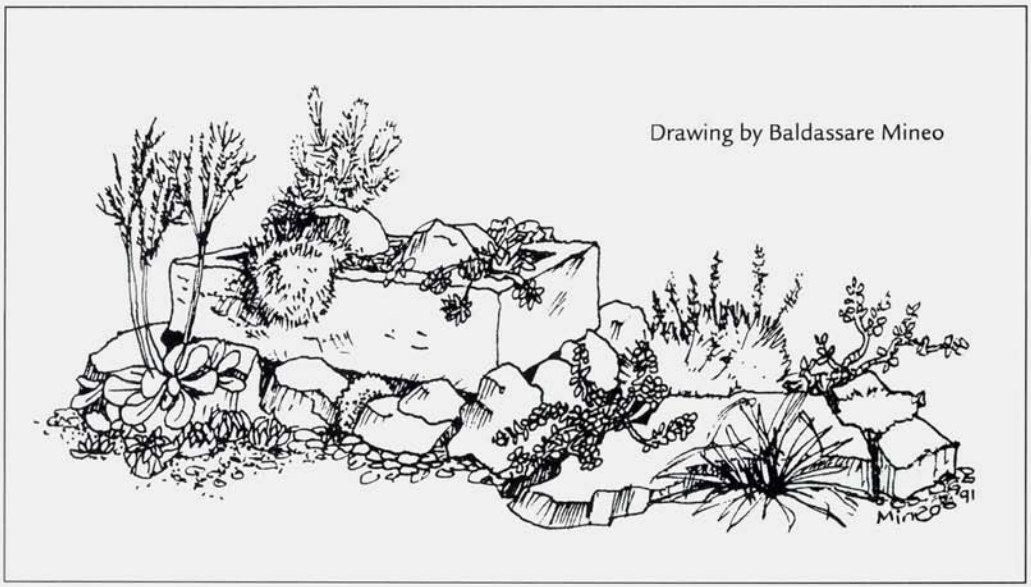
After the trough has cured for two to six days, carefully unwrap the plastic sheet from the trough, but do not remove it entirely. Unwind the duct tape from the styrofoam and discard it; extract the nails and store them for reuse. Remove the four styrofoam sides, which can also be cleaned and reused.

Do not pull on the hypertufa sides or move the trough unnecessarily. You can, however, use the tools to scratch and scrape at the sides to your heart's content, working into them signs of geologic age: worn and rounded edges, water-eroded seams, fault cracks, glacier scouring. It is truly difficult to overdo the distressing: in this case, more is more.

After this very physical session, rewrap the trough in the plastic sheet, again securing it tightly to retain all moisture. Return the trough to its previous resting spot for the final curing and hardening, which will take an additional 28 days. After the final curing, unwrap the trough and burn off the protruding fibers with a small torch or lighter.

The trough is now ready to be planted. The aesthetic and plant choices are entirely yours . . . or the subject of another article.

Joyce Fingerut lives in Connecticut, where she is building a new garden. She is the current president of NARGS and has held several other national offices. She edited the much-reprinted *Quarterly* issue on troughs and, with Rex Murfitt, wrote a book on the same subject published in 2000 by B.B. Mackey Press (available from the NARGS Book Service).



Drawing by Baldassare Mineo

Getting Started with NARGS

Harry Dewey

It is a pleasure to accept the editor's invitation to write occasionally about the Internet, primarily for readers who have not yet taken the full plunge into cyberspace and would like to know why they should consider it. This first column offers a brief discussion of basics, followed by an visit (on paper) to the NARGS web site, the most useful rock gardening site and a terrific extra bang for your NARGS dues bucks. Finally, there's a hardware and software discussion, on the theory that your appetite needs to be whetted before we talk about details that could cause your eyes to glaze over. Future columns will introduce the free e-mailing list Alpine-L and other resources to put you in touch with colleagues worldwide and answer your gardening questions quickly.

How Does the Internet Differ from Other Computer Features?

Computers seem newfangled to many, but to others they are an inescapable fact of life. Their strongest and earliest attraction for the general public was probably as word processors that brought about the extinction of the typewriter. Then people learned to build databases, play computer games, and lots of other things. But until the Internet arrived, they couldn't send e-mail or look at web sites. Just before he left office, Bill Clinton observed that, when he became president, there were fewer than 100 web sites in the world; eight years later, there were 40 million. Not a few of these deal with the world of plants. What do you need to reach them?

At first it was necessary to connect to the Internet via telephone, and most users still do, using the services of an ISP (Internet Service Provider). These companies range from local entrepreneurs with a few hundred subscribers up to giant AOL (America On-Line) with more than 13 million. A few charge no fees, while AOL charges more than $20 a month. Competition is already narrowing the field. To get online, you must be able to reach an ISP by phone (locally, to avoid a huge long-distance bill), unless you're among the increasing number of

users—mostly in cities—who are cable-connected. Once you're connected via your ISP to the Internet, you can send e-mail and visit web sites anywhere in the world without incurring additional fees.

What You Can Do on the Internet

Of the two glorious features of the Internet, e-mail was the first to make a big impact. Today, a majority of citizens in most industrialized nations use e-mail. Once you get the knack of answering e-mail letters, you can write and mail replies in as little as two minutes. And no postage!

The other feature is "surfing the Web." Why are there 40 million web sites? Because individuals, businesses, universities, governments, and other organizations have discovered the Web is a cost-effective way to advertise. Web sites can publicize your business or hobbies to anyone in the world, 24 hours a day, 7 days a week. A future column will help you start personalized searches on topics of interest.

After you've found a web site that has potential future value to you, your computer's software will allow you to "bookmark" it—list its address in a file of "favorites." You can go back another day, click on the bookmark, and quickly return to the web site. Web site addresses, the text that follows "www.http://", are known as URLs (Uniform Resource Locators). The URL for NARGS is: **www.http://nargs.org**

The Glories of the NARGS Web site

As an example of what just one organization has done, I'll describe the treasures of the NARGS web site. Every rock gardener should store its address in the computer so that with one click of the mouse, the ISP will automatically make contact with the web site and, in seconds, the main NARGS feature page will appear. The main feature page of any web site—the equivalent of a book's title page and table of contents—is called the "home page." The NARGS site has nine additional "feature" pages. Across the top of every feature page is a row of highlighted words representing all the other feature pages. You move around the site from one page to another by clicking your mouse's pointer on the page-name you want to reach, or on any other highlighted words. When your mouse pointer is correctly poised above a "clickable" word or picture, the arrow on the screen changes to a hand icon, indicating that you may expect another screen to appear when you click the mouse. Clicking on a clickable picture usually produces an enlargement of it. In the simulation of the NARGS web pages shown here, I've substituted small caps for computer-screen highlighting. The feature-page names above each NARGS page are MEETINGS / QUESTIONS? / PUBLICATIONS / SEEDS / BOOKS / GARDENS / SLIDES & VIDEOS / SITE MAP. Click on any one of these and your computer software transports you to that page.

Home page. Below these headings, the home page offers a changing array of other information. A recent visitor would find:

- Plant of the Month <JANUARY 2001> *Lupinus lepidus* var. *lobbii* by Iza Goroff
- Essays: <ROCK GARDENING>, construction and plant suggestions.
- New! <TOUR TO THE RUBY MOUNTAINS, NEVADA> (Sold out)
- <WHOLESALE ORDERING FOR NARGS BOOKS>

A "Site Search" block gives the visitor a chance to find a specific topic quickly, with the following instructions: "Find pages containing <ALL/ANY> of these words" with a fill-in box where you can click your mouse and type your topic. After you type the word or words, click on the following instruction and you will be whisked to the right page. Thus, if you want to know about *Gentiana buergeri*, you don't have to do a lot of reading. Just type the word "*buergeri*" and you learn within seconds that the name appears on the seedlist and that it was the Plant of the Month for October 1997.

A description of NARGS activities and goals follows, with the benefits of membership: "Toward this end NARGS offers its members the <ROCK GARDEN QUARTERLY>, an annual <SEEDLIST>, local chapter <MEETINGS>, a mail order <BOOK SERVICE>, a <BOOK LENDING LIBRARY>, a <SLIDE LENDING LIBRARY>, and a growing <WEB PRESENCE>. Yes, <MEMBERSHIP> has its advantages. You can see why our members are so passionate about rock gardening by <VISITING> some gardens."

Notice that the capitalized clickable words include not only the row of feature-page names but also other words embedded in the text. The paragraphs below detail the page that appears when you click on each highlighted word.

Plant of the Month <JANUARY 2001> brings up a nice long essay on *Lupinus lepidus* var. *lobbii*, written by Iza Goroff, a longtime NARGS member who writes this feature regularly. There are two large photographs, each approximately 6 by 6 inches on my 17-inch monitor screen: one a close-up, the other showing a dozen plants growing among phyllodoces on Mount Rainier.

At the left margin of the Plant of the Month page appear the highlighted links <ARCHIVE 2000> <ARCHIVE 1999> <ARCHIVE 1998> <ARCHIVE 1997>. Click on any of these and a new page appears with 12 small pictures of the plants of the month for that year, along with the name of the plant and the contributing author/photographer. Clicking on the picture for a given month brings up a larger picture (or two) of the plant and an essay about it.

"Plant of the Month" is one of the most delightful features of the NARGS web site. The sobriquet suggests that rock gardeners might, during the month of February 2001, move their beds of castillejas from the rear garden to the front walk, or wear castilleja boutonnieres to work, or initiate a neighborhood campaign to plant castillejas in every garden. This may be too optimistic, but Iza is certainly using this feature to promote fine plants and—above all—to build a cumulative collection of pictures and descriptions.

Clicking on <ROCK GARDENING> leads to a marvelous essay by the late Tom Everett (1902?–1986), titled "Rock and Alpine Gardens" and apparently

reprinted from a booklet of the same title published in 1992 at Millwood, New York, by the Hudson Valley Chapter (48 p., illus., 23 cm). Everett's article appeared originally in his own *New York Botanical Garden Illustrated Encyclopedia of Horticulture* (New York: Garland, 1980–1982), which he famously wrote (all ten volumes, 3,601 pages) all by himself.

He was a superb plantsman and rock gardener whose knowledge was literally encyclopedic. It was a stroke of genius to place his essay on the NARGS web site. The visitor can access its sections (many illustrated with line drawings) by clicking on their titles, such as <ENGLISH ROCK GARDENS>, <GETTING STARTED>, <PLANTS AND PLACEMENT>, <SPACING THE ROCKS>. Another section, <PART II, GOOD ROCK GARDEN PLANTS>, was prepared by members of the NARGS web contingent. It includes a list of plants deemed suitable for North American rock gardens, many of them accompanied by color photographs. Here is a typical entry:

> Armeria maritima [ma-ri-tee-mah]. Very variable in color, from white to rose, the usual form is lilac pink. Tiny flowers in rounded heads in late May. Forms a dark green grass-like mat. Brightest selection is cherry-red 'Düsseldorf Pride'. Greenland, Europe. Zones 3–8.

Returning to the home page, let's investigate <TOUR TO THE RUBY MOUNTAINS, NEVADA>, even though someone has kindly added "Sold Out." A click brings an extremely comprehensive package of information, including general information, available hikes, plants expected to be seen, mountain ranges to be visited, descriptions of food and lodging arrangements, weather, itinerary and schedule in wonderful detail, terms, conditions and responsibilities, restrictions (no plant collecting), reading list and background materials, costs, and an application form, plus the five clickable web sites: <HUMBOLDT NATIONAL FOREST IN NEVADA>, <PLANT SPECIES IN THE RUBY MOUNTAINS>, and 3 tourist info pages for Salt Lake City. After checking them out, you can get back to the NARGS site by using the "Back" feature on your web browser. Even if you missed signing up for the tour, you can plan your own trip to the Ruby Mountains.

The page <WHOLESALE ORDERING FOR NARGS BOOKS> describes a new wholesale-orders program through the NARGS Book Service for the benefit of chapters, and others who need quantities of these titles for resale. The books currently offered are *Lychnis and Silene in the Garden* by James L. Jones, *A Rock Garden Handbook for Beginners* edited by Jack Ferreri, and *Handbook on Troughs* edited by Joyce Fingerut and Gwen Kelaidis.

In the paragraph about the perks of NARGS membership, there are a number of highlighted key words. <ROCK GARDEN QUARTERLY> takes you to the <PUBLICATIONS> page, and <SEEDLIST> to the <SEEDS> page, described below.

At one time, NARGS offered its members (far fewer in those days) a mail-order lending library. Today, clicking <BOOK LENDING LIBRARY> brings the information that "NARGS has arranged with the Pennsylvania Horticultural Society for NARGS members to borrow books from its McLean Library. . . . [The] list is available on the <PHS MCLEAN LIBRARY> web site." Instructions for using

the service follow. Members living in remote areas can thus enjoy useful books they might never see otherwise.

The page <WEB PRESENCE> turns out to be a persuasive recruitment site for volunteers to augment the NARGS web site. Eleven opportunities were available on 1 February 2001.

Now let's go back to the headings at the top of the page and see where they take us.

Meetings. This page provides information about the NARGS chapters and about both local and national meetings. Under the link *Local Meetings* we read:

> Thirty-three <LOCAL CHAPTERS> in Canada and the United States meet throughout the year for lectures, exchange of plants and seeds, shows and garden visits. These friendly gatherings offer a wealth of information and inspiration, as well as a source for unusual plants. NARGS also sponsors tours by recognized authorities to local chapters, the <SPEAKERS' TOUR PROJECT>.

Clicking on <LOCAL CHAPTERS> brings up a list of all the chapters and a map of North America showing their locations. By clicking on the name of a given chapter, you get a description of the chapter, usually with a bit of history, a directory of its officers, a schedule of upcoming programs, and directions for inquiring about membership. Most of the chapter pages are maintained by the NARGS staff (chiefly by Mark Mazer), but some chapters have their own web pages, which are seamlessly accessed by a link from this page, and for these a great deal more information is usually available. Examples of chapter-maintained pages include the home pages of the Alaska chapter (the Alaska Rock Garden Society), maintained by Jaime Rodriguez, and of the Emerald Chapter, maintained by Louise Parsons.

Clicking on <SPEAKERS' TOUR PROJECT> displays details of the NARGS program for booking outstanding speakers on a tour of several chapters during a relatively brief period, with resultant economies in fees and travel costs. Many of these speakers come from overseas, so sharing travel expenses provides considerable savings for the lucky chapters. It's eye-opening for prospective members to see what famous garden experts they can hear—and talk with—just by attending chapter meetings.

The Meetings page also displays a National Meetings section which announces annual meetings and winter study weekends, currently through 2005. Dates and hotels are not given for meetings much more than a year in advance, but the site provides elaborate detail for meetings of the current year, with information about plant shows, lectures, and sales of books and plants. A new feature made possible by the use of web sites is the "preview" pages of the January 2001 Eastern Winter Study Weekend, which showed several of the color slides each speaker would use.

Questions? This main heading takes you to a page labeled "Help for Rock Gardeners," with these features:

- <DIRECTORY OF E-MAIL ADDRESSES> of NARGS members; you gain entry by listing your own name and address.
- <ALPINE-L>, information on how to join this on-line discussion group.
- Rock Gardening 101, where beginners can ask <LARRY THOMAS>; if stumped, he'll pass along tough questions to a specialist.
- For almost anything related to NARGS administration, your best bet is the <RESPONSIBLE POSITIONS> page, a Who's Who of national and chapter officers.
- For a discussion of the Society's concerns with conservation and collecting go to the <CONSERVATION POLICY> page.

Membership. The question we would all like to hear most is "How do I become a member?" Clicking <MEMBERSHIP> lets you sign up for a subscription to the *Rock Garden Quarterly*, participation in the Seed Exchange, and buying books at a discount from the Book Service.

Publications. This page is currently devoted entirely to the *Rock Garden Quarterly,* describing it and listing 20 issues published from 1995 to1999 in the format 1999 <WINTER><SPRING><SUMMER><FALL>. Clicking on the URL for the Winter 1999 issue brings up a page with blurbs for all the articles in that issue. Examples:

> The Cardinal Divide, an Alberta Alpine Restoration, by Donna Balzer. An inspiring report of heroic and successful efforts to reverse the plant destruction suffered by a delightful section of the continental divide.
>
> Kananaskis Country, Alpines after Banff, by Todd Boland. A must-read, no, a carry-along guide to the beauties awaiting your post-conference exploration of the Alberta Rockies. With four pages of color photos, Boland entices you to adopt his home-away-from-home, indeed makes it quite unlikely that you'll be able to resist.
>
> Alberta Alpines through the Seasons, by Rodney Shaver and Llyn Strelau. Here is your month-by-month description of how it goes with the Calgary rock gardeners, complete with lavish photographic illustrations. The authors' listing of their successes and "near-hits" certainly struck a note of familiarity with this reviewer. Not only are articles like this helpful for visiting gardeners who want to understand the local situation, but such articles also inspire and educate the rest of us as to how we might best deal with the vagaries we've been dealt at home.

Someday this site will offer on-line credit card sales of the articles, delivered by e-mail, or of complete issues of the quarterly, sent via the post office. One hopes that eventually it will add some information about other NARGS publications: the *Bulletin Board*, the 50-year index to the *ARGS Bulletin,* Marnie Flook's fine *History of the American Rock Garden Society, 1934–1995*, the co-published volumes from NARGS and Timber Press, and works in preparation.

Seeds. The Seed Exchange page is accessed by clicking this heading in the main heading or <SEEDLIST> in the text. It describes the 2000–2001 Seed List

and lets you click one button to view the list of garden-collected seed, or another button to view the list of wild-collected seed. Another button brings up the previous year's Seed List. There is an honor roll of donors of the largest number of seed varieties, a list of donors' countries, and a paragraph called "How the Seed Exchange Works." The paragraph "Seed Donors" displays a clickable link that leads to a list of the most popular plants in terms of previous years' actual seed requests. Instructions and donation forms can be downloaded/copied in any of five languages. A list of prohibited species is posted, as well as a list of commonly misidentified plants. Instructions for subscribing to a donors' discussion list are provided.

There is also an online version of the *Bernard E. Harkness Seedlist Handbook,* based on plants offered in the NARGS Seed List over the years since the exchange began, and currently being updated by a committee. This permits you to search for any family and rewards you with a list of genera. Searching for a genus brings a list of plants with information about longevity (annual, biennial, perennial), height, appearance, origin, and hardiness. For example:

> *Plectranthus umbrosus*: Perennial, 2'+ (60 cm), blue-purple flowers, Honshu, in mountains, Generally hardy in North America. References for *Plectranthus umbrosus*: Ohwi, Jisaburo. *Flora of Japan*, 1965.

Books. For those who need to expand their libraries, this page is a great boon. Besides explaining how the service operates, there is an order form that can be e-mailed over a secure line with your credit card number, or printed out and sent via post with a check. There is an explanation of discounts, including a link to the on-line Timber Press catalog, where NARGS members can order at a 20% discount. This is accompanied by a fantastic list of titles available from the Book Service, more complete than the lists printed in the *Rock Garden Quarterly*.

Gardens. At the top of this page is a simple list of states, without a word about gardens, but clicking on a given state reveals a list of members' gardens there that can be visited by appointment. Owners have supplied brief descriptions of their gardens. Farther down on the page is a statement of garden-visiting etiquette, supplied by the Delaware Valley Chapter.

Slides and Videos. This main heading, or <SLIDE LENDING LIBRARY> in the descriptive text, takes you to the Slide and Video Library page and its ordering instructions and mouth-watering lists of slides and videotapes. Provisions for ordering by e-mail had not been completed at this writing.

Links. A "link" is a quick route from one web site to another. Many web site designers include these as an extra. Clicking on a link (as described in the discussion of the Ruby Mountains tour above) takes you to some other site; you can return by using the "Back" feature of your web browser. The NARGS site, for example, offers as "master links" INTERNET DIRECTORY OF BOTANY, GARDENNET, SCOTT'S BOTANICAL LINKS, ROCK GARDENER'S LAST RESORT, THE ALPINE GARDEN, any of which produces many more links on down the line. There are links to other national societies devoted to rock and alpine gardening—ALPINE GARDEN SOCIETY (UK), SCOTTISH ROCK GARDEN CLUB—and to smaller regional rock

garden societies such as ALPINE GARDEN SOCIETY OF BRITISH COLUMBIA, NORTH LANCASTERSHIRE AGS GROUP, VANCOUVER ISLAND ALPINE AND ROCK GARDEN SOCIETY. You can visit societies devoted to a single genus or family: *Androsace*, cacti and succulents, *Codonopsis*, conifers, *Cyclamen*, *Dianthus*, ferns, *Geranium*, heathers, *Penstemon*, primroses, *Rhododendron*, saxifrages, violets; native plant societies in many states; the American and Royal horticultural societies; botanic gardens in the United States and abroad; nurseries and seed merchants; regional floras such as the Andean Botanical Information System, Flora of Australia, or Flora of Mt. Rainier National Park. A miscellany of other sites includes, for example, The Amateurs Digest: Cactus, Succulents, Caudiforms; Seed Germination Database; Cyber-Plantsman; Hortus West; Dictionary of Botanical Epithets; Endangered Species List; USDA Plants Database; Harvard University Herbaria; Global Plant Checklist (IOPI); Biota of North America; HortNet Links; APHIS Import Permit Information; Washington State University Rock Gardening Page; Doug Green's Rock Gardener's Frequently Asked Questions (FAQ); *Horticulture* Magazine; Bonsai/Rock Gardens; Alpines and Bulbs; Calendula Horticultural Books. In addition to *Alpine-L*, you can find information on lists like *Native Plants of Pacific Northwest* or *Trillium-L*.

Site Map. This page functions like a table of contents. A click on any link will take you to the desired page.

Hardware: Equipment You Need to Get on the Internet

First, you need a telephone (or cable connection, where cable Internet service is available). Equally important is a fairly modern computer. A computer more than a few years old can certainly function on the Internet, but it may not be able to take advantage of advances in speed of operation for fast display of photographs of plants, and you will waste a lot of time waiting for web sites to appear. Newer computers offer vastly increased capacity for storing files and pictures and for running sophisticated new programs. I recommend a computer speed of at least 600 megahertz, with several gigabytes of storage space and a minimum of 32 megabytes of RAM (random access memory). Such computers are currently available for $400 to $500. Roughly speaking, by doubling your expenditure, you can increase the specifications to 700 megahertz, 20 gigabytes, and 64 megabytes of RAM; by tripling it, you should be able to get up to 900 MHz, 40 gigs, and 128 RAM—and at that point, you're way out of *my* league. I run *Alpine-L* from a computer with 600 MHz, 8 gigs, and 64 RAM. Mark McDonough, an industry professional, suggests that these figures are already dated, and that huge strides in sophistication and capabilities (and software bloat), with a lot of focus on ease of use, have led to an abandonment of computers under 700 MHz.

A question basic to many cybersurfers is, should I use a Windows-based computer or a Macintosh? I'm not getting into that debate. Mac owners are fanatical about their machines' superiority, but the sales figures are horribly lopsided

in favor of Windows-based computers, and some ISPs don't respond as readily to Mac users' needs.

You *must* have a modem, the device—usually built into your computer's case (and therefore known as an "internal" modem)—that dials, on command, the telephone number of your ISP and then connects your computer to that of the ISP. This involves a usually audible electronic process known as "handshaking." Once connected, you can ask your e-mail program to retrieve the incoming mail your ISP has been holding since you last checked. The currently standard modems transmit data at 56K bps (bits per second). A "DSL" service that enables you to connect to the Internet the instant you turn on your computer has become available recently. If you can get DSL service for around $40 per month, it's competitive with ordinary modems, which require a second phone line if you don't want to tie up your phone while you're on line. DSL service transmits phone conversation simultaneously with computer signals, on the same phone line.

Backing up your work is very important, so I recommend equipping your computer with one of the various types of removable drives (Zip, Jaz, SuperDisk, CD-R/RW, etc.). If you download a lot of pictures from the Internet to make your own gardening library, this—or a huge hard drive—is the only practical way to store them.

Software

This discussion is concerned only with basic software. Your computer probably will come with software that enables you to receive and send e-mail and to find web sites on the Internet, and also software for managing the files you will inevitably accumulate.

The capabilities of the various software packages vary, but most brands perform the same range of tasks. Unless you make your living with computers, you are unlikely to know (or need to know) all the things your computer software can do. The two most popular Windows-based systems of e-mail software are MS (Microsoft) Outlook Express and Netscape Communicator's Messenger. The two most widely used Internet-surfing software systems (called "browsers") are MS Internet Explorer and Netscape Navigator. The two Netscape systems come in a package called Netscape Communicator. There are other systems, such as Eudora for e-mail, that became popular because of unique capabilities that have since been imitated by the two field leaders, but these independents have slowly declined in popularity. Web sites can look startlingly different when displayed through different browsers, and many web sites identify the browser software for which they're optimized. Apparently Netscape has some difficulties interpreting markup language (HTML) text and table formatting, and sometimes misinterprets HTML instructions, resulting in undesirable web page display.

Interdependence between E-mail and Web sites

E-mailing lists usually must create web sites to support the needs of their subscribers. Frequently asked questions and their answers are more effectively available on web sites, where they may be consulted by the list subscribers. Thus, web sites like that of NARGS serve their audiences as collections of frequently asked questions and answers.

Most web sites sit there passively, waiting for people to find them. Much more frequent usage occurs if their contents are actively brought to the attention of the potential audience. The NARGS could either set up an e-mailing list to announce additions and changes to its web site, or it could take advantage of the opportunities offered by existing e-mailing lists, such as *Alpine-L*, to publicize new features. For example, the Plant of the Month is announced promptly on *Alpine-L* by the feature's creator, Iza Goroff. Another cooperative possibility is new books added to the NARGS Book Service web page.

History of the NARGS Web site

Tom Stuart has provided the following outline of how the NARGS web site was developed.

"The original site was at the new Missouri Botanical Garden web pages. We soon got lost on their front page as they grew, and we also needed other facilities. Within the year we moved to our own domain.

"In most respects the current version [of the site] expands greatly on the original. However, there was one feature there at the beginning but missing in subsequent years. That's [naming] the seed donors. Not only is it a way of thanking them, but it gives us a means of following up with the donor even if we can no longer find the seedlist. From my view, knowing the plants' owners and sharing tips are some of the highest points of rock gardening. However, an open door policy seems to induce fear. Perhaps the FBI will raid and make off with all the *Silene acaulis*. In any case, there is opposition."

Harry Dewey, a retired librarian, lives and gardens in Beltsville, Maryland, near Washington, D.C. He started the rock garden e-mailing list Alpine-L in 1995.

Musings from a Rock Garden

Sowing Seed

Alexej "Sasha" Borkovec

The rock gardening business is in dire need of statistics. For example, do you know how many rock gardeners are left-handed? How many play the guitar? And the one that really puzzles me: How many grow plants from seed? Is it 80 percent or 20 percent? No hard data are available; I venture to guess the lower number, but even then consider it highly optimistic.

Why so few? Perhaps because people are troubled by the complexity of what they have heard or read about the requisite procedures. They have been intimidated by the intricacies of soil mixtures, temperatures, plant hormones, sulfuric acid, hydrogen peroxide, sterilization, light cycles, fungicides, fertilizers, petri dishes, moist paper towels, and so on. It all seems so complicated. "You want to grow plants from seed?" the experts ask. "It's so simple. All you need to do is empty and clean out your cellar, provide temperature and humidity control, install benches with fluorescent lights and automatic time switches, and reserve one refrigerator for seeds that require variable hot and cold treatment." No one tells you how to persuade your wife to give up her cellar pottery workshop and her vegetable- and fruit-only refrigerator, or how to explain to the kids that instead of Harvard it will have to be the local community college, because you just need the money.

Well, is there some way out? Yes, there is. A very wise woman and a great rock garden enthusiast, Doretta Klaber (in *Gentians for Your Garden*; M. Barrows, New York, 1964), suggested starting with the firm belief that the seeds just *want* to come up, and all you need to do is give them the opportunity. The operative word here is "want"; it is the seed's nature to germinate, and it doesn't need much to fulfill its destiny.

I'm not saying that all the fancy accouterments are good for nothing. Some seed does indeed germinate only after elaborate treatment, and sowing and growing your seed in a sterile medium under artificial illumination and controlled temperature almost always leads to a much larger number of plants and faster maturation. In fact, I too would use a basement, greenhouse, spare refrigerator, and all the other paraphernalia if only I had them. I'm a scientist myself, so my point isn't to disparage the scientific method, but to search for simplicity.

A word of caution. Since Mother Nature tends to be a bit perverse at times, it doesn't necessarily follow that what works for me will work for you. What I describe is a method I use with reasonable success. But you may—indeed, should—make some changes and find your own way. Consider this a few hints to be improvised on.

First, the medium. If you want to grow just a few plant species, say fewer than ten, buy regular seed-starting soil mix from a garden center. It is usually free of weed seeds, and a small quantity doesn't cost a fortune. For a larger project extending over several years, make your own medium. A simple recipe is one-third good topsoil, one-third peat moss, and one-third perlite (all by volume, not by weight). There is no end to other possible soil additives and their combinations; ultimately, everyone comes up with his or her own best mixture, with a proper balance of the two most important properties: drainage and water retention. The latter varies widely according to climate and/or your willingness to water more or less frequently.

Next comes the container. I use two kinds: one is square plastic pots 8 to 10 cm (3–4 in.) wide, and the other an assembly of plastic cells that come in a rectangular flat (ca. 27 × 54 cm. or 11 × 22 in.), familiar to buyers of annual or vegetable seedlings. Exact sizes are not critical and the cells can be reused for several years.

The third step is to fill the containers with the medium, water them well with a fine spray, and allow a day or two for the soil to settle. The pots should be full to about 2 cm (3/4 in.) below the rim, the cells to about 5 mm (1/8 in) below the top. Large seeds are sown in the cells, on the surface of the soil, not more than three seeds in each cell. The small seeds go into the pots, sown as thinly as possible.

The final step consists in covering the seed in all containers with a thin (2–5 mm) layer of finely crushed stone or brick. I use crushed granite, obtainable as "turkey grit" in farm supply stores for a reasonable price. The flats as well as the pots are placed on level ground exposed to the sun and covered with a wire screen that protects them from heavy rain. In dry weather, daily watering with a fine spray that doesn't disturb the surface is essential. Even before germination begins, slugs and other undesirable wildlife must be denied entrance at all costs.

This is a simple seed-growing technique without any claims for excellence or sophistication. It requires a minimum of labor, space, and expense, and it does work quite well. Since not all seed or all species will germinate in the first six months after sowing, something needs to be done about the late germinators. At the end of June, I collect all ungerminated containers and stack them up in a shed. There they stay until next February or March, dry as a bone, when they are taken out and placed with the other trays in the open. Undoubtedly, this rather harsh treatment kills some seed, but a surprising number survive the dry year and germinate the following spring.

What to do with germinated seed was the subject of my previous Musings (*Rock Garden Quarterly,* spring 2000, pp. 146–148), but one question of many rock-gardening neophytes needs to be answered. Is growing plants from seed really worth the trouble? The answer is a resounding "Yes!" Rock gardening as

a hobby means the desire and willingness to experiment. There may be a few that will grow almost anywhere, but the overwhelming majority of rock garden plants, and practically all true alpines, need more than just soil and water. This "more" is the difference between growing a plant successfully and killing it. The final interpreter of this meaning is the grower, whom all the literature and experiences of other people cannot replace. To this assertion, the grower responds by experimenting, placing the plant here or there in the rock garden, following up with one treatment or another. One plant in one experiment is seldom adequate, but to conduct five, twenty, or a hundred experiments is difficult or even impossible—unless you grow your own plants.

A second major reason for growing more than one plant has to do with genetics. No two seedlings are exactly the same, and the chances of producing a specimen with some especially desirable characteristics increase in proportion to the number of available plants. The possibility of obtaining a superior plant—i.e., one that does better in your garden than the one you bought from a nursery—is not remote. Selection is a powerful tool that has served all gardeners for thousands of years.

Although these two utilitarian reasons should be sufficient to persuade anyone to grow plants from seed, there is another reason that has nothing to do with utility. Growing plants from seed is fun, a true labor of love.

Alexej "Sasha" Borkovec of Silver Spring, Maryland, is a frequent contributor to the *Quarterly* and his Chapter's newsletter.

Plant Portraits

Penstemon pinifolius 'Magdalena Sunshine'

The Pineleaf Penstemon, *Penstemon pinifolius*, is native to northern Mexico and the states of Arizona and New Mexico. It is a small, erect, shrubby plant with needle-like foliage on many-branched stems. The typical plant bears numerous narrowly tubular flowers about an inch (2.5 cm) long in colors from orange to deep scarlet. It is an adaptable plant that does well in heavy soils, so it has become popular with gardeners.

There are at least two named yellow-flowered clones of *Penstemon pinifolius* now being grown. The first to enter gardens was 'Mersea Yellow'. Barry Starling, writing in the *Alpine Garden Society Bulletin* (vol. 55, no. 4, December 1987) reported that 'Mersea Yellow' originated as a sport on an otherwise normal plant in the garden of Mr. J. Jowers of West Mersea in 1979 or 1980. The sporting shoot was propagated by Mr. Jowers and grown on by him. Mr. Jowers eventually gave a plant to Jack Gingell of Ramparts Nursery, who increased its numbers substantially. On June 16, 1987, a plant shown by Ramparts Nursery received a unanimous vote for the Award of Merit. By the 1990s, 'Mersea Yellow' was being offered in the United States by a few specialist nurseries.

During the first week of July 1991, my wife and I made our first trip to New Mexico. We were looking for native *Primula* species in the wild, and one locality we decided to visit was in the Magdalena Mountains. On our way up to the summit, we saw plants of the typical *Penstemon pinifolius* with red-orange flowers. Farther along, we came around a curve, and glowing in the sunshine on the cut-bank of the road was a yellow-flowered plant of this species.

Since I was in a hurry to get to the site of *Primula rusbyi*, I made a mental note of the location and continued up the road. On our return trip that afternoon, the penstemon was in shade. I drove past it without realizing I had missed it and had to turn around. Once I had relocated it, I took a few cuttings and a piece that had a bit of root attached. I put these in our cooler, and about 2,000 miles and three days later in Oregon, I put them in propagating medium. All the cuttings failed, but the piece with a little root survived.

I named it 'Magdalena Sunshine' (photo, p. 106). I rooted some cuttings and gave one plant to Diana Reeck at Collectors Nursery in Battle Ground, Washington. They have offered this clone in their catalog for the last few years (albeit misspelled 'Magdalina Sunshine', an error that also appears in the 2001 catalog of Siskiyou Rare Plant Nursery).

I haven't grown 'Mersea Yellow', but people who have tell me that 'Magdalena Sunshine' has flowers of brighter yellow. I have not seen any indication of my plant's reverting to the standard color, and I don't believe it could possibly be a sport.

Dale Lindgren reported in the *Bulletin of the American Penstemon Society* (vol. 55, no. 2, July 1996, pp. 3–4) that two-thirds (14 of 21) of the seedlings produced from 'Magdalena Sunshine' seed had yellow flowers. He observed that the yellow-flowered plants had green stems, while the orange-flowered ones had reddish stems. Dale wrote, "'Mersea Yellow' has been reported to be less vigorous and hardy by some gardeners compared to the red and orange forms."

The 1998 winter here in western Oregon began with mild temperatures through early December, followed by a dramatic drop to subfreezing temperatures within a 24-hour period. Our plant of 'Magdalena Sunshine' was set back, but so was a 10+-year-old plant of *Dryas octopetala* growing nearby, which I always considered to be as hardy as a rock. Our penstemon slowly came back the following summer, but it flowered only sparsely that season. It now looks as good as it ever has; however, the dryas is still only a skeleton of its former self.

Most penstemons are easy to propagate from cuttings, especially those taken in the fall. However, I have difficulty with *P. pinifolius* regardless of when the cuttings are taken. The foliage tends to turn brown and rot, even though roots may have started to develop. I may try treating them with a fungicide to see if that would prevent them from failing.

Jay Lunn
Hillsboro, Oregon

Spiranthes cernua var. *odorata* 'Chadds Ford'

Like far too many native plants these days, *Spiranthes cernua* var. *odorata* 'Chadds Ford', a native orchid, was discovered just as its habitat was about to be destroyed. (Some botanists place this plant at species, not variety, level, as *S. odorata*.) Dick Ryan, an eccentric character with a passion for native orchids, found the plant in the 1960s in a wet ditch near his home town of Bear, Delaware. At the time, Bear was a rural crossroads; today, this former orchid habitat is overrun by tract houses.

It didn't take long for word about Ryan's exquisite discovery to spread. Dr. Merlin Brubacker, a plantsman with a keen interest in tropical orchids, was

smitten by this denizen of temperate Delaware. In 1973, a division of the orchid grown by Dr. Brubacker received the coveted Certificate of Cultural Merit from the American Orchid Society. 'Chadds Ford' (photo, p. 106) is a wonderful cultivar: a vigorous grower with large, extremely fragrant flowers. Although the plant was discovered in Delaware, it was named in honor of Chadds Ford, the town in southeast Pennsylvania where Dr. Brubacker lived.

Spiranthes cernua var. *odorata*, a fragrant form of the species commonly known as "nodding ladies' tresses," is found in coastal regions of the southeastern United States from Virginia to Florida and west to Texas, where it flowers from fall through winter. The flowering stems can reach about 3 feet (1 meter) tall, with 3 to 6 glossy dark green leaves up to 8 inches (20 cm) long on the lower part of the stem. Its yellowish white blossoms are larger than those of typical *Spiranthes cernua*, which is found throughout eastern North America. Like other members of the genus *Spiranthes*, the flowers of this species are spirally arranged in a spike of twisted appearance. (The name *Spiranthes* comes from Greek *speira*, meaning "spiral," and *anthos*, "flower.") This species is called "nodding ladies' tresses" because of the nodding posture of the individual florets that make up the spike. One of the most distinctive features of *Spiranthes cernua* var. *odorata* is its potent, sweet fragrance, which is often compared to that of vanilla or jasmine.

Most orchids are difficult to propagate, and they also have a reputation of being almost impossible to grow. The most commonly accepted theory on why they're so temperamental is that the symbiotic relationship with mycorrhizal fungi found on the root tips, essential for the breakdown of nutrients in the soil to forms the plants can use, is difficult to simulate in a garden setting. 'Chadds Ford' is the exception to the rule. It's easy to grow and forms colonies quickly.

In August 1992, Dr. Richard Lighty, director of the Mt. Cuba Center for the Study of Piedmont Flora in Greenville, Delaware, gave me a 6-inch pot of 'Chadds Ford'. I kept the plant in a moderately heated greenhouse (45°F). By December 30, I was able to divide out thirty-two 2½-inch pots and eighteen 4-inch pots, and put the stock plant back in its original pot.

The following spring, I transplanted several divisions outside in the garden. By midsummer, flower buds had begun to form. In late summer, my garden was graced with 18-inch spikes of waxy white orchid flowers, tinged with green and scented with vanilla. The flowers persisted into late fall.

Spiranthes 'Chadds Ford' prefers wet feet. However, it will do perfectly well in any rich, moisture-retentive soil, in sun or shade. Given these conditions, this plant, which is stoloniferous, will multiply in no time at all. I highly recommend it, even for the novice gardener.

If you'd like to learn more about native North American orchids, take a look at the following books: Phillip Cribb and Christopher Bailes, *Hardy Orchids* (Timber Press, 1989); A. W. Darnell, *Orchids for the Outdoor Garden* (1930, reprinted by Dover, 1976); Oscar W. Gupton and Fred C. Swope, *Wild Orchids of the Middle Atlantic States* (University of Tennessee Press, 1986); Philip C. Keenan,

Wild Orchids across North America (Timber Press, 1998); and Welby R. Smith, *Orchids of Minnesota* (University of Minnesota Press, 1993).

Barry Glick
Renick, West Virginia

Source

Sunshine Farm & Gardens, Renick, West Virginia 24966; <www.sunfarm.com>.

Tulipa humilis and *Tulipa clusiana*

By far the most satisfying of the various tulip species I've tried in my rock garden (USDA Zone 4) are *Tulipa humilis* and the lady tulip, *T. clusiana*. They deliver an inebriating, month-long floral show without the usual tulip hangover of broad, slow-ripening leaves. These two species, in all their forms, have flowers of exquisite color on plants with narrow leaves that soon disappear. They bloom in succession, with *T. humilis* beginning in very early spring, which prolongs the show. Both species are hardy at least to Zone 4, bloom reliably every spring, and are widely available from bulb suppliers. These helpful attributes set them apart from similar and equally beautiful narrow-leaved species such as the tender *T. cretica,* hard-to-find *T. kurdica*, and shy-blooming *T. saxatilis*.

The flowers of *T. humilis* range in color from light pink through violet to brilliant crimson, all with a contrasting central blotch and anthers that can be either yellow or black. It masquerades in catalogues and older source works under the names *T. pulchella, T. violacea*, or *T. pulchella* 'Violacea'. I've grown two forms, both with proportionately large flowers on stems 3–5 in. (7.5–12.5 cm) tall. The first has yellow-centered flowers of a lovely clear violet that I haven't seen on any other tulip. They quickly open flat, over 2 in. (5 cm) wide. In contrast, the other form has goblet-shaped flowers of a brilliant crimson that becomes positively incandescent on sunny days. Last fall I planted bulbs of a third form, 'Lilliput,' that should prove to be an even better rock garden plant, with nearly stemless flowers of purer deep red. (Photos, p. 107.)

As *T. humilis* fades away, the lady tulip comes into its own. An easy distinguishing mark is the pretty vertical pink stripe on the creamy white petals of the type species and also on the yellow petals of the smaller *T. clusiana* var. *chrysantha.* This species has a slender elegance that's unique in the genus. It has proved hardy in Zone 4 and also does well in California and other places often considered too warm for tulips. It has naturalized in southern Europe, apparently in great quantities. When I was in Athens last spring, there were huge pails of cut lady tulips for sale at every florist and at street markets.

Both species are native to stony hillsides or slopes in a vast area of western Asia. *Tulipa humilis* ranges east from eastern Turkey through northern Iraq and northwestern Iran; *T. clusiana* stretches from there to the Himalayas, with the yellow-flowered variety found as high as 10,725 feet (3300 meters). It is the only

tulip species (under its former names, *T. stellata* and *T. s.* var. *chrysantha*) pictured in Oleg Polunin and Adam Stainton's wonderful book *Flowers of the Himalaya* (Oxford University Press, 1984, p. 429, plate 124).

Much more dramatic is the appearance of the lady tulip in Beverley Nichols's *Merry Hall.* It was wartime—March 23, 1943—in India's wild North-West Frontier. The author, wracked by pain and thirst, was being carried on an improvised stretcher when he spotted a huge drift of his long-sought mystery tulip, whose description matches *T. clusiana* in every regard. He demanded that the party stop for them.

These plants are among the most graceful in the spring rock garden. They deserve spotlight treatment, planted far enough apart for each one to be savored as an individual. *Tulipa humilis* blooms before all but a few other rock garden plants and has brilliant colors that stand well by themselves. As an experiment, I've nonetheless dug in a few dozen bulbs between plants of *Pulsatilla vulgaris* in mixed colors. With any luck, they'll all bloom at about the same time this spring, and the leaves of the little tulips will ripen before being overtaken by the pasque flowers' mops of carrotlike leaves. By the time you read this, I'll know whether the resulting burst of color is pleasing to the eye or grating to the nerves.

In contrast, the pink-striped creamy whites and soft yellows of the lady tulip and its variety are natural mixers. The rock garden is in full bloom by the time their flowers mature, and I have yet to see anything whose good looks these little tulips don't enhance. As I look at a loose drift of them, it's easy to understand Beverley Nichols's long-ago decision to suffer pain and thirst a little longer while his stretcher-bearers dug out a few bulbs.

GERALD TAAFFE
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Iris unguicularis: Algerian or Winter Iris

Like so many things horticultural, the idea of gardening for winter bloom first enthralled me through the writings of Elizabeth Lawrence, an author from the U.S. South. Through her suggestions, plus some discoveries of my own, I now have numerous bulbs, perennials, and shrubs in bloom on any given day between Thanksgiving (late November) and Valentine's Day (mid-February)—our idea of what constitutes winter in the South.

Perhaps the most enchanting thing to bloom during this period is the Algerian or winter iris, *Iris unguicularis*. Since my first encounter with it, I've collected as many selections of this species as possible, and I now have blooms during all but the coldest spells of winter.

Iris unguicularis is native to the southern and eastern Mediterranean, with scattered populations from Algeria up through Turkey and the Greek Peloponnese. There are two basic morphological variants of the species. The Algerian race, the one most often represented in cultivation, is a plant with fairly wide (to about 0.5 in./1 cm) leaves that grow about 12 to 16 in. (30–40 cm) long. The

other variant, of Greek and Cretan origin, has narrow, wiry, more erect foliage which usually grows only 4–5 in. (10–13 cm) tall. Some botanists have classified the forms as different subspecies or even different species; the smaller form is sometimes offered under the horticultural sobriquet *Iris cretensis*.

The blooms of *Iris unguicularis* are borne on elongated floral tubes rather than true stems, and these may be 2 to 6 in. (5–15 cm) long. The petals have the typical iris arrangement, with three upright "standards" and three arching "falls." The specific epithet means, "narrow-clawed" and refers to the shape of the petal base. The flowers are typically medium blue-lavender, with yellow to orange markings on the falls, but variations occur. There are white, deep violet, and even pink forms in existence. The deep violet form is fairly common in cultivation, but the others are as scarce as hens' teeth. Most flowers have a sweet, honeylike fragrance, but this too is variable, and the fragrance is most obvious when the flowers are brought into a warm room.

Although the available literature sometimes implies otherwise, the cultivation of *Iris unguicularis* is fairly simple, at least where I garden in North Carolina. Sun to high shade is preferable, although I've seen acceptable plantings in woodland conditions. Good drainage is essential, although the soil needn't necessarily be gritty, as British sources often state. Lime is usually advised, but I grow mine quite well in an acid sand. Some forms have been hardy to about 5°F for brief periods when placed in a dry, sheltered site, but they are unlikely to tolerate extended or wet freezing conditions. They can be grown in containers, but these must be large (at least 10 in./25 cm in diameter) and deep, and the root zone must not freeze.

Plants out of flower are not too attractive, so care should be take to choose companion plants that will draw the eye from the clumps of ragged, yellowing foliage. I usually take the time during August to clean out the dead foliage from each clump. My reasons are twofold: first, I fear that the matted, dying foliage will cause the crowns to rot during hot, wet weather; second, I worry that the dead foliage will provide cover for slugs, which love nothing more than the tender emerging flower buds.

Seed may take a year or more to germinate, and the easily transplanted seedlings bloom in their third or fourth year. I have found that propagation by division is not always easy here. In Mediterranean climates, where the plants experience a normal dry dormancy in summer and come back into growth in fall, they are readily divided just as the new growth starts to emerge. I've found that small divisions are fine as long as each piece has an adequate amount of root.

There are numerous selected clones of *Iris unguicularis*. Unfortunately, most of these are simply unavailable in North America. Over the past several years, I've amassed a good-sized collection of cultivars, primarily by importing them. These are the best and most interesting:

- 'Marondera' is a recent selection that originated in a garden in Zimbabwe. This large-growing selection is by far the most vigorous of all the forms I grow. Clumps double in size each year and bloom profusely from late Octo-

ber through early April. The large flowers are a fairly typical medium lavender-blue but have excellent form with strong standards. The foliage is also reasonably attractive at all times—definitely an asset.

- 'Walter Butt' (photo, p. 108) is a large, older cultivar with lovely silvery-lavender flowers. The foliage seems more upright and substantial than is typical, and the plants also tend to bloom earlier than most other clones. It is also one of the most fragrant.
- The name 'Alba' is a catch-all for any number of white forms. These generally have the reputation of being weak-growing and short-lived, but a form I picked up at Washfield Nursery (UK) seems to be a fairly strong grower. The flowers are pure white with yellowish-green markings on the falls, and are borne on unusually long tubes, up to 12 in. (30 cm).
- 'Mary Barnard' is a mid-sized cultivar with flowers of deep, velvety purple, marked with gold on the falls. This is a fairly vigorous and striking cultivar, but it rarely blooms for me before mid-January, a characteristic that detracts from its value.
- 'Abington Purple' is a small-foliaged cultivar with the most striking flowers of all: very dark purple, marked with bright orange on the falls. This low growing (around 5 in./12 cm) cultivar, like other smaller forms, is perfect for the rock garden.

Iris unguicularis is not readily available through the North American nursery trade. I know of no nurseries that offer it consistently from year to year. It's a plant that is frequently passed from one keen gardener to the next. Visitors to Montrose Gardens in Hillsborough, N.C., can purchase divisions of a floriferous, fragrant, low-growing form. Below are two commercial sources that I have had excellent luck with. The first sends out bare-root plants in the fall which establish easily.

MIKE CHELEDNIK
Greenville, North Carolina

Sources

Cultivars: Avon Bulbs, Burnt House Farm, Mid-Lambrook, South Petherton, Somerset, England TA13 5HE; catalog $5 (U.S. bills)

Seeds: Jim & Jenny Archibald, 'Bryn Collen', Ffostrasol, Llandysul, Dyfed, Wales SA44 5SB, UK; catalog $3 (U.S. bills)

Books

Time Tested Plants: Thirty Years in a Four-Season Garden. By Pamela J. Harper. Portland: Timber Press, 2000. 351 pp, 250 color photographs. Hb, $39.95. ISBN 0-88192-486-5.

It is meant as no disrespect to reveal that my preferred way to read chapters in plant and gardening books is rather random: initially seeking information on plants that I am currently interested in, and then moving on to topics I want to find out more about; rarely do I follow the sequence in which the book is presented. Thus, in *Time Tested Plants* I started with hellebores, moved to the chapter on autumn bulbs, and lingered over spring perennials. Eventually I had read the entire book, and an afternoon was "lost." I think that you too will find it hard to dip briefly into *Time Tested Plants* without lingering longer than you had intended.

Pam Harper gardens on a two-acre site sheltered from tidal creeks near the Chesapeake Bay, a long arm of the Atlantic Ocean between Virginia and Maryland. She effortlessly describes her experiences "playing with plants." She first gardened in England until the late 1960s; since 1971, she has worked in Virginia's coastal plain (USDA Zone 7) on mulch-enriched, acid sandy soil. Even now, she fights back the native vegetation of tupelo gum, pines, hollies, and thickets of wax myrtle that want to reclaim her space. This locale is the stage for her four-season garden.

Time Tested Plants is a distillation of years of gardening experience and knowledge of stalwarts of the garden: trees, shrubs, perennials, and bulbs. Topics covered include plant propagation, plant care, and pairing plants. If you are looking for information on new, trendy plants just being introduced into our landscapes, you will not find it here. In Virginia for 30 years, Harper has grown scores of plants—many did not make the final cut in this book—and her choices to include are plants that provide long-term adaptability and beauty for a decade or more.

Her essays cover little-known native plants, such as Indian pink (*Spigelia marilandica*), the eastern coral bean (*Erythrina herbacea*), and the several species of false or wild indigo (*Baptisia*). She does not overlook plants she has drawn from

more exotic places, however. Thus *Eucalyptus neglecta* (Australia), *Ipomopsis rubra* (Mexico), and *Ligularia tussilaginea* (now *Farfugium japonicum*) from Asia are objects of both her spade and her pen. She also writes about variegated plants, one of my own interests: *Aralia elata* 'Variegata', *Acanthopanax sieboldianus* 'Variegatus', and *Fallopia japonica* 'Variegata'. Rock gardeners will find appeal in her comments on growing pulmonarias, *Iberis*, *Arabis procurrens*, primulas, epimediums, ajugas, corydalis, phlox, and similar "in scale" plants.

I feel I am the poorer for never having visited Harper's garden myself (though I have had invitations), especially when I gaze at the exceptional color photographs taken in her garden. Like the rampant wisteria she describes that won't take "no" for an answer, Pam Harper's prose will embrace you irresistibly. Chores you may have planned will remain undone. In *Time Tested Plants*, there is hardly a sentence that appears not to be written sincerely—and rarely one that lacks the confidence and assurance of firsthand experience.

BOBBY J. WARD
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Alpine Plant Life: Functional Plant Ecology of High Mountain Ecosystems. By Christian Körner. Berlin: Springer Verlag, 1999. vi + 338 pp., 4 plates. $119 (hardcover, ISBN 3-540-65064-7), $64.95 (paper, ISBN 3-540-65438-0).

This book should be required reading for all ecologists and ecology students. Alpine environments are extreme, and plant responses to these extremes are unique. The author considers alpine areas to be sites of grand natural experiments "which provide unbeaten opportunities for comparative ecological research, the study of plant adaptation and the mechanisms for survival of physical stress." For this reason, alpine environments have attracted generations of plant scientists. Körner's book gives us a nice summary of alpine plant studies and covers all parts of the world, including the tropics.

In the introductory chapters, the author describes the main physical parameters of the alpine environment, climate and soils, and deals with the impact of the main parameters (such as snow) on alpine plants and alpine ecosystems. Other chapters deal with physiological ecology of water and nutrient relations of alpine plants, their photosynthesis, growth physiology, biomass production and plant reproduction. The closing chapter covers global changes and human impacts on plants in alpine environments. The author tries to present the reader with "the bulk of scientific findings" related to alpine plants in a reasonably condensed way. There is an amazing number of references (close to a thousand) which will help readers who want more details.

The treatment of these topics is thorough and in depth. Modern treatment of alpine ecology and the inclusion of a good treatment of tropical alpine environments make this book unique. I would have expected more on plant communities and the role of competition in alpine environments, as well as a more thorough coverage of animal-plant relationships. The latter is addressed only in

a section on "Biomass losses through herbivores" and in one on pollination. In the chapter on mountain climates, the author fails to mention Jan Jenik's anemo-orographic systems (see *Preslia* 31: 337–357, 1959), which explain many vegetation patterns in high mountains.

Körner's book is written in clear English but displays some features of German syntax and style. Too many subordinate clauses and parenthetical phrases require good mental concentration: the book cannot be read quickly. The absence of a glossary is a serious oversight; should I be ashamed that I don't know what Pick's Law of Diffusion is?

The book is beautifully produced, richly illustrated, and—in spite of my critical comments—the best modern treatment of "functional ecology" of alpine plants. In publishing *Alpine Plant Life*, Springer has added a valuable classic to their catalog of important works in ecophysiology. Both author and publisher should be commended for this book.

Adolf Ceska
Vancouver, British Columbia

Flora of Steens Mountain. By Donald H. Mansfield. Corvallis, OR: Oregon State University Press, 2000. 410 pp. $29.95 (paper, ISBN 0-87071-471-6).

Long, rainy Oregon days give us time to read, and even in winter, when the opportunity to "test-drive" a new manual of Pacific Northwest flora is lacking, the appearance of one is very welcome. As an amateur botanist, I consider my response a valid test of the usefulness of such a book's keys for the enthusiastic nonspecialist.

The Steens Mountain is home to several endemic plants, including an especially garden-worthy penstemon with wonderful, oversized flowers: *Penstemon davidsonii* var. *praeteritus*. The rich, diverse flora of this isolated mountain includes elements of both the Basin and Range and the Cascades botanical provinces, with some additional spice from the Rocky Mountain and Sierran areas. Well-known alpine plants include *Sedum debile* from the Rocky Mountains, and *Claytonia nevadensis* from the Sierra Nevada. Visitors can also experience floristic zonation from desert to alpine within a remarkably small distance.

This welcome book, sized to fit easily in a backpack, covers more area than its title suggests, essentially including the southern half of Oregon's huge Harney County. It thus takes in such diverse regions as the Alvord Desert basin, Riddle Mountain, and Diamond Craters. In this area, the coverages of three well-known regional floras meet and overlap to varying degrees: the *Jepson Manual of Higher Plants of California* (James C. Hickman, ed.; University of California Press, 1993); *Flora of the Pacific Northwest* (C. Leo Hitchcock and Arthur Cronquist, eds.; University of Washington Press, 1973); and *Intermountain Flora* (Arthur Cronquist et al., eds.; New York Botanical Garden, 1994).

Because Mansfield's book is comprehensive and centers on material that is peripheral in those floras, it is useful to anyone botanizing in southeastern

Oregon and adjacent parts of Idaho or Nevada. Travelers to this region may also want to visit the nearby Pueblo Mountains and the rocky sagebrush flats that are the home of the beautiful endemic *Penstemon cusickii*. Weather and access in "Oregon's Outback" are unpredictable, so it is good to have options.

Many handy organizational features are incorporated in *Flora of Steens Mountain*. My main complaint is that the placement of the drawings in one section at the end of the book makes using them a bit awkward. The introduction provides excellent guidance to readers who are new to keying out plants. With examples, it explains clearly how a dichotomous key works. There is a brief but encouraging section on how to collect plant specimens for later study, and an especially fine but concise introduction to plant names. The concluding sentence is sure to elicit a wry smile: "The expectation that our taxonomic categories are fixed pigeonholes will be unfulfilled" (p. 26).

The author views the compilation of the flora as a dynamic, ongoing process. He has a web page which may be accessed at <http://hecate.acofi.edu/biology/academics/faculty/mansfield/steens.html>.

The introduction also includes an overview of the biogeography, geology, climate, natural history, and human history of the area. It meets the challenge of accommodating both the motivated but unskilled amateur and the professional botanist. This new flora will stand the test of time and use well.

LOUISE PARSONS
Corvallis, Oregon

NARGS COMING EVENTS

2002 Eastern Winter Study Weekend, Jan. 25, 26, 27, Falls Church, Virginia. Host: Potomac Valley Chapter. Contact: Alice Nicolson, 3435 S. 8th St., Alexandria, VA 22204 <taxonomy@aol.com>

2002 Western Winter Study Weekend, Feb. 22, 23, 24, Medford, Oregon. Host: Siskiyou Chapter. Contact: Ruby Reed, 310 Brandon St., Central Point, OR 97502 <imrareed@connpoint.net>

2002 NARGS Annual Meeting, June 11–14, Anchorage, Alaska. Host: Alaska Chapter. Contact: Frank Pratt, 7446 E. 20th Ave., Anchorage, AK 99504-3429 <akkrafts@alaskakrafts.com>

Is Your Passion Listed?

Are you the donor who once provided the seed exchange with 37 different species of *Veronica*? The man who decided to grow every *Scutellaria* species he could find? The possessor of every *Muscari* yet described?

Writing as a person who jumped out of her chair with a whoop last night upon discovering *Fritillaria straussii* in a seed list, I know there are "genus mavens" out there focusing their skill, resourcefulness, and obsessive-compulsive disorders on a great variety of plant groups. Some of them are more visible than others; take the Japan Violet Society and its converts in places as far-flung as Pennsylvania and Germany, who provide the NARGS exchange annually with a bewildering array down to the level of, let us say, the sub-forma. Some of them are happy to share their enthusiasms in print—like Mark McDonough, the Onion Man—but others are still lurking in their scutellaria groves and grape hyacinth vineyards.

I looked over the most recent NARGS seedlist and compared some significant genera that members were obviously growing enthusiastically with a list of featured genera over the past ten years of the *Quarterly*. Although many of these plant groups have been mentioned from time to time in compendia like Gwen Kelaidis's "100 Best Plants for Beginners" series, quite a few have not received focused attention.

Therefore, I'd like to invite you to peruse the following list of genera that contain legitimate "rock garden" plants. "*Geranium*?" you ask. "*Plantago*?" Indeed, there are little *Geranium* species that won't take over your garden, and there are delightful fuzzy, mat-forming miniature plantains. There are 4-inch bergenias, 6-inch delphiniums, tidy tropaeolums, and seriously alpine-looking alstroemerias.

If you know them, grow them, and cherish them, please consider telling the rest of us about them. A Plant Portrait of one or a few species is a good place to start; a feature article is even better. Your editor stands ready to collaborate, if you aren't sure how to put your knowledge into prose. You don't need a computer; you can write in pencil on notebook paper, if you wish. You don't need to be able to write good English; we will be happy to arrange the translation of articles from most major languages.

Here is the list I came up with. The editor's address is on the last page of this journal—waiting for a letter or e-mail from anyone with a rock-garden obsession. Take one from any column!

Alchemilla
Alstroemeria
Aquilegia
Arenaria
Armeria
Arnica
Arum
Asperula
Aster
Bergenia
Betula
Biarum
Calandrinia
Calceolaria
Cardamine
Carex
Carmichaela
Celmisia
Claytonia
Codonopsis
Colchicum
Cortusa
Corydalis
Crassula
Cremanthodium
Cyananthus
Dactylorhiza
Daphne
Delphinium
Dicentra
Dionysia
Dodecatheon
Dracocephalum
Edraianthus
Empetrum
Ephedra
Epilobium
Eranthis
Erigeron
Erodium
Geranium
Geum
Glaucium
Globularia
Gypsophila
Helianthemum
Helleborus
Hypericum
Incarvillea
Jurinea/Jurinella
Lavandula
Leontopodium
Leucojum
Linum
Lupinus
Lychnis
Meconopsis
Mertensia
Mimulus
Minuartia
Narcissus
Nomocharis
Orostachys
Ourisia
Papaver
Paradisaea
Paris
Phacelia
Phyteuma
Plantago
Polemonium
Polygala
Potentilla
Pulsatilla
Ramonda
Ranunculus
Raoulia
Roscoea
Saponaria
Satureja
Scilla
Scutellaria
Senecio
Shortia
Sisyrinchium
Soldanella
Sternbergia
Symphyandra
Synthyris
Teucrium
Thalictrum
Townsendia
Tricyrtis
Tropaeolum
Tulipa
Veronica
Viola
Zauschneria

Do you know of East Africa and/or Northern European wildflower sources? Please let me know: Louise Anaouïl, 780 Richelieu, Brossard, Quebec, Canada J4X 1G9.

Our plants rock—tropical style! Coleus, cuphea, bananas, lantanas, etc. Catalog free. Singing Springs Nursery, 8802 Wilkerson Road, Cedar Grove, NC 27231; tel. 919-732-9403.

Hepatica seed will germinate reliably when sown fresh. Seed sent as soon as it is ready. List at: www.pm-images.demon.co.uk

Seeking seed or live plants of *Onosmodium virginianum* (Virginia false gromwell, Virginia marbleseed, wild Job's tears). Will pay collecting fee and postage. Wish to undertake construction site plant rescue. André Henry, P.O. Box 6, 55210 Vigneulles, France.

Unusual bulbs: *Crocus, Fritillaria,* western American plants, more. Free list midsummer. Sorry, no shipping outside USA. Jane McGary, 33993 SE Doyle Road, Estacada, OR 97023; e-mail janemcgary@earthlink.net

Retail mail order perennial nursery, established 15 yrs., national reputation. Great opportunity. Nursery and fabulous display garden, 3 acres w/ 4 additional to expand; approved house site. Ideal location in mild climate of Raleigh-Durham area, NC. $417,625 incl. land. Request prospectus from <kimhawks@ipass.net> or tel. 919-942-7404.

N·A·R·G·S BOOK SERVICE

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Flora of Steens Mountain by Donald H. Mansfield. 424 pp. illus. color photos, maps, keys $24

*Time Tested Plants** by Pamela J. Harper 340 pp., 250 color photos $32

Plan a trip with field guides to outstanding botanical areas.
All have color photos. Additional titles available.

Canyon Country Wildflowers by Fagan (includes Arches and Canyonlands National Parks). 152 pp. $16

Sagebrush Country by Ronald Taylor (Nevada, Oregon, Idaho, Utah). 221 pp. $11

New England Mountain Wildflowers, New England Wildflower Society. 235 pp. $13.50

Wildflowers of North Carolina by Bell (also Virginia, South Carolina, Georgia, Tennessee, Kentucky, West Virginia) 217 pp. $13

Southern Rocky Mountain Wildflowers by Robertson (includes Rocky Mountain National Park) 168 pp $12.50

Central Rocky Mountain Wildflowers by Phillips (includes Yellowstone and Grand Tetons). 232 pp. $16

Wayside Wildflowers of the Pacific Northwest by Strickler (Oregon, Washington, British Columbia). 272pp. $16

Wildflowers of the Columbia Gorge by Jolley. 323pp. $16

Wildflowers of the Fairest Cape by Peter Goldblatt and John C. Manning (South Africa). 240 pp., 459 color photos $28

*indicates hardcover

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SPECIAL NOTE:
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