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THE BULLETIN

Editor . . . . . Sharon Sutton, 2020 Walnut, Port Townsend, WA. 98368
Assistant Editor . . Harry Dewey, 4605 Brandon Lane, Beltsville, MD. 20705
Contributing Editors . . . . Roy Davidson, Anita Kistler, H. Lincoln Foster, Owen Pearce, H. N. Porter
Advertising Manager . Anita Kistler, 1421 Ship Rd., West Chester, PA. 19380

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Cover Picture
Dodecatheon alpinum
Ice Lake, Wallowa Mountains
Phil Pearson, photographer

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Plant Trails of the Northwest: Wallowa Mountains — Part I

To Ice Lake and the Matterhorn

Marvin Black and Dennis Thompson
Seattle, Washington

Joseph, Oregon, sits in an oasis of irrigated pasturelands, the water supplied by the melting snows of the Wallowa Mountains that form a horseshoe with Joseph sitting between the two prongs that open northward. The main road from the west — Pendleton and Portland are off that way — crosses dusty, dry land sliced through basalt cliffs by little rivers, topped by rolling bosomy hills of wheatland. East, beyond Joseph, things get hotter and drier. Twenty-five miles down that road, at Imnaha, cactus (*Opuntia polyacantha* and *Oenothera caespitosa*) dot the roadbank.

Joseph is jumping-off point (population 800; last grocery, motel, liquor store) to the high Wallowas. Close by are some of the finest Pacific Northwest alpine areas. Ice Lake, here, is one of our great favorites, sitting right at 8000-foot timberline. Less than two miles beyond, the Matterhorn (9845 feet, the highest Wallowan summit) looks right down Ice Lake's throat.

Unlike the Rockies and more civilized ranges where high-speed roads disgorge camera-clad travelers directly onto the roadside eritrichiums, Northwest mountain roads prefer the river courses and the lower ridges. Thus one must earn one's way, trailwise, up to timberline. This somewhat insulates the alpine plants from the onslaughts of casual plunderers; it also challenges the less active. Arriving at these cliffs across talus slopes requires strenuous effort. The eight-mile trail up to Ice Lake is measured in backache, blisters, and sweat.

A drive out of Joseph and beyond the five-mile length of Wallowa Lake south of town reveals a large campground, resorts, pack-horse rental, and the trailhead for major routes into the mountains. The heart of the Wallowas is directly ahead in the Eagle Gap Wilderness Area.

At first, the West Fork (Wallowa River) Trail is rocky, a cool hike deep in a canyon. We climb steadily, in and out of the woods. Rare pteridophytes grow here such as *Botrychium virginianum*; there are five *Pyrola* species, *Disporum trachycarpum*, and *Calypso bulbosa* which blooms early in the season. The five-foot towers of purple *Delphinium occidentale* and pink *Mimulus lewisii* flourish near seeps and springs. *Linnaea borealis* keeps company near *Aquilegia formosa* in moist woodland habitat recalling hillsides two hundred miles nearer the Pacific Ocean. The clamoring river enlivens the hike, roaring and stumbling over rocks like some exuberant adolescent.

After three miles, a trail vees off to the right, the Ice Lake Trail, crossing the river westward on a smart new wooden bridge. Beyond, it begins to zigzag, climbing lazily through a baked, rock-strewn meadow of *Calochortus macrocarpus*, three-inch luminous orchid and white exclamations, and of five-foot sprays of *Senecio serra* bearing swarms of yellow daisies. It meanders in and out of the cool woods, reversing itself at the foot of rock walls, venturing onto rockslides, making switchbacks. In hotter places, *Artemisia michauxiana* offers gray-green foliage and thin spikes of moonlight yellow, surprising with its sweet chamomile scent rather than the expected bitter wormwood pungence.

Clematis columbiana drapes or peeps out of an occasional trailside shrub, offering demure lavender pendant blooms, Flaming *Castilleja* brightens dry meadows. These mountains flaunt about a dozen species, and these paintbrushes will accompany us all the way to the high scree slopes. The fragrant western mock-orange, *Philadelphus lewisii*, overloads its branches with exquisite white flowers along this lower hillside at 5500 feet. An array of minor-fruiting shrubs greets us: *Ribes* and *Rubus, Rosa, Lonicera, Sambucus, Symphoricarpus, Vaccinium.*

The trail steepens, legs ache a little, there are no leveling-off places to rest as we scrabble our way up the rockslides. In these glaring dry basalt outcrops grow mats of *Penstemon fruticosus* var. *serratus*, happy two-inch evergreens with holly foliage and airy rose-orchid blooms. Their constant companion, *Heuchera cylindrica* var. *alpina* boasts darkish tufted rosettes of rich green with six- to ten-inch greeny-white spikes above, somewhere

between the bloom shape of lily-of-the-valley and common plantain.

Another pair of penstemons is prominent along the trail. *Penstemon venustus* thrusts up husky spikes of strangely luminous lavender on sturdy plants that promise good garden-border possibilities, well drained, usually in sun but accepting some shade. Similarly versatile but still more shade-tolerant is equally tall and thinner-spiked *Penstemon wilcoxii*, mostly purple but capable of vivid gentian-blue on some plants.

The bold-foliaged plant with bright apple-green flower spikes in dampish shade on these slopes is *Veratrum viride*, the envy of those outsiders who didn't grow from youth accustomed to its four-foot show.

At the five-mile mark (5800 feet elevation) the rocky meadows have given way to a grim landscape of rock outcrops and tumbled boulders down the mountain face. We've had no glimpse of the Matterhorn yet, but its aura reaches here. The trail encounters Adam Creek, the outlet stream plunging down in leaping waterfalls from Ice Lake. Creek and trail approach each other in a sort of courtship dance up the mountain in twenty-four switchbacks. Anything in this landscape earns the title of rock plant. There are no alternatives. Here grow golden daisy *Eriophyllum*; screaming green-sulfur *Eriogonum*, a genus richly represented in the Wallowa flora; and knee-high plants of pale pink *Eupatorium occidentale*, in its best form achieving some merit with heads of little tube-flowers, looking quite uncompositelike.

Elegant groups of drawf ferns decorate sunny cliffs with *Cheilanthes gracillima*, *Cryptogramma crispa*, and *Polystichum lonchitis* along the trail above 6500 feet elevation. All are excellent in the open rock garden if not grown overly wet. The ferns are sometimes accompanied by a toupee of *Juniperus communis* var. *montana*. Another fern, *Adiantum pedatum* var. *aleuticum*, the delicate western maidenhair, grows by wet seeps where the trail ducks into trees, its lacy froth joined by filmy little orchids, habenarias and *Listeria cordata*; and the bold, orbicular leaves of *Saxifraga mertensiana*.

Legs and feet plead for relief as the trail levels deceptively near the seven-mile mark, but the mosquitoes of lingering late snow drifts make us hurry on. Waist-high stems of the rayless western coneflower (*Rudbeckia occidentalis*) are a diversion, their black cones shockingly nude.

The last long mile into Ice Lake is an ordeal of steep switchbacks, a challenge demanding total concentration, yet floral gremlins scatter their wares trailside with great success at distracting us. A most unlikely onion is *Allium validum*. The swamp onion launches a noble stem to sometimes three feet, topped by a bright rose-orchid head the size of an egg. It is a striking bloom on a plant that grows sometimes in dry rocks, more often with its feet in standing water. The showiest of the death camas group, *Zigadenus elegans*, regularly mingles with the swamp onion here. It makes a bold spike-foliage accent crowned with ivory spikes of starry blooms tattooed lime and orange.

Aster alpigenus var. *haydenii* appears at 7800 feet to announce our impending arrival at Ice Lake. The plant is but an inch or two high, sprawling

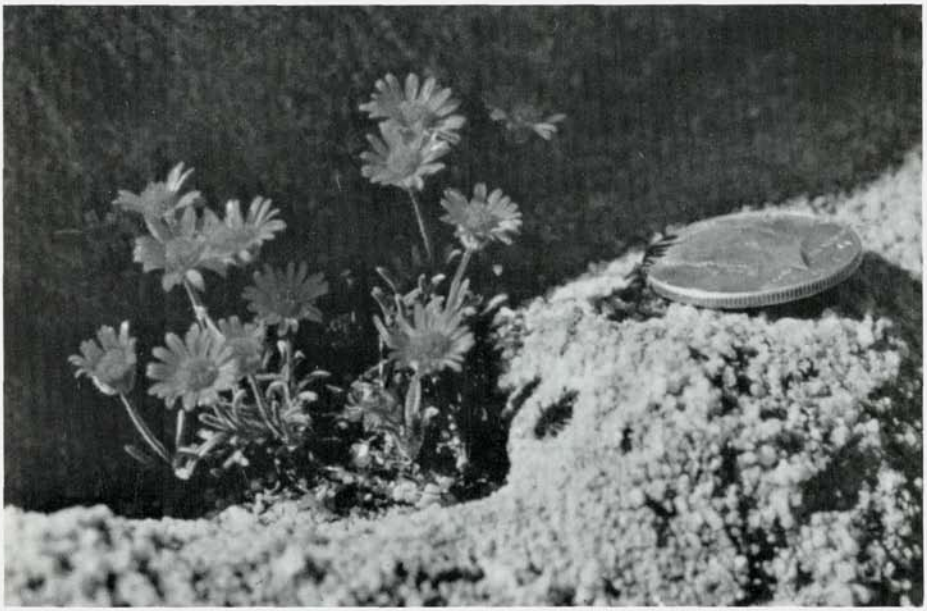
with narrow-lanceolate leaves and a few lively violet, narrow-rayed daisies. The penstemon that accompanies it with six-inch spikes of tubular blue-purple blooms is probably *Penstemon spatulatus*; it chooses dry slopes rather than rocks. The leveling trail swings ninety degrees westward, and a delightful phlox look-alike flanks the trail. *Linanthastrum* (*Linanthus*) *nuttallii* smothers its six-inch mounds under fragrant, starry phlox-blooms in varied pastels. This great beauty compares favorably with the best phloxes. (Fritz Kummert grows this plant in Austria.)

At the 7900-foot level, the light woodland of lodgepole and whitebark pines (*Pinus contorta* and *Pinus albicaulis*) parts suddenly, and we are at the shores of Ice Lake. Its half mile of shimmering surface is cradled against the mountain with a textbook lave dike. And there, reflected in the mirror, is the first view of the Matterhorn, straight ahead, looking not at all like its namesake. This isn't the neatly pointed cinnamon summit that occupies the foreground — which is but a subsidiary peak — but the hulking silver-gray dome peering over its shoulder like an ill-concealed chaperone.

Dazzling clear and blue-green, the lake is a liquid focus where several geologic events converge. Created by its volcanic dike, it peeks up at the westward summits of the Matterhorn and Sacajawea (northwestward, second highest at 9833 feet), both gray limestone uplifts from the floor of an ancient sea. Along the shores and incongruously along high-ridge talus slopes is fractured rock-bearing shells and clearly marine fossils. Moving upward on the alpine slopes toward either peak, the land is striped vertically with seams alternating among acid-volcanic basalts; granular, white, iron-free granitic grits (which we descriptively call "sugar-rock"); and alkaline, silver-gray, sculpted limestone. Each of these elements has its separate flora endemic to its striping, dramatic and richly varied.

Campground areas at the east end of Ice Lake have a flora worthy of their own travel brochure: sky-blue dwarf *Penstemon procerus* var. *tolmei*, ivory *Zigadenus* with magenta *Allium*, mats of dwarf *Phlox*, *Polemonium pulcherrimum*, *Heuchera cylindrica*, *Linanthastrum*, *Erigeron compositus*, *Erigeron poliospermus*, *Erigeron bloomeri*, *Arenaria*, *Eriogonum*, and *Castilleja*. The tall lupine nearby with spectacular, bold, white-hoary foliage (and disappointing small lilac flowers) is *Lupinus leucophyllus*.

The main trail toward the Matterhorn follows Ice Lake's north shore notched into talus slopes which spill into the lake. *Hypericum formosum* var. *nortoniae* is here, a notably fine rock garden candidate. The plants here match laudatory descriptions of *Hypericum scouleri* by Gabrielson and others but are of a different and equally ornamental variety. Fire-engine red buds are the glory of this mat-former which grows in rocks here. Perhaps dry-tolerant, it seems to prefer subsoil moisture. Nearby, *Monardella odoratissima* bears above its peppermint-scented leaves feathery flowerheads of bright orchid, a much livelier color at Ice Lake than elsewhere. Choosing the hottest, driest rockbanks, it makes compact, pillow-shaped plants wider than their four-inch height, with neat paired ovate leaves of grayed green.



Erigeron chrysopsidis var. *brevifolius* Dennis Thompson photo

Hedysarum occidentale gives a flamboyant rose-fuchsia show on nearby talus; it is one of the best in an underrated genus.

A flat meadow at the end of the lake is habitat of willows and such Ericaceae as *Kalmia polifolia* var. *microphylla, Ledum glandulosum,* and phyllodoces. In wet talus near the little streams grow peach-and-gold *Aquilegia flavescens;* showy ivory sprays of bloom on foot-tall *Polygonum phytolacaefolium,* pretty enough that someone should try it in a garden; and *Epilobium latifolium,* the dwarf rose-mallow large-flowered willow herb.

One is apt to miss these flatlanders, however; the lure of mountains is overwhelming. There are unbroken, open slopes to the ridgetops and summits from this point. Though trails cease, there is no fear of getting lost; the lake below is in view at all times, and there are many obvious courses up through the rocks.

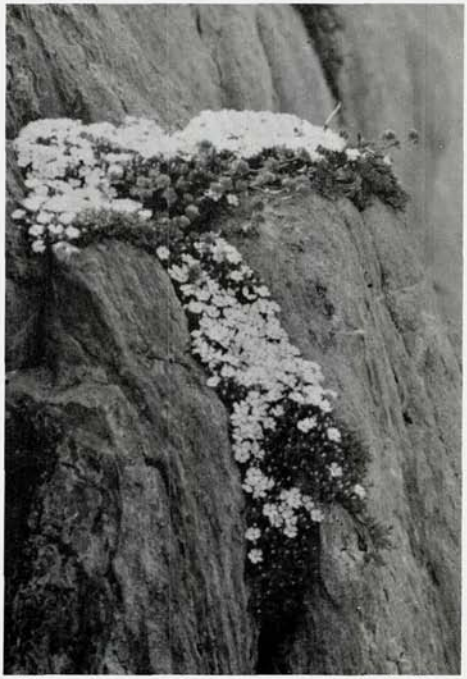
First come gardens in the vertical seams of rocks mentioned earlier. The flashiest and most diminutive yellow American erigeron grows here. Its name, *Erigeron chrysopsidus* var. *brevifolius,* is much larger than the plant which, complete with twenty gold daisies, is no larger than an American silver dollar. This midget variety is a high Wallowa endemic collected by William Cusick in 1900. Tight miniatures of *Eriogonum ovalifolium,* the western desire and despair of countless European gardeners, grow in this garden. *Anemone multifida* var. *globosa* occurs here in both a sulfur-ivory color form and a glowing rose form which mocks authors who have belittled this plant for its often disappointing color.

To crawl about this natural rock garden is to experience Paradise. Species grow more reduced and compact here than elsewhere. They have given varied results when the dwarfed forms were tried at sea level. One encounters, as did Peck, a reduced, tiny-belled campanula which he christened *Campanula sacajaweana*. With several Wallowan plants commemorative of Captain Lewis of the Lewis and Clark Expedition which passed near these mountains, it was a fitting gesture to commemorate the Indian guide; however, the plant has now moved to *Campanula rotundifolia* var. (or forma) *sacajaweana*. Campanulate blooms with shorter, less starry lobes than *Campanula piperi* are sometimes upfaced, recalling that species, more often pendant or with their lavender trumpets outfaced. Stem length varies from an inch to four inches, the stems arising from thin underground rhizomes that either emerge from rock cracks or venture a few inches into the fine white granite grit. Grown under *Campanula piperi* culture, this rare variety is a promising trough or pot plant. It will bloat if overfed.

Plants of *Potentilla fruticosa* that grow in this acid rock are ground-huggers, mostly under two inches high. The same species colonizes more exposed limestone rocks one hundred yards away at ten times this stature. At least part of the reduction may relate to the different mineral content of these apparently starved rocks and may offer an insight into cultivation.

A legume from these rocks sends belly-planters into rhapsody. *Astragalus*

Dryas drummondii Phil Pearson photo



Phlox pulvinata and *Ivesia gordonii* M. Black photo

tegetarius makes a doll's carpet; it would have to stand on tiptoe to be a half inch high, though the little furry-pad plants might reach teacup width in old age. It is a quiet plant. One must lie down, breathe deeply, be very still, and concentrate before its mauve-purple blooms can be seen at all. Its little pea flowers, less than matchhead size, are tucked singly or in twos or threes among narrow-cut leaves. Quite ungrowable, it is a pleasant diversion while catching one's breath during the scramble up the rocks: a convention of homunculi in lavender suits.

In rock crevices above, *Pellaea breweri* makes ladderlike bands of light green, refreshing among so many gray-hairy foliages. Topping these same limestone outcrops, *Dryas octopetala* sprawls dark-foliaged mats catlike in the sun, with golden *Dryas drummondii* like its cousin growing nearby, sleepy and rarely opening fully the petals of its lovely rose-like buds. We've found no hybrids.

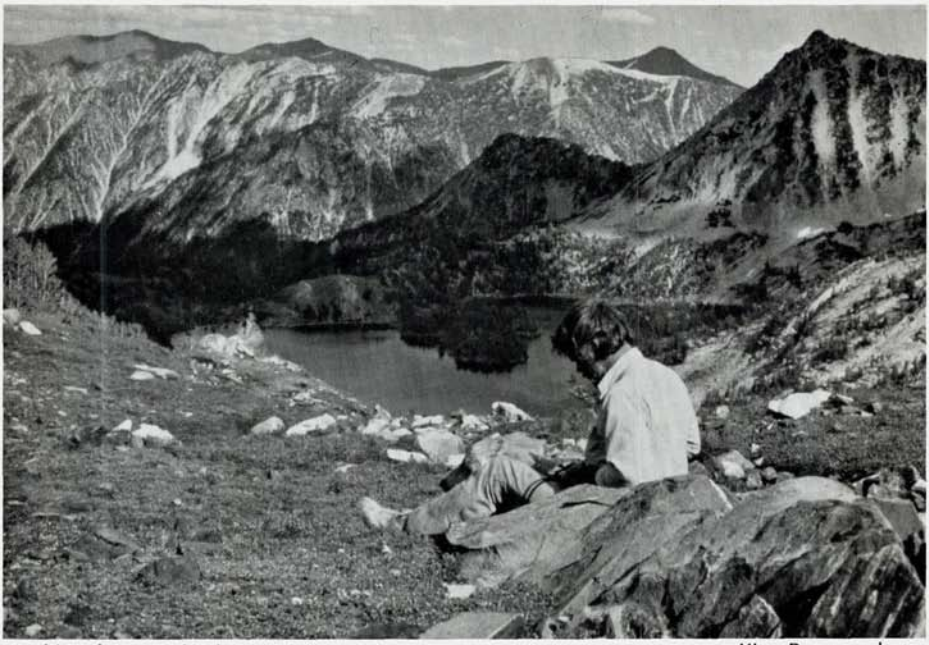
In warmer screes nearby grows an interesting trio, including a fine lavender-blue flax, *Linum perenne* var. *lewisii*, large-flowered and nine inches tall. Stubby spikes of large-flowered *Penstemon speciosus* mingle with them, sometimes approaching gentian blue in this patch 2000 feet higher than the usual top of this species' range. Then, like some demure bride, *Pedicularis racemosa* var. *alba* attracts with spiky racemes of lovely ivory bonnets. This plant, first described by Douglas from the "summit of the high mountains of the Grand Rapids of the Columbia" has not been championed. It should be. Perhaps it would succeed with seed broadcast in a grit or scree part of the rock garden so the seedlings could find hosts, in the manner some are now succeeding with *Castilleja* species. The *Pedicularis* deserve better than Farrer's tirade:

> Also their ephemeral air of effectiveness makes them seem rather like vicious fungoid emanations that will soon collapse into rottenness and disappear in half an hour.

Farrer's digestion must have been terrible.

Clinging to granitic rocks here are pastel drapes of *Phlox pulvinata*, one of the best western rock carpeters. According to Hitchcock, our most respected northwest botanist, this is the species usually encountered in the trade as *P. caespitosa*. It is more compact, usually freer flowering, and we think superior overall to true *P. caespitosa*, which itself is a compact form of the taxon formerly called *P. douglasii*. Hitchcock allies *P. pulvinata* with the Rocky Mountain *P. condensata*, which is yet more reduced but similar. Growing out of the phlox mats is often *Ivesia gordonii*, with neat rosettes of carrot-like foliage above a taproot and numerous five-inch stems with inch-wide balls (cymes) of tiny yellow flowers.

The most natural course, when one has looked at these hanging gardens, is to follow briefly a stream that slices a little canyon through these rocks. Above the small gorge, it forms a miniature cirque populated by mats of dwarf willows, *Salix nivalis* mostly but some *Salix arctica* and occasionally other mostly prostrate, larger leafed willows. Climb up to the south, and clinging



Looking down on Ice Lake Kitty Pearson photo

to the sides and tops of these rocks one sees great plants of *Silene acaulis* up to a yard across with uniformly brilliant rose flowers, much brighter than those of the central Rockies. Little bun-like *Saxifraga caespitosa* and *Saxifraga bronchialis* var. *austromontana* plants with white or ivory blossoms are common. As we climb, they are joined by hard-mat forms of *Saxifraga oppositifolia*, its rose-purple blooms long spent by the early August date of this narrative.

Looking back, Ice Lake lies four hundred feet lower in elevation; the Matterhorn is steadily in sight and perhaps three hours away. The easiest approach is to bear toward the left of the mountain. A straight-on route would bring us up against the several-hundred-foot precipitous headwall that faces us. That cinnamon, unnamed peak in our left foreground (elevation about 9000 feet) is easy to steer by. Across scree slopes ahead, aiming somewhat to the right of the peak, are new treasures such as the upright, succulent, four-inch stems of *Sedum rosea* topped by maroon flowerheads.

The wetter rocky seep drainages here (strange! even some of these rocks bear wonderful seashell fossils) hold a series of prizes. One is the alpine form of *Viola adunca*, its variety *bellidifolia*. It is in rotund clumps, two inches high, studded with periwinkle-blue flowers — like the first evening sky. *Dodecatheon alpinum*, never a tall plant, achieves elfin stature here, bearing its blooms on stems a scant inch high, never more than three inches, sharing turf with the violets. So, too, does *Pedicularis groenlandica*, commonly called elephant-head for the trunk-like appendages on the fuchsia-

pink blooms. This species sometimes attains twenty-four-inch heights on Mount Rainier; here one sees dwarf pink elephants only four inches tall. *Polemonium pulcherrimum* grows here and a superior form of *Cassiope mertensiana* var. *gracilis* with outsized snowbells highlighted by red sepals that support each bloom like a fine jewel. *Phyllodoce empetriformis*, rosy pink, and *Phyllodoce glanduliflora*, moonlight yellow, grow in nearby colonies, and here and there is the pale pink hybrid so dependably present that Hitchcock calls it *Phyllodoce* x *intermedia*, saying it won't be found without both parents present. Another plant of these rocky wet-seep minimeadows is the littlest lily, *Lloydia serotina*, with strangely fragile, small, upfaced, pearly blooms that do credit to the common name of Alp lily. Six-petaled, usually solitary flowers are on thin four-inch stems above grassy leaves. Nearby, *Ranunculus escholtzii* shuns companionship, preferring wet, open, granite grit sites to display its lemony flowers, inch-wide on three-inch stems.

In open screes at 8700 feet, the eritrichiums begin. There is an emotional electricity present when we view these cushions of such incredible blue. Perhaps the reason for the power of the emotion lies with the inaccessibility of these populations. One's heart is in one's mouth even before the plants appear, from the intensity of the climb. Perhaps it is the size of these clumps, sometimes larger than one's hand, or the intensity of blues, from delphinium to the lighter color of *Gentiana sino-ornata*. Maybe it is because these alpine forget-me-nots grow in open grit scree without companions, like great blue drops left when someone painted the sky. Ours is *Eritrichium nanum*. Hitchcock says it is very close to European forms. Steve Doonan made an interesting discovery a year ago. Tiny cuttings brought down in August failed to root then, but some held refrigerated in a plastic bag were trying to make roots in the refrigerator by spring and formed new roots readily when placed in rooting medium. The best of the cuttings achieved good spread and bloomed that summer at his nursery near Seattle!

A fine rose-pink *Lewisia pygmaea*, similar to the superbly colored Colorado plants, grows on the Matterhorn in scree. Woolly buns of drabas dot this open scree, whether *Draba paysonii* or *Draba oligosperma* we haven't determined; both these pale yellow species grow here. Flashy alpine daisies make intermittent appearance: *Townsendia montana*, *Townsendia parryi*, *Aster sibiricus* var. *meritus* and apparently other alpine *Aster* and *Erigeron* species. Few of these are white; most are strong blues, pinks, and purples, difficult to match with botanical descriptions of plants reported from here. With them on the slopes grow *Eriogonum ovalifolium*, *Castilleja* species, *Spraguea* (*Calyptridium*) *umbellata* var. *caudicifera*, while nearby rocks boast *Silene acaulis* and *Saxifraga oppositifolia* by the hundreds.

Those who have stood on Matterhorn's summit (we always wind up in the eritrichiums) speak of the knifelike ridge with its thousand-foot vertical wall dropping to the west. Photos show a landscape of dozens of snow-covered peaks in August, looking like the Rockies in July.

On summer afternoons, thunderstorms often sweep the slopes. Hidden

by the bulk of the Matterhorn until fifteen minutes before the rains come, they streak in from the west on hundred-mile-an-hour winds. Travelers to these high slopes must have appropriate preparation in their packs and a dry tent pitched at Ice Lake. When a thunderstorm hits, that tent in view below, even if it's an hour away, is reassuring.

Almost certainly there are still-undiscovered new species or subspecies here. And then there are the many plants which grow extra dwarf here, which will be useful for troughs or small rock gardens. Just as the south edge of the Wallowas has its old ghost towns such as Cornucopia, so there are ghost plants to be sought. Several plants collected here only once, about eighty years ago, have never been rediscovered. There is the chance for reintroduction as with some of those from the Appalachians after decades of search. Whether one discovers something new or old, or not, there is the exhilarating feeling of tramping one of the best remaining botanical frontiers in this country. The flowers, alone, are reward enough.

[This is the first in a series of articles planned by the authors to cover the botanically significant mountain areas of the Northwest.]

★ ★ ★

I am persuaded beyond doubt that what succeeds in one area (soil, water, drainage, sunshine, etc., etc.) is no guarantee that it will succeed in another, given the same culture. Our move from Pleasant Prairie to Mt. Spokane has proven this conclusively with many plants. So, if you are successful with a given plant group — grow it, and be satisfied. It is great to experiment, but it is pretty hard to beat nature. — Charles Thurman *Mead, Washington*

★ ★ ★

The gardens that look most right are usually small "yards" presided over for some years by a gardener who is not thinking very much of design in any abstract or formal way, but who is exercised over how to grow his favorite plants as well as he can.
— *The Essential Earthman* by Henry Mitchell

"Some Real Fine Grass"

Dr. C. William Nixon
Randolph, Massachusetts
and
Donald L. Hughes
Hanover, Massachusetts

Now that we've got your attention, we confess to taking liberties in choice of words, and, probably, we even cheated a bit, since this article is really about dwarf grasses appropriate for growing along with other choice alpine plants in rock gardens, troughs, etc., and not about so-called "grass" belonging to the Family Cannabaceae. The plants that will concern us here all belong to the Grass Family, Gramineae (or Poaceae, if you insist on being avant-garde).

It is with a great deal of trepidation that we have anything to say about a group of plants where so much confusion exists and where several other writers of knowledge and distinction have preceded us with good accounts on a similar subject. So, in spite of the old saying, "fools rush in . . .," we will have a go at it anyhow.

Any alpine plant enthusiast who has ever gone into the high mountains where the choicest and tiniest plants are located must be surprised at first by the predominance of grasses and sedges (often indistinguishable to the non-specialist) over other herbaceous plants. At the lower of these high elevations, grasses may practically cover the ground, giving the effect of an alpine lawn. Tucked in amongst all of these grasses and sedges, but much less numerous, are the other small plants that can endure this difficult environment. As we go on up to even higher elevations, everything becomes smaller and scarcer. Here, even the grasses and sedges are scattered, managing to grow next to a large rock or boulder or wherever they can gain purchase on sufficient soil to survive. And finally, when such great heights are reached where practically no herbaceous plants can grow, one finds that these survivors are usually grasses and sedges.

If these plants are so much a part of the alpine plant scene, why is it that we don't utilize them more often, even as fillers or background plants in our rock gardens and troughs? To be sure, there are some grasses and sedges that, although of small stature in the high alpine situation, will grow far too large when brought down to sea level or thereabouts and perhaps given a richer diet than the lean one that they have been accustomed to. Others, under the same circumstances and for much the same reasons, will become invasive to the point of suffocating other choice species that are not so vigorous. However, there are several miniature grasses and sedges that are presently available that have none of these bad features. Undoubtedly, there

are more still to be found and tried out that will also be suitable for our small gardens. We plan here to mention a few of the choice ones with which we have had some experience. We are growing a number of other species, but since we have not yet had sufficient time and experience to gain intimate knowledge about them, we will postpone describing them. And, of course, there are still some apparently choice species that we have not yet been able to acquire. We are trying to do just that, and we would welcome hearing from anyone who has some of the ones not mentioned here. We will happily trade (or whatever) in order to fill in our collections as well as yours. In fact, we have propagated those in our collections in some numbers for just this hopeful possibility. Now on to the ones that we are familiar with — all grasses, Family Gramineae (Poaceae).

Mibora minima. Some years ago, a tiny *annual* grass began to appear among the rock plants in many gardens in the eastern United States and possibly elsewhere as well. Perhaps someone consciously imported it, but it is more likely that it was introduced accidentally by seeds that came in the soil along with other plants or else was included in seed packets ordered from overseas. In any event, it proved to be a desirable plant and was allowed to grow and seed itself about which it does to some excess. However, its identity remained a mystery, apparently, as seed was offered for several years in the ARGS exchange identified only as a small annual grass.

The identity of this little plant eluded us for several years until a plant of it was sent from England to one of us (CWN). Armed with the knowledge that it was known in England and that they might know its identity (Don't they always?), we finally located a good description in one of Will Ingwersen's books He has this to say about it:

> A tiny, annual alpine grass, *M. minima* is very useful for growing in association with small alpines which like companionship, e.g. *Gentiana verna,* which dislikes growing in solitary splendour. It never becomes invasive and appears as neat tufts of thread-fine bright green leaves and seldom growns more than 1 in. high.
>
> [*Alpine Garden Plants,* Will Ingwersen, 1981. Blandford Press]

The only thing that we might add is that the species is native to the western Mediterranean region, this according to other reference works.

The tiny seedlings of this grass appear suddenly with the onset of warm weather. They grow quickly to mature size and produce many seed heads. The plants are perhaps best from this point on. Seeds ripen, are shed, and the plants die in the autumn. Nothing more is seen of them until early the next summer.

This grass has a shallow root system so that it can easily be pulled out, where it is not wanted, by the simplest tug. It makes neat little tuffets of about three or four inches high at most. The leaves are so tiny as to be hair-like and yet they are distinctly wiry. The plant is an asset anywhere in the rock

garden where it can be seen and appreciated. It is especially appropriate for planting in small container gardens where each little tuffet imparts a natural turf appearance without being the least bit overpowering. It seems to prefer to grow in rocky or gravelly soil.

We hope that this information will clear up one of the mysteries of unnamed plants in our gardens and that *M. minima* will now take its place as a desirable little grass for the rock garden. It is the only *annual* grass that we grow and thus the only annual one described here.

Poa abbreviata. This extremely tiny perennial grass grows to only one or two inches high in most situations. It makes a mat or turf (similar to some of the large-lawn grasses) from which it spreads slowly by underground runners. In fact, it reminds one of a diminutive lawn-type grass. Its tiny leaves are dark green spikes that are more soft than rigid. We suspect that it could become overpowering to less vigorous tiny plants if it were to be grown under optimum conditions. However, one need not worry about this as it is easy to dig out and destroy. It is quite winter hardy here in Massachusetts. For us, propagation has meant division of the clump as it has never flowered and produced seed. In summary, *P. abbreviata* is a most desirable tiny grass, especially if used to create the effect of alpine lawn.

Festuca glacialis. This small grass has the ability to impart color, texture, and a superb naturalness to a miniature alpine landscape. Its color is bluish-gray where the small wiry leaves are alive and growing. But in addition to that, it tends to turn brownish at the bottom of the clump due to dead or partially dead leaves. The clumps grow to only a few inches tall and then tend to fall over in a mat on the surface of the soil, thus exposing the contrasting colors and giving a rather unkempt but natural appearance to the pseudo-alpine scene. It produces aerial joints on the leaves that become plantlets. These need only to be harvested in a little bunch and planted. A new clump will soon be thriving. If one doesn't assist nature in this way, the established clump will ultimately flop over onto the ground where many of the plantlets will take root and grow. Occasionally, one notes a seed head on this plant, but we have never bothered to raise it from seed since it is so easily propagated vegetatively. For certain, this is another valuable tiny grass for the rock garden. It has an especial attraction through the winter, when color in the garden is otherwise minimal, since it retains its lovely bluish and brownish muted colors the year round.

Our *F. glacialis* was obtained many years ago from a nurseryman who sold it as *F. scoparia.* One wonders how many rock gardeners are still growing it as such. The true species, *F. scoparia* (synonym, *F. gautieri*), we do not have. It is, apparently, similar to *F. glacialis* in size, habit, etc., but differs in being bright green instead of blue-gray.

The preceding three grasses comprise the very tiny ones. The remain-

ing three are larger but still not in the tall grass category. These will attain a height of about six to ten inches as a general rule and, as such, still have merit as rock garden plants if well situated.

Festuca viridis. This grass is a good clump former, and the color is vivid green. The leaf blades are thin and quite wiry. Height is about six to eight inches. Increase this one by dividing the dense clump into many parts.

Milium effusum 'Aureum' (Bowles' Golden Grass). This graceful eight- to ten-inch grass has broader leaves than any of the preceding grasses, and they are a definite yellowish-green. Easy to grow, this plant seems to appreciate some shade and moisture at all times. It can be propagated either from seeds or by division of the plant since it offsets quite readily by underground stolons.

Hakonechloa macra 'Aurea' (sometimes 'Aureola'). This is one of the most strikingly colorful grasses and is truly worthy of a choice spot in the garden. The leaves are flat, narrow, and graceful, and they are almost indescribable as to precise color. Close observation shows that they are irregularly streaked lengthwise with green and cream-yellow. In good light, much of the leaf turns pink or even bronze. The overall effect is that the plant appears to be yellowish but cries out for closer inspection due to this strange variegation. It seems to appreciate a little shade. Propagation is by division of the clump since it spreads by underground stolons. It is not invasive.

This completes the descriptions of the reasonably small to tiny grasses suitable for the rockery and with which we have had experience. We have others on trial at present, notably *Deschampsia flexuosa* 'Aurea' (a yellow cultivar recently found in the High Tatra Mountains), *Koeleria glauca,* some small cultivars of the very blue *Festuca ovina,* and others. We are most anxious to acquire others, for instance, the true *F. scoparia, Alopecurus lanatus,* etc. Do get in touch with us if interested.

In the future, we hope to do a similar write-up on the dwarf sedges and related taxa that we also grow, since these plants are so very similar to the grasses in the alpine landscape. And as we all know, some of the most beautifully variegated plants are to be found within this group.

It is our hope that some of our enthusiasm for these generally misunderstood plants will have been communicated to the readers. One can only wonder why these plants are shunned by so many. Is it because they have had to mow the lawn once too often? Or is it the fear of never being able to get rid of them once they have become established? Whatever the reason, it is too bad that these diminutive, non-invasive forms are not used more often to impart a naturalness to the rock garden that few plants can give.

In conclusion, may we refer back to our opening statements and say that grass is just great — get high on it. We are!

Allium Notes
Part III

Mark McDonough
Bellevue, Washington

[Drawings by the Author]

My Favorite Onions

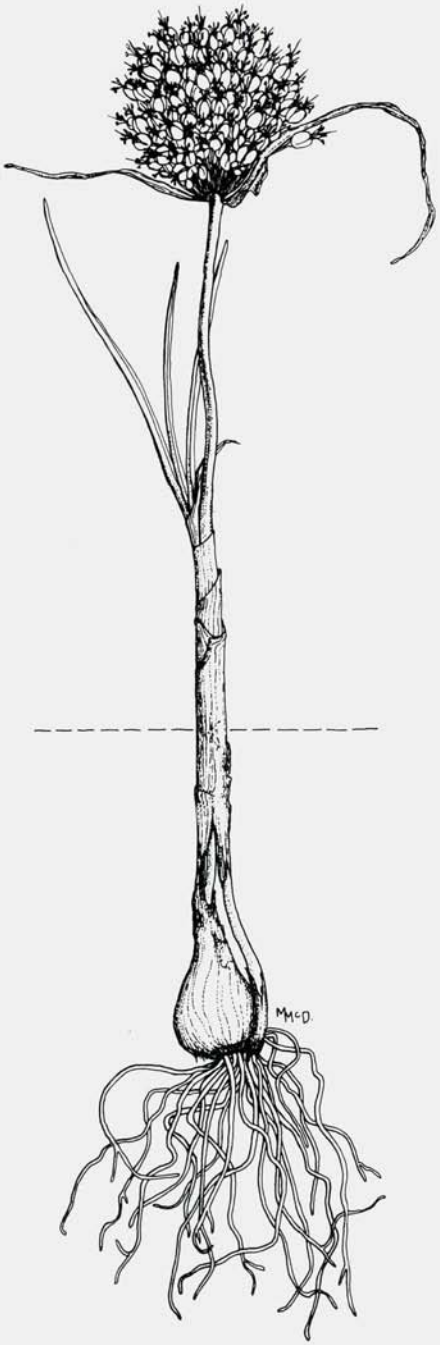
The reader might think that all alliums are my favorite, but there are species that impress me as possessing special charm and beauty, captivating my attention, luring me to inspect every nuance of such a plant for hours. I am a hopeless alliumaniac; there's no turning back now.

Allium perdulce var. *perdulce* tops my list of favorites. It is surprising that this easy and beautiful plant is not better known, as it is a widespread species of the Great Plains states, extending southward into Texas. Perhaps the reason is that *A. perdulce* was confused in early taxonomy and only recognized as recently as 1940. *Allium perdulce* should open our eyes to the potential of some of our beautiful native bulbs.

From a small bulb with a fibrous reticulate bulb coat arise a few wiry basal leaves which splay outwards. In April, the stocky stem barely reaches four inches in height and holds an upfacing cluster of sculptured vase-shaped blooms. The flowers are sumptuously large (for an allium) and of a pleasingly pure and lively lavender-rose, the intensity of which is enhanced by the thick waxen texture of the flowers, conspicuously shining near the base when viewed in sunlight. In many alliums, the tepals are virtually identical, but in *A. perdulce*, as can be seen in the drawing, the three outer tepals are very different from the three inner tepals. While all of the segments are gracefully recurved, the inner ones are narrower and paler in color. The outer segments are broad and have a central green nerve on the back. The stamens are white and abruptly dilated at the base into a united cup surrounding the deep pink ovary. The extraordinary feature of this onion, however, is its overpowering, sweet scent of hyacinths. Indeed, this feature is so noticeable that botanists, who rarely report such incorporeal qualities in their scientific descriptions, have consistently taken note of this characteristic.

While going dormant shortly after flowering and being subjected to baking in the wild during the summer months, such treatment is hardly required in the garden. Under better conditions, the bulbs persist reliably and will throw up foliage in the fall if moisture is available. Bulb offsets seem reluctant in cultivation and seed rarely sets, causing difficulty in increasing one's stock.

Allium perdulce var. *sperryi* occurs disjunctly in southwestern Texas. This endemic is taller and more robust, bearing even larger flowers of white or pale pink, with the deeper color confined to the midribs, and is only faintly scented. I have not seen this variety, nor is it in cultivation.



Allium tchaihatchewii

Allium tchaihatchewii (in bud stage)
MAC. & W. 5766

Entirely different is June-flowering *A. olympicum* from the mountains of Turkey, fairly recently introduced from an Albury, Cheese, and Watson collection. This is a hardy plant displaying a fascinating growth habit. The grayish-green leaves and the stout flower stem covered with a silver "bloom" lie prostrate for a distance of three to five inches. The reddish-veined spathe is composed of two valves, opening as if hinged to the stem to reveal a packed mass of striped buds (see illustration). Like popcorn, they burst into fuzzy one-and-a-half-inch globes of bright pink or paler silvery pink with the dry, twisted, and turgid spathe segments piercing the head, reaching out lifelessly along the ground. The anthers are bright yellow, dangling on long pink filaments, to add to the charm of the pleasingly fragrant poms. It's quite an amusing sight to see these sparkling balls of bloom lying on the ground — truly a belly plant. But beware! Do not place your nose too close to the blooms, as tempting as they may be, to enjoy the non-alliacious scent, unless you are prepared for insects crawling on your face, as scads of ants and assorted flying pollinators will be milling about, relishing the sweet nectar secreted by the three nectary openings at the base of the ovary.

Plants may bloom as young seedlings only able to put out a couple of flowers, but a mature bulb several years old boasts well over one hundred blooms per head. While seed is plentifully produced if kept protected from the rain, germination has been sporadic and frequently poor. The bulb will divide into two or three bulbs after several years but is still rather slow to increase. Seed is seen in the seed lists and should be sought after enthusiastically, as *A. olympicum* is a first-rate rock garden plant that is excellent for use in a trough or in containers.

Flowering at the same time, and making a splendid potted specimen, is *A. tchaihatchewii*, collected only a few years ago by the MacPhail and Watson expedition to Turkey. Collection notes indicate a preference for alpine habitats in mobile screes. In cultivation, however, I found that the plants respond to a richer scree mixture than its native haunt might indicate, when well supplied with moisture when the plants are in active growth.

I was fortunate to receive several bulbs from this expedition, along with seed. Two distinct forms of the same species resulted, each producing their flowers in strikingly different modes. In one form, the flowers are so densely packed into an upright head that it seems impossible for the buds to open. In the other form, the pedicels are long, slender, and flexuous, spraying into a shower of little blooms. Adding to the equation and expanding the possible permutations, the stem can be silvered and the foliage glaucous, or all herbage can be green. Any combination of the above variables has occurred.

The plant illustrated in the bud stage and at anthesis depicts what I call the cluster-head form and is my favorite of the two options. The flowers are unique in their ovoid shape, tightly constricted at the mouth with hardly enough room to let the wispy purple stamens and style protrude. The color is plum purple with a pruinose "bloom" of much the same color and characteristic as a Concord grape; indeed, the head looks just like a bunch

of little grapes. Once fertilized, individual flowers are pink, the purple egg-cluster dappled with sugary pink begetting a most satisfying cool pastel combination reminiscent of Easter.

With *A. tchaihatchewii,* as with *A. olympicum,* the spathe becomes dry and persistent during flowering, and the blooms are nicely scented but not quite as sweetly. Stature and flowering time vary among the forms of *A. tchaihatchewii.* My next favorite is a short specimen only four inches tall, with a many-flowered loose burst of the same little grapes, flowering a full two weeks after the cluster-head form.

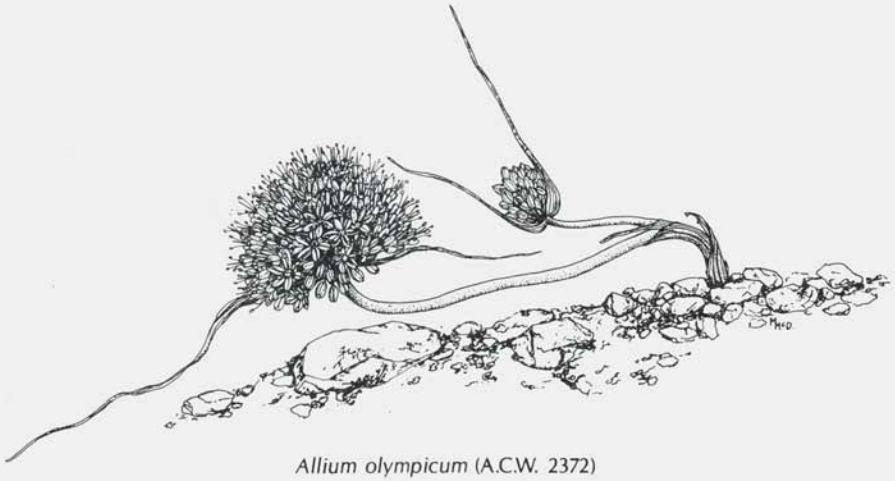
Shortly after flowering the plants go dormant, after which watering may be withheld. But the restless bulbs soon awaken; after only a month, fresh growth sprouts forth, remaining evergreen through the winter. Watering should commence once new growth is apparent, taking care to water sparingly in winter months to avoid rot.

Allium tchaihatchewii was perfectly hardy in New England for four winters but never increased. It seemed more prosperous under pot culture. The bulbs require three to five years to reach maturity and then are exceedingly slow to offset. As with *A. olympicum,* the developing seed heads must be protected from rain if seed set is desired. But even with the visiting ants and bees and rain protection, seed production is poor or nil. With the small amounts of seed collected, germination has been rather poor and erratic. Building stock of this fine species requires considerable patience. May we hope that in a few years all of the forms can be introduced into the trade.

Of some mystery is a tiny allium that was evidently inadvertently collected along with *A. tchaihatchewii* in Turkey. Of the several bulbs I received labeled as *A. tchaihatchewii,* one bulb resulted in a charming miniature wholly unlike the others. Each year, two shining green leaves, which are quite narrow and short, appear along with a solid little stem only three inches tall. At the modest summit is a nodding spray of twenty to forty perfectly shaped bells of mulberry maroon, lighted with smouldering yellow anthers. The flowers and the thick pedicels are of the same unusual hue, dusted with a powdery "bloom." The flowers give off a tantalizing aroma reminiscent of purple iris, only noticeable, however, during warm sunny hours with little wind. With this allium, I am reminded once again of the genus *Fritillaria,* as it possesses bells in miniature replica of similar melded tones that defy description, appearing somber on a dull day but luminous when the sun penetrates the translucent waxy goblets of claret.

While reliably appearing each year, the bulb has never produced an offset, and the carefully gathered seed has never germinated. All I can hope for is that the plant continues to prosper, and perhaps when the next installment of the *Flora of Turkey* on monocotyledons is published, I can then attach a name to this very special allium. Several other Turkish alliums are being grown here, but they too are still under collection numbers awaiting identification.

One of the daintiest onions is *A. amabile* (now considered synonymous



Allium olympicum (A.C.W. 2372)

with *A. mairei*), which throws up tiny grassy tufts of rush-like foliage from forked storage roots. The deep rose-red flowers, borne in clusters of two to five in July and August, are long narrow trumpets with pointed tips, flaring enough to reveal the paler interior speckled with red. An established clump is a delightful toss of shiny olive leafage dotted with delicate star-trumpets.

Allium amabile, without an actual bulb, has fleshy rhizomes which enjoy a warm, moist position in rich yet free-draining soil. Carefully label its position in the garden or trough as it is so small and late to spring up that plants could easily be lost through careless digging. Also, take precautions where slugs are prevalent as the modest size and tender emerging shoots make bite-sized slug yummies. Plants are easily lost to such sluggy repasts. *Allium amabile* is an admirable trough plant which will generate requests from garden visitors for bits and pieces.

There has always been considerable confusion and uncertainty regarding *A. amabile* and a group of very similar Chinese onions: *A. mairei, A. yunnanense* (pale pink), and *A. pyrrhorrhizum* (deep crimson). At long last, this is cleared up for us by Chinese expert Xu Jie-Mei in the recently published *Flora Reipublicae Popularis Sinicae*, in which the oldest name, *A. mairei*, takes precedence, with the other names reduced to synonymy with it. A pastel pale form (originally described as *A. yunnanense*) must, indeed, be a very beautiful plant to have been collected by Reginald Farrer and identified as a "lovely [Lloydia] species."

Seed of *A. mairei* and its synonym, *A. amabile*, appear in seed lists, sometimes resulting in the true plant, other times yielding an imposter — most likely *A. senescens*. The true plant is easily raised from seed if not allowed to become parched. It is well worth the effort to locate.

There are other alliums that I would include under my list of favorites, but they are discussed elsewhere in this article.

American Onions

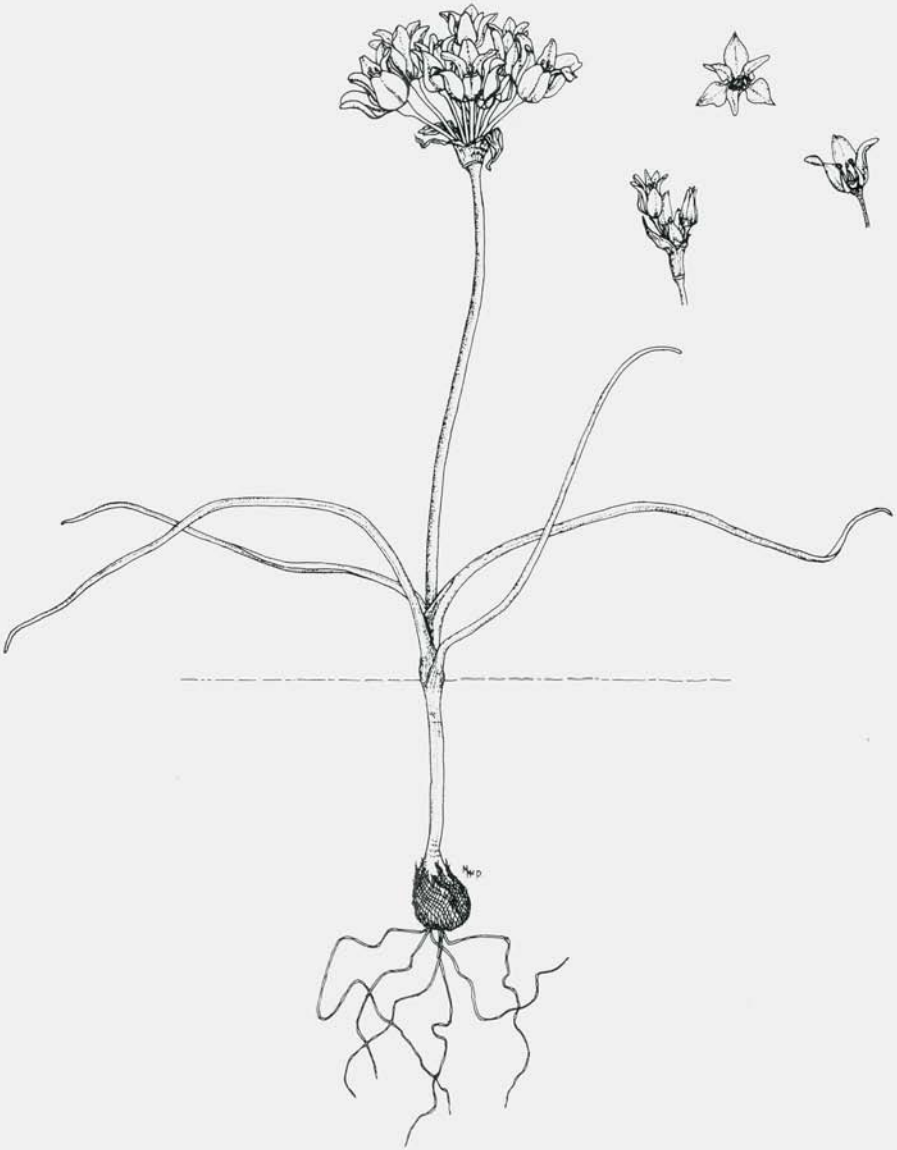
Of the alliums firmly established in cultivation, few of the approximately one hundred ten validly described American *Allium* species can claim inclusion here, the bulk of popular ornamental onions originating in Europe, Asia, and the Far East. I suspect that one reason for this may be our habit of looking to exotic plant species from abroad to fill our gardens. I can share in the excitement of growing a plant native to some far-flung corner of the world where few humans have botanized, but unfortunately, in the past, this has led to a disregard of our native flora, and many worthwhile plants remain obscure in the minds of horticulturists and absent from our gardens.

There are other reasons contributing to the glaring absence of American onions in horticultural circles. In North America, the center of the genus lies in the western coastal states, with California holding nearly half of the known species. The majority of western onions select arid habitats for their homes and therefore are often more difficult to grow than the European and Chinese onions that frequent our gardens. Such xeric species require a summer baking with all watering withheld, being very sensitive to rot during these dormant months and during the winter. Because of this, pot culture is the most satisfactory method of cultivation, a procedure employed by serious bulb devotees, though less conducive to more casual gardening practices. But it is worth experimenting with American alliums, as occasionally they successfully respond to conditions different from those indicated by natural habitat as is clearly illustrated by the beautiful and easy-to-grow *A. perdulce*, discussed earlier in this section.

Lastly, there is the frustration that many experience when trying to key out an onion found in the wild. It is said that American alliums are more difficult to key out because species identification is largely based on bulb coat reticulations which are highly developed in our native species, requiring a hand lens or microscope to narrow down an identification search to a single species in some instances. However, the American onions are well known and documented in modern floras, and if an entire plant can be examined, identification is not as difficult as reputed. The next time you chance upon a little onion while on a wildflower trek in the mountains, take a few minutes to explore a modern key rather than saying, "It's just another onion."

Allium cernuum is the only American species that enjoys considerable popularity. It is discussed in Part II of this series.

Allium geyeri is also easily grown and commonly found among the seed lists. In moist soils, it prospers without difficulty, bringing small pink flowers in early summer. While a useful plant for a spot of color in the garden and



Allium perdulce

even small enough to grow in a trough, this species lacks brilliance and is therefore of limited value. Early literature gives little indication of its peculiar disjunct range among many western states but describes several so-called species which now are reduced to synonymy with *A. geyeri*. On Pike's Peak in Colorado, dwarf plants with prostrate fans of foliage barely inches high occur, such plants (syn. *A. pikeanum*) undoubtedly of more value to the rock gardener. *Allium geyeri* var. *tenerum* displaces a variable percentage of flowers with bulbils and is therefore less desirable.

A common sight growing among sagebrush throughout arid western states is the tapertip onion, *Allium acuminatum*, often coloring whole hillsides with deep rose or purplish blooms. The stems stand naked from the rock-hard baked earth below, with little evidence of the two, or rarely three, leaves arising in spring from small, round bulbs buried deep in the ground. The umbel is relatively few flowered with sharply reflexed blooms superficially similar to those of *A. perdulce* but held in a looser, more diversely expanded head. It is easy to recognize this onion dotting the deserts with electrified tootsie-pop heads, sharing their extravagance with burnt copper and sulphur eriogonums and delicate lavender erigerons belying the arid environment.

Here in the Puget Sound area, the bulbs of *A. acuminatum* rot off easily even while in active growth in spring, with only a few bulbs able to put out their attractive blooms. Seed germinates freely, but unless the proper rest period is provided along with careful watering, most seedlings will vanish. A white form, from the late allium enthusiast Paul Maslin, should make for an interesting challenge in this climate.

Almost as widespread as *A. acuminatum*, *A. textile* carpets dry hills, mountains, and plains in the Rocky Mountain states and into Canada, often growing so thickly that it is impossible not to tread upon them. The balls of bloom held close to the ground are white with reddish-brown or greenish midribs. This onion will not arouse great enthusiasm from most gardeners, but to the bulb collector it is not without merit. I imagine a potful of clustered bulbs with quiet heads of bloom atop six-inch stems would be attractive, particularly if some of the pinker forms I noted were selected. As with *A. acuminatum*, the bulbs are prone to rot in less arid environments so perhaps are better suited to pot culture.

Less fussy as to moisture is the Californian *A. hyalinum*, an attractive species that is easy to grow. From surprisingly small ovoid bulbs, several flaccid leaves appear, with only one or two remaining at flowering time in early spring. Upright umbels of broad bowl-shaped flowers adorn the sturdy stems, startling the observer with the shiny reflectance apparent at the base of each flower. The individual flowers are of heavy substance, milky white kissed with pastel pink and touched with a pencil-line rib of apple green, exuding a fragrance as mildly sweet as the blooms are soft in hue.

While found growing on moist shaded canyon slopes and therefore more amiable to the Northwest rains we receive here, the bulbs do benefit from a dry rest period after flowering. After such a summer sleep, the foliage will

sprout from the awakening bulbs and will attempt to remain evergreen through the winter. From relatively low elevations, it remains to be seen whether *A. hyalinum* will be hardy in climates more severe than the temperate Puget Sound area. This plant is an easy subject for pot culture if in doubt as to its hardiness.

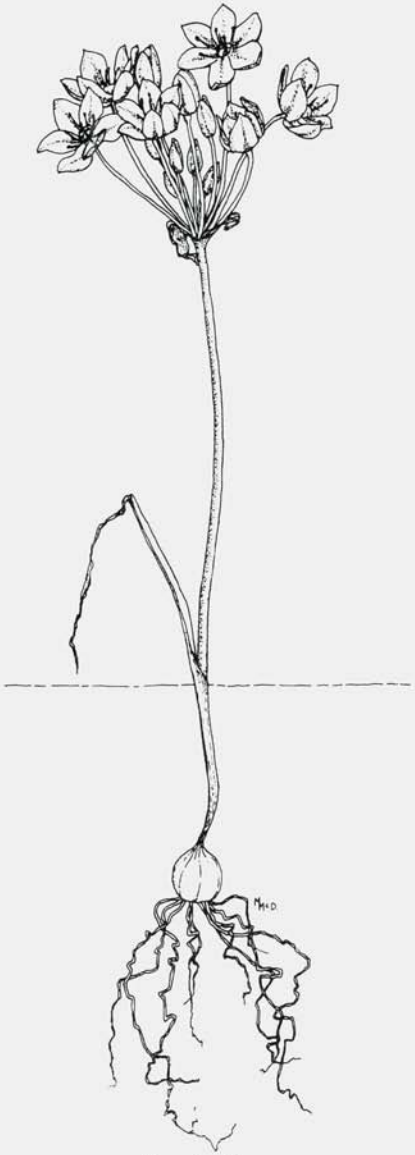
Allium praecox should be mentioned here. Once considered a variety of *A. hyalinum*, it now stands as a separate species. This is a very similar but stockier plant with many minor differences cited, but none that hold water. The only dependable characteristic with which to separate the two species is bulb coat differentiation.

For moist soil along a stream or pond, *A. brevistylum* is an admirable furnisher of bloom in May and June. It is easy to recognize this species by the bulbs which are attached to thick iris-like rhizomes. The stems spring from several flat basal leaves reaching one or two feet in height with few-flowered, skyward-reaching clusters of magenta flowers with flared tepals. Found in the Rocky Mountain region at moderate to high altitudes, this species prefers swampy ground or streamsides, only occasionally found on wooded slopes on drier soils, thus easily adapting to rich, moist spots in the garden. Later in the summer, plants go to rest for the remainder of the year as deep reddish-green growth tips just peeking above the surface. These tender tips can easily fall prey to discerning slugs craving a spicy nibble.

Allium validum is another of the swamp onions inhabiting moist mountain meadows, but extending farther west in its distribution, reaching the Pacific coastal ranges. This plant has much the same value as its look-alike cousin, *A. brevistylum*. The two can be separated by the long exserted stamens in *A. validum* and the very short ones in *A. brevistylum*, along with other less obvious differences. Both species make handsome, well-behaved specimens in the garden.

Only two other allied species occur, all having the characteristic rhizome and dwelling in constantly wet areas not usually associated with American alliums. *Allium eurotophilum*, from southern California, has only recently been described and is one that I have not seen. *Allium gooddingii* is the fourth member of this alliance, native to the White Mountains of Arizona and also recently recorded in a limited area of New Mexico. I owe thanks to Sonia Lowzow of Fjellgarden in Arizona for supplying this long-sought-after allium.

The smallest American onion must surely be *A. simillimum*, an endemic of mountainous areas in Idaho. Plants I observed were growing in decayed basaltic grit at about 7200 feet in central Idaho. It would be very easy to overlook the tiny bundles of white flowers ribbed green or reddish, nestled close to the loose black rubble. Bulbs grow clustered together in little colonies, each bulb putting out two narrow leaves that exceed the pale bloom. In cultivation, the bulbs rot easily. Those that persisted here briefly exposed foliage with no sight of bloom, then quickly retreated into dormancy for yet another year.



Allium hyalinum

Allium mairei (*amabile*)

Even better is a related plant also endemic to Idaho: *Allium aaseae*. The scape is generally a little taller, with flowers of pink or deep rose. Both would be charming additions to the alpine house where small bulbous plants can be appreciated. Unfortunately, neither is in cultivation, and *A. aaseae* is listed as "Threatened and Endangered" in Idaho.

Allium douglasii and *A. macrum* are to be found in spring-wet summer-arid regions of eastern Washington and Oregon. *Allium douglasii* occurs in four well-marked geographical varieties, one of which extends the range into adjacent Idaho. This past summer, while visiting southeastern Washington, I was fortunate to find *A. douglasii* var. *nevii*, a much smaller plant than the other varieties, with narrow channeled leaves and loose umbels of white or palest pink star-trumpets on foot-high stems. Typically, *A. douglasii* is a larger plant with very broad, arching foliage and densely flowered globes of pink, reminiscent of the European *A. senescens*. Most forms of *A. douglasii* have a somewhat ordinary look about them and are not to be cherished as first-rate ornamentals. *Allium douglasii* var. *nevii* has a certain daintiness that the other varieties lack, and I recommend it above the others.

Allium macrum is *A. douglasii* in miniature replica, being a far better plant, in my opinion. Unfortunately, the basic floras are misleading and have failed to account for the extreme variability evidenced in populations of this onion, basing their descriptions on a few herbarium specimens thought to typify the taxon. I examined large colonies of this allium on Colockum Pass at 5300 feet in the Wenatchee Mountains. Most grew in shallow depressions where the soil was temporarily moist, although depauperate plants were found on very dry rocky slopes. Small specimens with only slightly broadened foliage, representing typical *A. macrum*, grew alongside taller and more robust individuals with very broad falcate foliage, approaching the habit of *A. douglasii*. The Colockum Pass area is well east of the nearest station of *A. douglasii*, and without doubt these onion populations represent incredibly varying forms of *A. macrum*. Also, many differences between *A. macrum* and *A. douglasii* are reported in keys, but only those referring to anther shape and color are consistent and reliable for species determination.

The flowers of *A. macrum* compose globes of pale to deep lilac, with reddish or greenish nerves, displaying shiny bases to the tepals. The blooms carry a pleasantly sweet yet mild oniony scent. In one particular colony, unusually attractive specimens were growing in very wet and heavy soil, keeping good company with pale pink *Lewisia pygmaea*; delicate white prairie stars, *Lithophragma tenella*; *Zygadenus venosus* var. *graminius* with handsome eight-inch spires of creamy yellow; deep blue, dwarf camassias; magenta dodecatheons; and others. Here, the onion plants showed to good advantage, with shiny falcate leaves and short fat buds that nodded in lantern fashion. In a month's time, all traces of moisture and the plants would be gone and the soil parched and hardened. A similar sun-baked rest is needed in cultivation, with watering judiciously resumed when leaf sprouts show in late summer.

Rather abruptly, my descriptive journey into American alliums ends, surely a meager and random sampling of the large number of species available to us. However, there are dozens of others "in the wings" here in various stages of maturity. Perhaps in a few years my collection will hold a greater number of American representatives.

Seed of nearly all American alliums should be tried without fear, as many will prove surprisingly more of a challenge than anticipated, hardly following the preconception of noxious, odoriferous weeds running amuck in choice rockery beds. I have failed with many a western onion, but I will continue in my efforts to raise these interesting and attractive plants. Some difficulty may be met in trying to locate seed of the less common sorts, but a sharp lookout among the various seed exchanges will yield sporadic results. Several state native plant societies and nurseries that specialize in native plants offer seed of local native onions that are not generally available elsewhere.

[To be continued]

Collector's Notebook: A Pair of "Ruddy Brooms" Cornus stolonifera 'Kelsey's Dwarf' Viburnum opulus 'Nanum'

These two rather similar utilitarian shrubs have been known in horticulture for some time, yet they never have been put to their most suitable uses, at least not to the degree they deserve. Both have the general appearance of having come from witches'-broom origins: slender, much branched, mounding habit, small and close-set leaves, and a flowerless existence. Yet in spite of the absence of blossoms and the resulting fruit, each has an individual personality that should be better known.

They have the effect in the rock garden or in its immediate environs of being in the right mood and scale to associate with the wee things and to lend them a sheltering setting. They give a wondrous warm glow to the lifeless scene when they are leafless in winter. Of the two, the cornus is the redder; the viburnum, sort of bronze. Both are in the twelve- to eighteen-inch range.

As mature plants, they take on rather pleasing undulating forms and can effectively replace a large rock, to several tons. Small plants are not without what we call "character." Propagation is simplest; they layer themselves readily.

Cornus stolonifera 'Kelsey,' listed in Hortus II, was named for the nurseryman who undoubtedly perpetuated it and may have discovered it. *Viburnum opulus* 'Nanum' is included in Rehder's second edition listing. Unlike some plants that have come to us via the Witch, both are reliable in growth and do not revert. The cornus is of value for holding very wet, steep banks as it has a root mass comparable to what is seen above ground.

Roy Davidson; Seattle, Washington

Don't Discount Arizona
Part II

Sonia Lowzow
Lakeside, Arizona

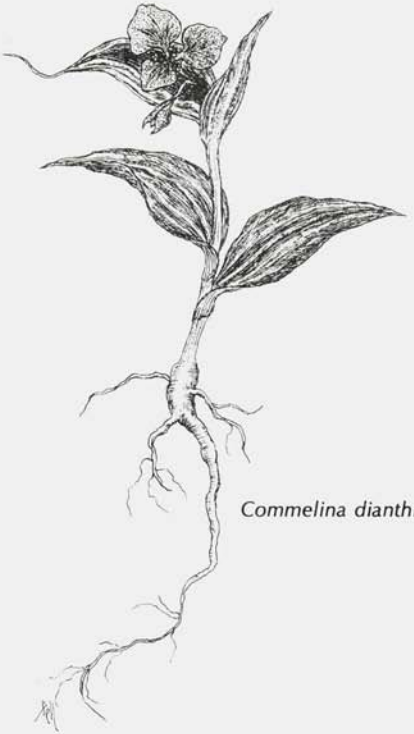
[Drawings by
Janet Fell
Lakeside, Arizona]

Admittedly, Arizona is probably the succulent capital of the nation, but the genus *Sedum* is hardly typical of that wide-ranging characterization, there being only five native species here. Also, oddly enough, none of the tender sedums that are so common south of the border are found within Arizona. Instead, all of the natives are alpine or broadly sub-alpine plants with an elevational range of from 3500 to 12,000 feet.

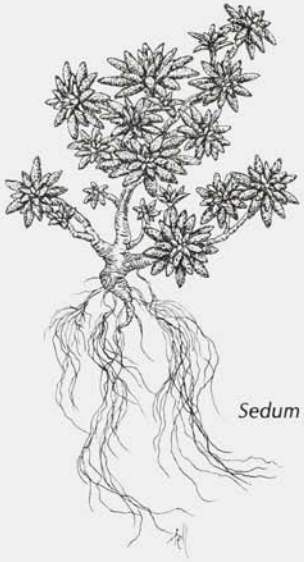
It is the little *S. stelliforme* of the White Mountains that has captivated me ever since my first glimpse of it on a rocky hillside above Big Lake a few years ago. This is an exciting little sub-alpine plant, small and controlled in habit and unexpectedly attractive in bloom. It grows in profusion on the same rocky peninsula that is the prime habitat of *Lewisia pygmaea* and is found elsewhere at altitudes of up to 9500 feet. It weaves itself onto lichened rocks and fills tiny crevices between them. Most plants are only two to three inches in diameter and an inch or so high. One three-year-old plant at Fjellgarden is about four inches across, spreading to about six inches when in bloom. This sedum has little, twiggy, decumbent stems with one-quarter to one-inch rosettes of tiny lanceolate leaves at the apices and along the stem nodes. The bloom is a veritable froth of miniature pink and white stars, completely covering the plant, in mid-summer. The rarest characteristic of *S. stelliforme* for the rock gardener, however, is its non-rampancy. The leaves do not detach easily, as do so many of the species, nor does it seed about with abandon. I took a small plant to Panayoti Kelaidis of the Denver Botanic Gardens about a year or so ago. He describes it as "one of the most impressive little alpines I've ever grown" — well-deserved praise for one of my favorite Arizona natives.

On that same peninsula, which is at an elevation of 9200 feet, grow a few other praise-worthy species, but *only* a few. There are many low, tight plants of *Commelina dianthifolia*, quite a number of *Saxifraga rhomboidea*, *L. pygmaea*, and *Sedum stelliforme* in quantity, and an occasional much-reduced clump of *Arenaria fendleri*, but no other species have I ever found there. The peninsula slopes down toward the lake shore and is a jumbled mass of rocks, large and small. The subsoil is a heavy clay, but the surface is essentially stable scree. The entire area is in full sun throughout the day.

I am particularly intrigued with the form of *C. dianthifolia* in this loca-

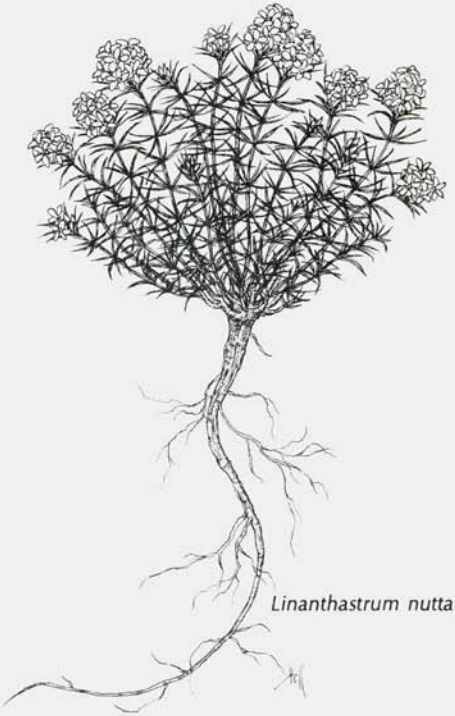


Commelina dianthifolia



Sedum stelliforme

Saxifraga rhomboidea



Linanthastrum nuttallii

tion. It grows to only three or four inches in height, and the leaves are exceptionally short and broad. The color of the flowers is a rich cobalt blue. This is a species that is often described as "half hardy," but temperatures can go to −30 °F. at that elevation. The plants that I have at Fjellgarden have retained the dwarf aspect and the deep blue color. I grow them in rich, moist scree in full sun. They have proven completely hardy here where there are many more freeze-and-thaw cycles during the winter than in their habitat. I hope that a wider dissemination of seedlings from these plants will determine whether the increased hardiness will be a consistent characteristic, particularly in the northeastern and north-central states. If so, *C. dianthifolia* may yet be recognized as the reliably hardy rock plant that I find this plant to be here, which could be a real blessing, for what else blooms with such a lovely clear blue in late summer *before* the fall gentians even have set their buds?

Saxifrages are, unfortunately, not very plentiful in this country, where we have few of the lovely and floriferous species that are found in Europe. Arizona has only six native species, most of which grow on the alpine heights of Mount Baldy and the San Francisco Peaks. *Saxifraga rhomboidea* shares my rocky peninsula with the sedum and commelina — surprisingly, for I have found this plant elsewhere in far different habitats, usually moist shaded or semi-shaded locations in humus-rich soil. It is a small and not terribly exciting plant, but I love it for the oddity of its bloom which gives it a sort of charm akin to that of a monstrose or caudiciform succulent. The flat rosettes of slightly fleshy, glaucous leaves are about two inches across. The bloom cluster is a multitude of tiny white blossoms in a dense ball atop a chunky stem four to five inches high in earliest spring. I grow this plant in a trough where its strange bloom is enormously effective at close range. It appreciates a pocket of rich soil and can take considerable moisture.

At the same elevational range but in richer meadow-like soil grows the lovely *Linanthastrum nuttallii*, one of our really beautiful members of the phlox family. From a heavy rootstock rise arching stems of fresh green whorled leaves divided into multiple linear segments. A mature plant in bloom is eight to ten inches high and as much across. It forms a rounded dome smothered in clusters of half-inch white phlox-like blossoms, these with yellow eye and sweetly aromatic. The heaviest flowering is in early summer, with scattered blooms thereafter, almost till frost. Until last year, I had really treasured my few plants as the rarities I had assumed they were here, for I had previously seen only one or two plants in each of a few widely scattered locations. But in early August of 1983, I was collecting seed in an area west of the White Mountains along the Mogollon Rim and happily discovered a new and prime habitat of the linanthastrum. There, in deep sandy soil, they grow by the dozens (or perhaps even hundreds), and the sight was truly impressive. Until now, I have been growing my plants in moderately rich scree in full sun, but I intend to try a few seedlings in a deep sandy loam. Perhaps this will more nearly approach what seem to be their preferred

Goodyera oblongifolia

Hedyotis pygmaea
(Houstonia wrightii)

cultural condtions and perhaps it will also stimulate seed production which has been poor in the garden but is prolific in the wild.

Houstonia wrightii is another sub-alpine plant which deserves to be better known. It ranges from western Texas into New Mexico and Arizona and is a real sun-lover. The *Arizona Flora* indicates a top elevation of 8000 feet, but I have found plants growing in vast numbers at 8500 feet, at least. Its habitats are usually in rocky, heavy soil or in sandy loam. The plants are small, two inches high by four or five inches wide; loosely caespitose; and flower very heavily in summer. The color range is from pale lavender to a fairly deep pink. They will bloom in full sun to part shade, but the color is more intense and the plants more compact in sun. They are very resentful of lifting and transplanting and must be heavily sheared when moved and then watered copiously to stimulate new stem growth from the base. The botanists have recently revised this genus, and our little *H. wrightii* is now to be known as *Hedyotis pygmaea*. Perhaps the different genetic affinity may be some explanation of the difficulty of propagating this plant from stem cuttings which almost *refuse* to form roots. However, *fresh* seed will germinate easily.

To prove the existence of really moist areas in Arizona's mountains, I promised to discuss some of our native orchids. In a few locations, at about 9000 to 10,000 feet, grow small colonies of the incomparably lovely *Calypso bulbosa*. Here, it grows in a rich, deep, moist woods duff composed mainly

of the partially rotted cones of fir and spruce, its ramifying fleshy white roots wandering through the layer and sending up its solitary leaves and, in spring, its single six- to eight-inch stems, each holding aloft one perfect orchid. I was an orchid grower long before I became a rock gardener and am as charmed by the little fairy slipper as I ever was enamored of the exotic tropical epiphytic species. It has a grace and loveliness that the blowsier greenhouse orchids somehow just can't match. My little colony, planted in deep shade and in the duff collected in its native habitat, has increased slowly but steadily and blooms here, predictably, at about May first each year. How glad I am that calypso ranges just far enough south to reach Arizona

Another orchid that is, happily, quite common in the spruce-fir belt is *Goodyera oblongifolia.* Its blooms are not impressive, but for patterned foliage effect it has few equals. The goodyera is considerably easier to grow than is calypso, forming good wide clumps in moist woods duff and lighting up the shady areas with its white-striped leaves.

I also like another small Arizona orchid for foliage effect: Malaxis ehrenbergii, which forms clumps of single-leaved plants crowded closely together, almost resembling a smaller-leaved maianthemum. The blossoms are so tiny that they are utterly insignificant, but the over-all pattern is quiet and effective, particularly if planted at the base of some of the larger shrubs in the shade garden.

I have not yet touched upon the saxatile plants of the drier areas at slightly lower elevation: the many gilias, penstemons, eriogonums, drabas, and the tiniest lesquerella I have seen, Lesquerella arizonica. But they are another story and will perhaps demand a Part III of "Don't Discount Arizona."

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> I bear in mind the old adage that you should put one specimen of a plant where you think it will thrive, a second where you hope it will, and a third where you are convinced it won't. The result if often surprising.
>
> — from *The Englishwoman's Garden*
> edited by Alvide Lees-Milne and Rosemary Verey:
> "The Viscountess Ashbrook's Garden"

More on Trillium Propagation Natural and Induced

Edith Dusek
Graham, Washington

While trillium seed is supposed to exhibit double dormancy, some, such as *Trillium rivale*, are quite apt to germinate after a single winter. Those that fail to do so may come up the second year. In those species which do exhibit a classic case of double dormancy, individual seeds may germinate the first year. While this could be chalked up to a winter that came parceled out in cold periods alternating with warm ones, it does not explain those that dawdle for three or four years, sometimes longer. The spring of 1981 had some mysterious magic to it which resulted in bumper crops of seedlings from pots which had been seeded from one to four years previously. Although all of the pots share an area of the self water bench, some of the oldest ones had shown no signs of activity previously. Other pots, which previously had produced, came forth with more offerings. In all of the winters that they had faced, there were one to several cold periods with temperatures anywhere from 15 ° to 5 °F. Theoretically, seed in the oldest pots had had more than enough time to break the shackles of double dormancy.

At sowing time, trillium seeds are dark, irregular-shaped bits. A week of residence in nicely moist soil is sufficient to make them quite round, and the color changes to light brown. Since trilliums vary from species to species and even from plant to plant, it is too much to expect that all seeds will perform in exactly the same fashion. Some of them, at least, will continue to swell until they are perfectly round light-colored globules which are uncomfortably reminiscent of the slow release fertilizer called Osmocote. At this stage of affairs, I find myself irresistibly tempted to pinch the little fellows in an effort to discover what they are. A learned gentleman once told me that once the seed had expanded into this condition, it must germinate, because, since it has lost its protective seed coat, it would rot if it did not. I sure wish my trillium seed knew that. Whether, in at least some cases, the seed coat is lost or it just stretches interminably like some sweaters which have been through the laundry, I cannot say.

Some of these swollen creations may apparently remain in this condition for several years. Periodic inspections will often find them looking back at me like small fat Buddhas, in no hurry at all to have done with their contemplative state and get about the business of producing a plant. Since seed on the surface is vulnerable to drying (a common cause of loss), I put a bit of soil or moist vermiculite over them when they appear — or reappear! Sometimes they do not come to the surface, so I am deluded into thinking that a hoary old pot could not possibly contain anything of interest. Let me dump them, and there are those fat little folk looking reproachfully at me

and making it necessary to poke through the debris in search of any that may be hidden. One is reminded of the protocorm state common to many orchids. Is it possible that during this period of apparent inactivity, trilliums function in a somewhat analagous manner to that of their distant relatives?

When I see seeds lying on the surface, I always have the uncomfortable feeling that hungry birds can see them too. Though I have never seen any evidence that birds have disturbed the pots, the trillium seed certainly does get around. It is not at all unusual to find strays sprouting on the vermiculite between the pots or on the ground in front of the bench. Whether the seed responds to being whacked by raindrops by leaping nimbly about (as I have seen other seed do on occasion), I cannot say. Perhaps the fairies have been playing marbles with them. In any event, rescuing strays seems to be an inevitable facet of growing trilliums from seed.

Seedlings generally fly one small, rather narrow banner which in some species looks very much like that of some lily seedlings. Just to be different, an occasional seed will put up two seed leaves, each on its own stem. Sprouting seed may perform in time-honored fashion and wear the now-useless seed coat for a brief period after the parts emerge. Sometimes, however, the seed would seem to have no coat to shed nor is there any splitting of portions or any of the other antics one comes to associate with seed germination. It simply changes its shape so that one suddenly realizes that it somehow has come to look like a miniscule rhizome. If this were in fact the result of germination the previous year, then there should be a preformed root below and the leaf should be of a different shape. Not so. From the middle of this curious new shape, there emerges a wee shepherd's crook which straightens itself out to fly the tiny green banner. Somehow the portion below has made up its mind to form a questing root. If this activity has taken place on the surface, it is not unusual to see that sometimes the tiny root has problems getting where it should go. One disastrous attempt to remedy matters by sifting soil lightly over the surface of the pot was enough to discourage any further such meddling. All those seeds that had the leaves up promptly died. Now, when an individual here and there seems to be in difficulties, *it* is gingerly coaxed down into the soil. Rescuing miniscule problem children always makes me feel that each finger has assumed the proportions of a telephone pole, but the exercise is generally successful anyway. When rounding up strays, any which have landed in a clump are simply replanted that way in a container; there will be ample time to separate them later when they are not so fragile.

What does one call a trillium "seedling" that never saw a seed? I have no idea, though such things do occur. My first encounter with them was in connection with a plant of double *T. ovatum* which was not performing up to expectations. While it had flowered, the blossoms were a travesty of what they should have been. The plant had indulged in a spate of stem production, and much to my surprise (for this plant is completely double and sterile) there were seedlings among them. Since efforts with food and water

had not seemed to improve matters, I decided that the plant might be happier elsewhere. On digging the plant, it became evident that the source of its discontent was an extra large mole freeway which went right under it. The run was so deep that there had been no previous indication that it was there. Whether this hole was responsible for the proliferation of vegetative growth would be difficult to say. Whatever the cause, the rhizome had formed numbers of adventitious buds of various sizes. The smallest of these were responsible for the false seedlings.

In view of my past experiences with the many kinds of curious behavior indulged in by the top portions of trilliums, I should have expected no less from the bottoms. Babies from rhizomes are not too hard to take in stride, but roots which give birth left me properly impressed. Such things are not unknown in the plant kingdom, but they seem not to have been noticed in trilliums.

The first of these unexpected infants was found on a plant of *T. rivale* which had spent some time in a flat. In view of the fact that this species in the wild favors rather deep placement of the rhizome, it is interesting to speculate whether the shallow depth of the flat had any bearing on the situation. When I lifted the plant, I was astonished to find a baby not only perched on one of the roots but firmly attached to it. The baby consisted of the usual seed leaf supported by a tiny stem while the minute rhizome dandled suitably tiny roots below itself. Mention of the find to a friend back east brought the comment that the gentleman had noticed a similar affair on one of his eastern species.

In 1981 when it was time to plant out some trilliums which had summered in cans in the self water bench, three more of these "seedlings" came to light. These were produced by one of the Oregon hybrid sessiles. The parent plant had responded to all the tender loving care which it had received by producing masses of roots. Among them were three particularly robust ones which had hit the side of the can head on. Not to be deterred, they had then angled sharply downwards. The babies were produced where roots were forced to change direction.

It would seem from these separate incidents that the production of plants by roots is not a rare happenstance peculiar to one *Trillium* species, but that many, if not all, species are capable of producing them. They would go unnoticed if the plants were in the ground for they would be thought to be only normal seedlings. Moreover, since they occur at some distance from the rhizome, they would inevitably be lost in digging. If some propagator could discover how to get the plant to produce them freely, it would save a lot of wear and tear on the rhizome itself.

Whether any given rhizome should be subjected to any of the various forms of mutilation that are sometimes used to force the plant to produce offset growths depends in great measure upon the habits of the species to which it belongs. These vary as much as do the rest of the trillium parts. At one extreme, there is one member of the *T. albidum complex* which is

capable of producing enormous clumps in the wild. We counted over sixty stems on a single plant, and this was by no means the largest one seen. In other species, wild plants are most often single stemmed, but they respond to easy living in the garden by forming good-sized clumps. *Trillium ovatum* is typical of such a response. In both cases, plants produce not only the primordial bud but numerous supernumerary buds from various points on the rhizome. In either of these types, generosity in feeding and watering should make any form of rhizome mutilation unnecessary. Incidentally, accidental loss of the stem in wild *T. ovatum* is known to have resulted in the same response which the gardener attempts to achieve by deliberate removal of the stem in an effort to force multiplication.

Most trilliums have very compact rhizomes, but two of the sessile-flowered species are unusual in that they produce a sort of running rhizome which gives rise to an assortment of adventitious buds along the way. These are technically referred to as "elongated" rhizomes, a rather dubious use of the word, for any trillium which fails to elongate to some degree each year will die. There is also at least one rare form of *T. pusillum* which not only has managed to keep itself among the present because it produces running rhizomes but must do so if it is to survive. The reason for this is that the thing appears to be a quite sterile triploid.

On the other side of the coin, there are species of *Trillium* which confine their efforts to the production of a single primoridal bud. *Trillium parviflorum* is a typical example of this kind of response. Plants are most often single stemmed. A particularly robust plant may go all out and produce two stems for the same bud or, in rare instances, it may even have three. Such plants cannot be divided. If they are taken to the garden, the instance of two- or three-stemmed plants increases, but they still do not form the supernumerary buds which result in true clump formation. Apparently, their genetic make-up is such that they are generally inhibited from such behavior. This inhibition seems to be overruled only under extreme provocation. The only plant of *T. parviflorum* that I have found so far which had produced proliferations to the rhizome on its own had gone about it in a most unexpected fashion. In some time past this old plant had undergone severe damage to the posterior part of the rhizome. To judge from appearances, it must have fallen prey to a wet rot which destroyed a considerable part of the old tissue in a very irregular fashion. From the edges of the damaged part, the plant had put forth four supernumerary buds which, by the time I arrived on the scene, had formed four elongated attached rhizomes of fair size. The most peculiar part of the whole business is that the activity had taken place on the oldest portion of the rhizome, an area which, while remaining nutritionally active, generally loses much of its ability for the regeneration of any parts that would normally spring from it.

Among the sessile-flowered Oregon hybrids, individual plants run the gamut from those that readily form good-sized clumps to those which remain single stemmed. If one checks all of the many species known, un-

doubtedly there would be an equal disparity in the tendencies they displayed. It would seem that it would help any would-be propagator to become familiar with the natural inclinations of the plants he decides to multiply so that he would know which methods are most suited to each individual. To use the more severe procedures on those species which readily form clumps on their own is a bit like using a baseball bat to kill flies. On the other hand, those plants which are extreme in their non-clumping tendencies may respond very adversely to methods which deprive them of their only bud. For these, the choice of one of the alternate methods would be wise.

Is it superfluous to say that only those plants which are in strong physical condition should be chosen for surgical procedures of any kind? Plants known to be from clump-forming kinds but which have failed to clump probably have been lacking in either food or water, or they have been placed in a situation not to their liking. It would be nice to say that among single-stemmed plants flower production is an indication of health. It is, but only comparatively so, for plants will produce a flower of sorts even in quite adverse circumstances. If one does not believe this, measure and record the dimensions of the flower on a plant that has not been fed, then give it a good feeding and re-measure the next year on the same day after the flower opened as last year. The latter part of these instructions is important because the dimensions of the petals often change considerably between opening day and the day the flower goes into decline. In extreme cases, the increase may be as much as one half the original length of the petal.

Learning from plants is, or should be, an endless process, but knowledge unshared is as worthless as that hoarded special plant form which disappears when the owner loses interest in it or dies. The more we learn about these interesting plants, the easier it should become to keep and propagate them.

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Aquilegia jonesii is best grown from seed left in the seed pan two or three years after coming like radishes the second year. They should be transplanted in a sandy loam containing about one quarter dolomite limestone (powdered), by volume. This limestone, then, should be added each season in small quantities to keep the pH up. I planted several seedlings in the rockwork here in such soil. The second year from one-year seedlings, one plant had eleven blooms and made seed. I did not supplement the limestone, and the next year there were two blooms and no seed. It has not bloomed since and gets smaller yearly. The lime and a cool root run among rocks are essential, I believe.

— Charles Thurman *Mead, Washington*

Trees, Alpines, and Troughs

Wayne Kittredge
North Reading, Massachusetts

I'm fortunate enough to live by the shore of a small pond; our acre of high ground is surrounded on three sides by swamp and pond, with neighbors on one side only. In the congested north shore area of Massachusetts, we have a place that has retained a bit of the wildness and charm of times past, before the advent of industry, high technology, and ramping urbanism.

On the west-facing shore of the pond on our property, there is an outcrop of large boulders left by the last glacier's retreat. There, five years ago, I decided to establish my first attempt at a rock garden. At the time, the site was engulfed by old-fashioned, rapidly stoloniferous lilacs which only rarely flowered, a remnant of a garden my grandfather had made for one of his daughters. I should have taken the hint from the lack of flowers on the lilacs, but I reasoned at the time that this was due to the poverty of the soil which was a gravelly glacial till. In my youthful zeal, out came the grub-hoe and spade and fork and crow bar and sledge hammer, and at summer's end I had cleared half of what I had set out to do that spring. At first, I planted easy doers as I was surely a novice. They did well at first but later began to look less vibrant than is their norm. At that time, I didn't know the difference between a lilac root and a tree root — a tribute, I think, to the tenacity of the lilacs.

The next spring, I bought more easy plants from a local nursery that had an alpine section and put these straight into the scree with high expectations. I then set about clearing the rest of the rockery. By fall, it was done except for shoots of the determined lilac coming up from every bit of root not sieved out. About that time, the new plants were less than vigorous; even the moss phlox was anything but rapacious. Being a novice, I thought the problem was lack of nutrient as I had put very little into the existing gravel. I proceeded to fertilize, to no effect.

The next spring, as growth began, some of the plants didn't appear, and those that did were no more than in a holding pattern. I may have been a novice at rock gardening, but I had been gardening all my life and was suffering some pride damage. New seedlings from Drake's Nursery seed had sprouted, though, and undaunted, I prepared to set them in the new scree between two large boulders. Digging very deep in the soil to prepare it properly with perfect drainage and adequate compost, I noticed that the soil was full of roots. Surprised, I looked around. There were precious few plants in the scree, so it couldn't be those; the lilacs by then were really gone, and

the nearest trees seemed too far away to have roots in the garden. But these sure looked like tree roots. I dug them out. The seedlings were planted with more high expectations, and for a while they did flourish. By fall, however, they began to look sickly, and the following spring many were dead. The soil, when dug up, was again full of tough, fibrous roots, by now unmistakably tree roots.

During that winter, I had joined ARGS and had participated in the seed exchange. I had another batch of seedlings, but I dared not put them in the scree; it was time for drastic action.

Over that same winter, I had read about troughs but had really not understood, so I didn't think any more about them until the nursery bed was becoming seriously overcrowded. While considering how to go about ridding scree soil of tree roots, the thought of troughs kept nagging at the back of my mind. About that time, I attended my first ARGS chapter meeting. The subject was succulents, and there was a display of them in troughs. I surreptitiously poked at the funny-looking containers and scraped them with a swift fingernail, all the while furtively glancing about, hoping I was avoiding discovery by the owner. Finally, Mrs. Lubera took pity on me and gave me the recipe she used for hypertufa or trough mixture.

Later that day, I stood at the top of the hill above the scree, and slowly the idea crept into my mind. What if I dug out all the soil in the scree and lined the hole with hypertufa? The project seemed immense, beyond my ability to cope, so I tackled a smaller section above the scree. Out came the grub-hoe, etc., for what seemed the umpteenth time, and a four-foot by five-foot hole, three feet deep, was dug and lined with about an inch layer of hypertufa. I made this a bit thicker around the big roots and in places where there might be extreme pressure. I didn't layer in any chicken-wire reinforcement as I figured there would be soil on both sides to equalize the pressure on the cement mixture. It seemed a thing of great beauty when finished, if only because it might keep out the offending roots — but would it? A trough must have drainage holes in the bottom, which were provided. Would the tree roots find these and creep in to take over once again? To help discourage them, I put three inches of quarter-inch stone in the bottom of the in-ground trough. The hole was then filled with good rock garden soil, and some special plants were placed, this time with considerable trepidation and crossed fingers.

The next section of the rockery was on the other side of the two central boulders and seemed not so bad tree-root-wise, though a large oak stood at the top of the hill. I had been told that oak roots go down vertically rather than spreading horizontally. The new trough-bed had filled up with plants very quickly, and I was still pushed for space in the nursery bed, so I prepared the new section hastily and planted. A good thing, too, as I was soon to attend the Connecticut Chapter's seedling sale where I bought about fifty plants. A new friend, made that summer, supplied me with twice as many more. All went into the new section by the trustworthy oak. The plants in

the trough were vigorous, those in the new section were looking super, and my wounded pride began to heal. That winter, I slept well, confident in having solved the tree-root problem.

Almost needless to say, the next spring, to my utmost astonishment, the plants in the new section by the despicable oak were showing the by now all too familiar signs of tree-root stress. I quickly dug out the bed of lilacs by my house and transferred as many of my plants as possible to this area. Even so, some choice plants were no longer with me. The section by the oak was excavated again. It looked huge. I couldn't imagine lining it with hypertufa, so I left it gaping and searched for another alternative.

Meanwhile, we were being treated to Northwest coast weather (daily rain), and the pond rose until it was lapping at the base of the scree. A final insult was the loss of my one *Acantholimon* species raised from seed, which had had the audacity to flourish in the scree full of tree roots. Though the plant was a good foot above the flood, the saturated soil was too much for it, and it turned to mush.

After the flood receded, there was no longer any question about it; the hole by the oak was going to have to become a giant trough, roughly ten feet by fifteen feet with a six-foot vertical grade. It took eight large wheelbarrow loads of hypertufa (approximately forty dollars' worth), spread by hand and accompanied by a fair amount of foul language, but finally it was finished. It was so impressive looking that I was reluctant to fill it with soil, not to mention how much work it promised to be. Somehow, the soil I had dug out filled about one fourth of the trough when put back in; the rest must have been tree roots.

It seems incredible how much soil I had to make to fill the trough. It took many, many trips to the local sand and gravel yard for drainage material and several trips to our swamp for organic matter and as many more to the very rotted woodchip pile with a sifter before I had accumulated enough material to fill the rest of that enormous hole. I forgot how many wheelbarrow loads (and a large barrow, too) it took of the combined ingredients. As I dumped each one, it just seemed to disappear without raising the level of the soil in the trough at all. I thought I'd go crackers, but, believe me, it was worth it. Just standing and looking at it when it was finished gave me a sense of satisfaction. I even felt that I might have the courage to excavate and line the rest of the scree, a remaining area only half the size.

The recipe used for hypertufa was a little different from Mrs. Lubera's, whose recipe is excellent for portable troughs. In my case, the ground sucked the moisture from Mrs. Lubera's mix, making it harden too quickly. Therefore, I made it slightly wetter than the "cottage cheese consistency" as follows: one and a half parts of cement (Portland), one part of peat moss, one part of attic-insulation-type vermiculite (Zonolite), and one part fine sand. My solution for the drainage holes was to dig them about six inches deep below the lowest parts of the trough. They were about big enough to fit a softball. I then lined down the edges of the hole with hypertufa. The holes were next

filled with half-inch stone topped with fiberglass window screen very lightly dosed with engine oil. Another layer of half-inch stone held the screening in place. If the tree roots find that attractive, I just might throw in the proverbial towel.

So far, after two seasons, the first trough has not been discovered by tree roots, and though the roots did try to sneak over the top edge of the trough, they were easy to spot and remove.

A Scree in the City

Vaughn Aiello
Chicago, Illinois

About four years ago I heard another rock gardener say that the more gravel, the fewer troubles. When I started gardening in 1974, the shaded areas for woodland plants were the first I tackled, as I felt these were the best and easiest places to learn about conditioning my soil for the more conventional plant community that does well in ordinary good soil, especially after it has been worked up with humus, peat moss, and sand. I watched other gardeners create rock gardens in sun for several years before I attempted to do the same. As a result of this learning process, I decided when I started my sunny rock garden that the soil mix would be more suitable for rock garden plants if I used a combination of half my usual prepared soil mix and half gravel. This amalgam was therefore mixed, mounded, and laced with rocks before the plants were installed.

There was a good deal of bloom and growth, but then came the muggs of August, and several good dianthus and a few other plants died. The reason for these deaths was a mystery to me. About this time I started my work in the rock garden at the Chicago Botanic Gardens. There, once the plants were established and started to perform, I could see that a major cause for most plant deaths during the summer was too much loam, soil, dirt, or whatever you call that silt in the soil mix. Therefore, with each successive garden that I have built, less loam has been used. I became more and more convinced that the plants that appealed to me really disliked dirt. As a result of that conviction, I removed all of the plant material from one area of my garden, dug out the soil to a depth of one foot, and had it taken away.

Being in the heart of Chicago, my garden is over the original sand bed of Lake Michigan so drainage is no problem. Despite this, I put into the newly dug pit — some three feet wide and ten feet long — one to two inches of gravel to a raked level of two and a half inches. The coarsest sand that could be procured was then laid over this and watered down so it would wash

into the interstices between the large chunks of gravel. Over this was laid a layer of regular size pea gravel to a raked level of three and a half inches. Again coarse sand was thrown in and watered down.

The next step was making a soil mix that I thought would be appropriate for my conditions and needs. First, I mixed one part peat moss and one part coarse sand. To this mixture I added a like volume of gravel. Then to one wheelbarrow load of this mixture, one shovelful of soil was added — no more than that. The soil was only used as a coloring agent and to provide trace elements for growth. This "soil" mix was then placed over the sand and gravel layer in the pit, mounded and added to so as to achieve the desired shape and height. When the total depth was about two feet, the rocks were placed. This took the greatest amount of time as the rocks are the visual backbone of any rock garden. River-washed gray granite rocks were used because of their texture and color. When they were in place, a one- to two-inch layer of black granite gravel was spread over the entire area, level to most of the rock work. This created a jagged surface so air could move freely under the foliage of the plants to help fight the muggs of August. The gray granite rocks were placed close together to form ledges, cracks, and crevices for mat and cushion plants, thus making a dry surface for the foliage to spread out on.

Although the plants that had originally been the cause of this redevelopment were no longer desired in the garden, the lessons learned from them led to the selection of more unusual and exciting plants that would definitely need or at least be helped by scree-like conditions. Every day it seemed at least one new plant was added to the want list, and when the plant was found it landed in this area.

Such a scree may seem sterile at the bottom and perhaps overly rich at the surface, and it is — for the first year or so. But with each successive watering and rainfall, the deteriorating particles of peat, loam, and sand are carried deeper and deeper into the gravel where they become the trace elements that the plants need to live on. This forces them to develop better root systems as they search through the gravel mix for nutrients. With such extensive root systems, the plants are less likely to suffer from drought. Even though this area is in full sun, it needs less watering than areas with greater amounts of loam in the soil. Loam does dry out, and plants which have not developed extensive root-runs dry out with the soil.

Another reason a lean scree needs less watering than an area rich in loam is that the gravel and rocks on the surface heat up rapidly in the sunlight but just as quickly cool off at night. Any night-time moisture condenses on the cool rocks and percolates down through the gravel mixture just as moisture condenses and runs down the outside of a glass of cold water in summer. Any air moving through the gravel is also cooled by this accumulated moisture; there is very little air movement through loam.

Since this small scree provides conditions similar to those in many parts of the world, plants from diverse locations with similar conditions are likely to feel at home. Thus, penstemons were planted next to acantholimons and

gentians next to lewisias. Many truly dwarf narcissi and other small bulbs were also included. A list of plants tried in this area would be too lengthy, but mention should be made of some of the more unusual or those showing particularly good results.

Lewisia brachycalyx, Draba dedeana, Dryas tenella, Penstemon davidsonii var. *menziesii* 'Microphyllus' and *Asperula gussonii* have all done well.

Two results were unusual. In one, a chance seedling of *Phlox subulata* formed a cartwheel half an inch high with arms nine inches long, carrying blossoms of subdued pink only on their tips and only in the fall. The other case relates to a plant of *Rhododendron obtusum japonicum album.* With its pure white flowers and miniature growth habit, I thought it would look well against the dark background of rock and gravel. I planted it, knowing that I was taking a chance, but I felt it was worth trying as the shallow root system could spread through the concentration of peat moss in the top layer of the scree. It worked. There in full sun, only three inches high by eight inches wide and covered with flower buds, is this dwarf rhododendron only a few inches away from *Dryas octopetala minor.*

Pests are at a minimum in the scree. Slugs have given it a wide berth, perhaps because they do not find in it the plants they enjoy or perhaps because they would have to cover a large expanse of rock and gravel to get to them. Only three squirrels (usually a real pest) have been seen in seven and a half years. The only serious pests in the whole garden are worms — night-crawlers. And they are just that. They are anywhere from nine inches to fifteen inches long when they stretch out of their holes. A double, red hepatica was lost to one of these. The worm grabbed it and took it down into its hole. In addition, they deposit their casts on the surface of the scree. These clog the drainage and are too rich for the plants that grow there. An *Armeria juniperifolia rosea* died as a result of these deposits, to name only one. These worms have become real enemies and are treated as such. Nightly searches disclose them, and they are tossed into the pool for the goldfish.

Winter protection is practically nil. While loam heaves with frost action, taking the roots up into the air and breaking them as it does so, gravel and sand areas don't heave with frost; thus the roots are not damaged. I allow no covering over any type of plant in the rock garden at the Chicago Botanic Gardens, and I give the same treatment to my own plants. I cover only a newly placed experimental plant, such as *Anacyclus depressus,* which might resent winter dampness. This plant, by the way, does much better without loam. In the lean scree it develops a two-foot tap root. Where there is loam, it grows too lush and cannot take winter dampness if not covered. In the scree, I have discovered, it needs no covering. In the rock garden at the Chicago Botanic Gardens, there are several of these plants that are almost two feet across and are four years old. When they are in flower, one cannot find the foliage. So there are only two plants in my scree that will be covered this year, and both are trial plants.

Be the First on Your Block or Antennaria as a Groundcover

Paul Held
Westport, Connecticut

It has been four years since I planted a lawn of pussytoes. I did not want to write before giving this alpine groundcover and weed of lawns the true test of time. But now it is time.

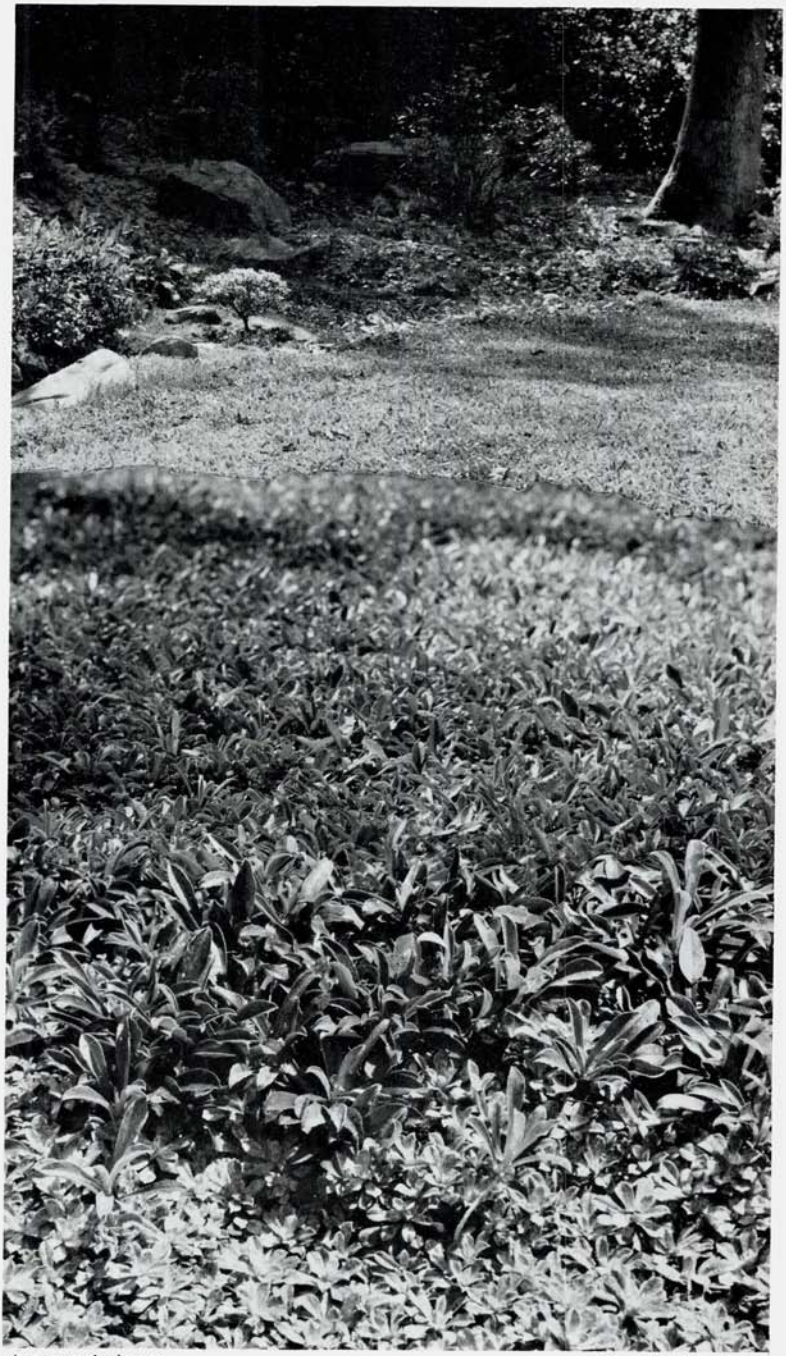
Six years ago, I met my wife, who at that time was having her house built. Not much attention was given to the surroundings, the house being built on blasted ledge. The builder contracted for a "lawn" to be put down around the house. The subcontactor did the best he could on his allotted funds, but that meant spreading a couple of inches of topsoil over the rocks and sowing it with seed mix.

It took only the following spring to devastate this work. Rocks heaved upward, and a spring, which didn't flow in summer when the leaves were on the trees, formed a pond in a depression at the top of a slightly sloping area. When the thaw came, the overflow of this pond and the runoff from the house washed the meager topsoil away, leaving a jumble of rocks and mud instead. Very little would grow on that.

I refused to be caught in the lawn-mowing syndrome, and though Jane claimed she enjoyed this chore, it got pretty bumpy and the terrain threatened to wreck the lawn mower.

As a Christmas present, a gift not much appreciated at the time, I contracted for a backhoer to dig a channel from the spring to the culvert under the driveway and a couple of channels to link up the gutter leaders from the house. I laid down perforated drain tile and filled over it by using a movable, slanted soil sifter to sort out the stuff removed in digging the ditch. The sifter straddled the ditch so the rocks sliding down its slanting face went into the ditch and whatever topsoil was in the pile (and it was very little) fell through the screen in a mound. Before moving the sifter forward (screen side first) along the ditch to cover the next section of drainage pipe with rocks, a sheet of asphalt roofing shingles was laid on top of the rocks already in the ditch. The next pile of soil falling through the sifter landed on top of the shingles rather than directly on the stones beneath so it would not clog the drainage. The drains worked beautifully and still do.

After that was done, there was a very small budget left over for the rest of the work. Topsoil doesn't come cheap. We are talking about an area of 2000 square feet, and I didn't want to buy topsoil anyway for fear of not knowing the ingredients it contained. So I managed to get sixty-eight bales of hay (a vanful or two) and spread it out. A local lumber mill delivered a truckload of rotting sawdust, and a local gravel supplier delivered ten tons of screened



Antennaria Lawn
(*Antennaria dioica* is smaller in size and more silvery.)

Paul Held photo

sand, the stuff that goes on the roads in winter but without the salt. These were spread in that order, the sand being the heaviest, but nothing was unmanageable. (No rocks!) This was left to mature for a year.

Feeling guilty about not cutting a lawn, I had instead concentrated on learning about and experimenting with groundcovers. I had just joined the ARGS and had bought or had been given or gathered just about every kind available. I read about a thyme lawn but did not appreciate the fact that my test patch died out one day into a circle of black due to a fungus or something. After much discussion with Jane, we settled on using a patch of pussytoes, *Antennaria dioica rosea,* which I had purchased from a local alpine nursery and which had by now grown happily to a two-foot by two-foot clump by the edge of the gravel driveway. I was amazed by how vigorously it grew, even over small boulders. Jane liked the gray color and smallness of leaf.

Spread to one plant every six inches, there are a lot of plants in 2000 square feet. I broke my clump of antennaria up into tiny pieces. As long as they had roots and a resemblance of life, they were planted out in the very early spring directly into the sand, despite the fact that the weather and the soil were bitter-cold. I had the area only half planted when I ran out. There was, however, another patch of antennaria (*A. neglecta,* I believe) which had caught my eye the year before on a roadside slope. I had moved part of it into the garden, and it, too, had expanded to a two- by two-foot spread. This species is relatively much coarser in leaf than *A. dioica rosea* and only half as gray, but it filled the bill as something for free and looked as if it would take the rigors of growing in plain sand. Every six inches — oh, my back and freezing hands. I used a little stick as a tool and just scraped a channel the length of the piece I tore from the clump, which was soon no more.

I did all this job without really considering ahead of time what it would involve, which was fortunate, for if I had thought ahead, I would have considered it impossible to do this chore all at once, but by not knowing what you're doing, you just proceed step by step until it's done.

Well, almost done — the groundcover, that is. The *A. neglecta* ran like ajuga and filled in marvelously by the end of the summer. The *A. dioica* was slower and more beautiful. People passing by began to notice. "What's that gray stuff? You mean you can *walk* on it?" Even rock garden friends were hesitant to trample it, but it seems indestructible. At some point in the spring, a leaf-curling insect would chew holes in some leaves and stunt some growth in the young tips. I fought this with all kinds of strong insecticides until finally finding BT to be best. This made me feel better, knowing it was a lot safer to use. I also tried to encourage the *A. neglecta* to grow faster by spreading a little fertilizer. I found, however, that this made the plants grow too lush, and a foot-square section succumbed, I guess to some fungus disease. I, therefore, have done no fertilizing since, and the lawn is better for that.

In fact, the only care that the antennaria lawn needs is as follows. In the spring, when the flower heads arise — zillions of them — they tend to become trampled and untidy. I tried the lawnmower, but it didn't work in

that the edges of the *A. dioica* mats that were not yet rooted down were lifted up, and the wheels of the mower dug into the loose sand. A convenient and apparently necessary tool is a motorized weed whip. It takes about an hour or two to go over the lawn with one. In addtion to this once-a-year job, where the edges of the planting do not come up against a stone surface or a large plant, the lawn has to be trimmed to keep it in check. This is a twice-a-year job, taking another two hours at the most. The next and last thing to be done, if you want a 99.9 % pure lawn, is to weed. Here you have to make a decision between an *A. dioica* or an *A. neglecta* lawn. The *A. dioica* has trouble competing with weed seeds that blow in and sprout. This means that too much time has to be spent weeding for my taste. The *A. neglecta*, on the other hand, grows so densely and is so strongly competitive that it takes only about an hour once a year to weed it, no more. In fact, the *A. neglecta* lawn takes about as much care as a blacktop surface, but *it* looks beautiful even at its worst in early spring when it is sort of reddish-gray-green, which I consider most attractive. I think I may cover the section planted to *A. dioica* with sand and plant it to *A. neglecta* instead. You couldn't ask for a better groundcover.

Inherent in the word *lawn* is the assumption of mowing once a week, fertilizing, mowing, watering, mowing *ad infinitum*. Not necessarily so, I find. Since this is the first I've heard of anyone having a pure pussytoes lawn, I just thought I should let the world know. Be the first on your block to have one!

★ ★ ★

". . . gardens are not made,
By singing, 'Oh, how beautiful and sitting in the shade. . . .'"
— Rudyard Kipling

★ ★ ★

Omnium-Gatherum

Best horticultural greetings to you all. I am delighted to be here. This is a lovely challenge of a job into which I hope to grow, with your help.

Sheep I'm the new shepherd of all those words written to give you information, enjoyment, and perhaps understanding. Some of the flocks of words will come in docilely gathered into expertly written articles; other flocks may need a great deal of tending. That's what shepherds are for.

Many read what the few write Lest the faithful few weary of being sheared too often, add the good wool of your own experiences with growing plants, making discoveries, searching for plants in the wild, observing, designing and developing gardens, researching. Tell us about plants that need to be better known and plants that are better unknown. (We'll have some controversy.) Tell us about plants that grow against all reason and expectation and plants that won't grow at all. (We'll have some problem-solving.) Give us adventures alive with rich descriptions of wild plants and their habitats. Help us to understand why plants are so important to us individually, personally, and in the greater scheme of things. Don't be afraid to write. Only once has there been a Goethe. And assuredly your new editor doesn't fancy herself a modern-day Farrer, but she can help you put one word after another, if need be.

Title Those of you who have been members for a sufficient number of years will perhaps recognize "Omnium-Gatherum" as the title of the editorial catch-all used by my father Merle Sutton during his editorship of the *Bulletin*. Its reappearance is due to a certain proprietary fondness for it on the part of the one who researched and suggested it to her then-new-editor father in his moment of need.

Soapbox My thoughts presently do not seem to formulate themselves into anything approaching the wonderfully profound essays of Timmy Foster's ". . . of Cabbages and Kings . . ." though perhaps when I am no longer suspended between a not-quite-finished new house in Port Townsend and a not-yet-ready-to-sell old house in Seattle fifty miles and a ferry ride apart, something will come. In the meantime, guest contributions are cordially invited. It is a good and rare forum for airing ideas more abstract and philosophical than are dealt with in most *Bulletin* articles. Sonia Lowzow's excellent contribution in the Summer 1984 ". . . of Cabbages and Kings . . ." is a case in point. She identified an area needing attention, but what is far more significant, she suggested remedies and positive outgrowths of those remedies. That's what we need! Anyone can identify problems, but few offer solutions.

Feedback is solicited Compliments and positive suggestions in any size or shape are gratefully accepted. Criticisms and negative suggestions will be carefully and respectfully considered. A general outraged uprising would almost certainly bring about a hasty change. A negative response from a very small group will be aired before a sampling of members before being acted upon, held for further evidence, or disregarded. (I am reminded of a member long ago who crossly attacked the editor each time an article appeared about a plant the member couldn't grow in his garden.) We really must be fair to all our membership, mustn't we? In matters of opinion and preference, I suppose the editor's are as valid as the next person's. However, well-documented evidence of error will be greatly appreciated.

Accuracy The accurate handling of technical information, botanical names, and other factual material as well as the mechanics of writing such as grammar, spelling, and punctuation is vital. Unfortunately, my degrees were neither in English composition nor in botany. Settling in one place with reference books unpacked and neatly arranged on library shelves will surely increase accuracy, but, were I the best editor alive, I'd still need and welcome your help in correcting present and preventing future errors. Lacking one truly definitive, exact, and ultimate world-wide source of correct plant names, we have begun a search for the currently most reliable information. This is a topic for further discussion.

Name changes Again, in the interest of botanical accuracy, would it not help to record plant name changes as they come along? Some of the changes are indeed fleeting, but we might be up-to-date for an issue or two.

Adlets Ad manager, Anita Kistler, has suggested a classified column for members to advertise for books and plants wanted, items for exchange or sale, etc. Sounds good. Any takers? Number of words and costs are still being explored.

Two views of winter Winter is the time to plan all the things you aren't going to get done during the rest of the year. Winter is a wonderful, expectant time of year; a whole new spring, summer, and fall lie ahead.

Book Reviews

The Complete Handbook of Garden Plants by Michael Wright. Published in the United States by Facts on File Publications, New York. $18.95.

I suppose every gardener longs for a pocket-sized book which has a clear picture in true color of every plant in cultivation arranged in a logical manner so that it can be used for identification of any plant in any garden or greenhouse, and those plants in the wild that ought to be in gardens. It would, of course, be designed to seduce the gardener into moving down new and previously unexplored horticultural paths; so it would have enough cultural information to get one started and up to the stage when one might think of joining a specialist society. Well, here is a book which tries to do it all, and it has mixed success. In this it invites comparison with the *Dictionary of Garden Plants* by Hay and Singe. If you liked Hay and Singe, you will like Wright's book, and you will need both of them. There is overlap of material, naturally, but they are in no way duplicates. This too is a British production with many contributors and consultants, all apparently from the United Kingdom.

The obvious difference is the fact that the illustrations here are watercolor drawings by more than 20 artists. A photograph has the advantage of placing a plant in a growing situation; it can give a feeling of what the plant would look like in one's own garden. It can sometimes convey the plant's personality. However, even good photographs are rather weak on detail, the kind of detail you might need to distinguish *Campanula betulifolia* from *C. poscharskiana*, say. Drawings can help us here, and the artist is able to display a plant in a formal and selective manner which aids appreciation of detail and even identification. If we are given bud, flower, and fruit in the same drawing, so much the better. Artificiality has its advantages; moreover, indifferent material can be the model for a work of art. A photographer can only select from what is present, not invent what is absent.

The illustrations then are what make this book worth having. They are somewhat variable in quality, but the over-all standard is high. Any faults the book has arise from the impossibility of producing a book which does everything. It is pocket size (fat pockets); there are cultural notes; there is plenty of seduction. It would be unkind to be too severe about its limitations.

One aspect of the book must be mentioned though. It is not at first glance obvious that this is a UK publication since the only map in it is of the United States. The hardiness zones we are all familiar with and are not totally satisfied with are here reduced still further to six zones. This leaves the "very hardy" zone stretching from Philadelphia to Nova Scotia with Long Island, the Berkshires, most of New Hampshire and coastal Maine all in the same zone. This is unrefined to the point of uselessness. We cannot select our plants on the basis of such vague hardiness data. A second criticism has to do with the drawings themselves. There is no scale enabling one to compare sizes of plants on the same page. It helps to go back to the text where plant sizes are given, but even this fails if the drawing shows only a plant part.

Whenever so many people work on one project, there has to be a little confusion of purpose and emphasis. A few genera are illustrated by too many cultivars; occasionally there are long lists of cultivars with no drawing. Are these meant to be recommended forms? There are too many trees and shrubs for my taste (about 40% of the book). Most people will use this section minimally for their own garden needs.

Each section (trees and shrubs, climbers, perennials, bulbs, rock plants, annuals and biennials, and water plants) is further broken down into botanical families which are presented in alphabetical order. The genera are alphabetical within the family but given common names in boldface. This makes the book more educational but not too easy to find one's way around in rapidly. A book which does this much is easy to criticize, but I must emphasize that every gardener will enjoy browsing through it, and it will be especially useful for those of us who have a little bit of everything including a few house plants or an alpine house. — G.C.

Japanese Residences and Gardens: A Tradition of Integration by Michio Fujioka, Kodansha International, Ltd., Tokyo, New York, and San Francisco. $18.95.

One of the large number of titles in the Art Series of this publishing house and a remarkable example of what it sets out to interpret, this thin but large (10½- by 14½-inch) work presents a challenge to commentary or review due to its utter simplicity, an explicit model of its subject. Although volumes have been composed "in explanation," it has never, probably, been expressed as well.

There are thirty-one pages of finest color depictions, including title and contents pages, within an unpretentious binding and handsome jacket, also in splendid color. These photographs by Kazunori Tsunenari serve to introduce a sixteen-page text, with each of these pages given about half to further black and white illustrations.

There is nothing secretive, nothing mysterious, about the tradition. As the jacket states, "The greatest contribution of Japanese culture to the world in the coming decades may well be the integration of man's dwelling-place with the world of nature — that is, the spiritual and spacial union of home and garden. . . . There is no need for labored commentary . . . anyone with two eyes and human intuition will instinctively feel the beauty and significance. . . ."

It is too evident to those who visit expecting to find such visions of harmony everywhere that it is becoming a diminishing thing. The tradition stems from the obviously deep-seated acceptance of the obvious, that mankind as part of nature has not aspired to "rise above" himself. Whatever was at hand has become in time part of the tradition. It is that simple — *so* simple as to be very difficult to put into mere words.

While the photographs depict rather grandiose examples, they are surely the finest examples, and the underlying principles will be found in the exquisite homes of the peasant farmers — should the visitor be so honored as to be invited. The severity of the Roanji landscape may not be our cup of tea, yet we are drawn to that inner peace it brings, even from only viewing a photo.

This is a book for the serious student of the natural landscape as well as the collector of fine books, and the modest price attracts us to other titles in the series.

— B.L.D.

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