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American Rock Garden Society

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THE BULLETIN

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Cover Picture
Dodecatheon sp.
Ice Lake, Wallowa Mountains
Phil Pearson, photographer

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Zauschnerias: So Misunderstood

Panayoti Kelaidis
Denver, Colorado

[Drawing by the Author]

Few genera of native plants seem to be shrouded with more confusion than *Zauschneria*. Even the name many people find difficult to pronounce, and its spelling gives most of us pause at first. Botanists have had their own problems with the genus. Several recent treatments have lumped California fuchsias into a single species of fireweed: *Epilobium canum*. This remarkable feat of compaction is by no means universally accepted among botanists. There are a number of cytological, morphological, and ecological criteria that clearly delineate not just *Zauschneria* from *Epilobium*, but several taxa within the genus itself. If botanists have trouble recognizing these brilliant flowers, gardeners and hummingbirds alike have no problem telling zauschnerias from willowherbs.

Few times are duller in the rock garden than the late summer months. Hailstorms, hot weather, and insects have usually taken their toll. If the gardener happened to stay too long on a trip to the mountains, some disaster

will almost certainly have managed to magnify the damage. Just as one starts to develop some novel neuroses, one notices a flash of red among gray leaves. Usually its some low form of *Zauschneria californica* or *Z. garrettii* which are first to bloom. The color tends to be redder in these than in other species, and the foliage, a variable dusty green. Each day that passes covers the mat with more and more flashing blossoms, like miniature tubes of lipstick, until the whole mass is a scarlet carpet. Each week finds more and more species and cultivars in bloom until hard frost puts an end to the show once and for all.

For many years I despaired of growing zauschnerias in Colorado. After all, when no less authority than Roy Elliott states unequivocally that, "*Zauschneria* is none too hardy; we have found, however, that it will survive about three winters out of four; and in any case the wise gardener will always keep a few cuttings going of any plant with the specific name *californica*." What hope is there of growing plants such as these in Colorado where winter embraces half the year, with frequent near- and sub-zero spells? If gardeners in the British Isles hesitate, who are we to leap in?

As with so many plants new to cultivation in the Rocky Mountain region, I first saw zauschneria in Paul and Mary Maslin's garden in Boulder, Colorado. Paul had obtained a start of *Z. arizonica* from a Denver garden where it had grown for years with no special attention or care. Indeed, the owners had inherited the plant with the garden and didn't know what it was or how it got there. In less than a year the rooted Irishman's layering had formed a large shrub almost a yard tall that opened its first blossoms in mid-September 1977. The flowers of zauschnerias are remarkably uniform in shape and structure. They are typical of hummingbird-pollinated flowers in their red color and tubular shape flaring at the end into a sort of trumpet. The segments are tetramerous, which is to say that petals and sepals come in fours. It resembles a scarlet honeysuckle rather more than any fuchsia in its general shape. Many people locally mistake it for a penstemon, especially now that *Penstemon pinifolius* has gained popularity as a groundcover in Colorado.

By late September, *Z. arizonica* looks like nothing so much as a bush on fire. It suckers modestly at the base and forms eventually a dense tangle of stems. These die down to the base every winter and should be pruned in the spring to let the new growth develop unhampered. Flowers are produced out of the upper leaf axils of all the branches so that, barring an untimely frost, the annual display is positively amazing. It is much larger in leaf and spread than any other zauschneria we have grown, although some of the forms of *Z. californica* ssp. *latifolia* and *Z. californica* var. *californica* will attain considerable size in milder climates. Both of these tend to have somewhat narrower leaves (much narrower in the latter form) and grayer leaf color. It is easy to tell these apart when they are growing together, but there is no denying that some forms of *Z. californica* are very similar to *Z. arizonica*. They have even been combined by some monographers of the genus.

In nature there would be no way to confuse them, for the range of *Z. arizonica* is far to the east, in scattered localities throughout Arizona and

a short way into Mexico. Nowhere is it abundant, apparently. It's surprising that a narrow endemic of the Sonoran desert would prove to be one of the hardiest zauschnerias.

The closest relative is *Z. garrettii* which ranges far to the north in Utah and western Wyoming. This tends to be a smaller plant, although it too has broad leaves, greener and with more prominent toothing than other more westerly zauschnerias. According to Robert Bowman,* the Arizona taxon probably evolved from this northern species. At any rate, it is interesting to note that the two most northerly zauschnerias, *Z. garrettii* and *Z. septentrionalis*, are both diploid in their chromosome number, with closely allied tetraploid taxa occurring far to the south.

Although I have visited Utah on many occasions in the late summer and fall, I have never encountered *Z. garrettii* in the field. It too is apparently not especially common in the wild, with many scattered localities throughout its vast overall range. The form we are growing at Denver Botanic Gardens was collected just south of Jackson Hole, near the Grand Teton National Park, in Wyoming. Here it occurs at subalpine elevations on scree slopes. It has been grown for many years at Casper, Wyoming, a city not noted for mild winters.

Our plants of *Z. garrettii* are perhaps the least showy of the genus at the Rock Alpine Garden. Each flower tends to stay rather closed instead of flaring into the wide open trumpets characteristic of other zauschnerias. In nature there is supposed to be quite a degree of variability in this group, although in the garden it is fairly uniform. Its outstanding characteristics are a rather low habit, early bloom (beginning as early as July here), and tolerance to extremely cold temperatures. I suspect that it could prove a valuable parent for hybridizing hardier zauschnerias. The species itself is probably for only the inveterate collector.

Zauschneria septentrionalis, according to Robert Bowman, is probably the most primitive taxon within the genus. He speculates that the genus likely originated in the Siskiyou Mountains of southern Oregon and northern California where this species currently is found. Whatever its phylogenetic status, this distinctive plant doesn't look the least bit primitive. It has intensely silver foliage which would be worth growing in a garden for its own sake. Very flat growing, it rarely exceeds 4 or 5 inches in height. The species has proven to be one of the hardiest and most adaptable in Colorado gardens, thriving in a variety of sites and exposures. It does like sun, warmth, and a good loam, however. Although it starts to bloom later than most forms of *Z. californica*, by the end of September the whole mat is studded with bright orange flowers.

Rock gardeners are always looking for ways to optimize space. I am not quite sure how the inspiration came to me, but on one hot bank that was gradually being covered by *Z. septentrionalis*, I decided to try planting some tulips for added interest in the spring. A shipment of *Tulipa batalinii* had just arrived from Holland, so I inserted several dozen bulbs here and there among the blooming branches of the zauschneria and proceeded to forget

about the whole matter. Next spring, the flattened thatch of leaves and stems of the zauschneria was studded with this loveliest of tulips. Each year the number of blossoms on both the tulips in the spring and the zauschnerias in the fall has increased. This is a combination to remember. *Z. septentrionalis* was listed for many years by several northwestern nurserymen as *Z. etteri*, a name with no botanical standing.

Zauschneria cana is almost as silvery in color as *Z. septentrionalis*. This is the only other diploid species of *Zauschneria* and is found far to the south of the other two diploid taxa. It is restricted to the coastal region of California south of the Bay Area, and not surprisingly it has shown itself a little tender. I have not succeeded in growing *Z. cana* outside in Colorado, although I take cuttings every fall as Roy Elliott suggests and try them in a different spot each year. Perhaps one day I will find a microclimate to suit this plant or obtain hardier stock. It is well worth any effort, for *Z. cana* is a distinctive and aristocratic plant. It forms an upright shrub that dies down to the ground every winter. Its leaves are the tiniest of any zauschneria, sometimes only a centimeter long on terminal shoots. These leaves are very narrow and sometimes have revolute margins, giving them a coniferous look. Or rather, it would give them such a look if they were not covered so thickly with white hairs. The over-all effect is remarkably similar to a lavender or a white-leaved rosemary. The normal-sized flowers are spectacular against the mass of tiny foliage. Unfortunately, it seems to be one of the last zauschnerias to bloom and is usually frosted here before it can come into full bloom. In Colorado it rarely grows more than a foot in height, but in other gardens it can apparently approach a yard in height. A mature plant in full bloom must be unbelievably attractive.

The most commonly grown, reliable, and vigorous species of *Zauschneria* is *Z. californica*. This species, or rather complex of subspecies, varies so much in habit, height, leaf form, and flower color that it is meaningless to speak of the species without designating cultivars or subspecies. A few generalizations are nevertheless in order. Virtually any form of *Z. californica* appears not only to be hardy, but a potential weed. Most forms spread rapidly enough from suckers to be considered rampant. Do not plant *Z. californica* near any choice alpines. These are groundcovers to blanket slopes by the square yard, not screes by the inch.

Zauschneria californica ssp. *californica* is actually the least encountered form of the species. It may have originated as an autotetraploid of *Z. cana* which it resembles closely in its narrow, revolute, silver leaves and upright habit. It is a little larger in all its parts and rather hardier. It overlaps *Z. cana* in its range, extending a little farther into the Coastal Mountains than the diploid species. I have a superb form of this subspecies with bright red flowers which I obtained from a California nursery. It is as invasive as the weediest subspecies *mexicana* cultivar. It has shown no sign of tenderness here in Colorado, and is somewhat lower than other examples of this taxon.

Zauschneria californica ssp. *latifolia*

Zauschneria californica ssp. *mexicana* has somewhat broader foliage than ssp. *californica* and is also rather less silvery. It is found throughout the coastal ranges of California from the northern part of the state to San Diego. Flower color varies from the deep red commonly grown in gardens to a famous albino usually designated as "var." or "subspecies" *alba*. As floral albinism represents no more variance in a given plant than a few genes, it undoubtedly merits no more than *forma* status, and since all plants in cultivation appear to be remarkably uniform, the white form of *Z. californica* ssp. *mexicana* ought to be known by a cultivar name. I would suggest 'Alba' in single quotes, for the sake of adhering to traditional usage for this plant. As with other forms of *Z. californica* ssp. *mexicana*, this is a low, spreading plant excellent for use as a groundcover.

Z. californica ssp. *latifolia*, found throughout the range of the species, is best known in its many stations throughout the Sierra Nevada. This is usually intermediate in height between *Z. californica* ssp. *mexicana* and *Z. arizonica*. Its foliage is always broader and larger than the other subspecies of *Z. californica*. It generally has a sprawly, amorphous habit, although some forms closely resemble *Z. arizonica* in their more upright, shrubby habit. Unless they are growing side by side, it is difficult to tell some forms apart.

Most forms of *Z. californica* var. *latifolia* have the orange-red flowers typical of so many zauschnerias. A few years ago, however, Daniel Campbell of the University of California at Berkeley Botanical Garden encountered

a bright pink flowered plant in the foothills of the Sierra Nevada in Nevada County that keys out to this subspecies of Z. *californica*. He took several cuttings of this plant which were given to Ron Lutsko, a landscape architect and rare plant nurseryman from Lafayette, California. Ron has distributed cuttings from this original plant to botanic gardens and rock gardeners worldwide under the name *Z. californica* ssp. *latifolia* 'Solidarity Pink' after the Solidarity Mine near which the original plant had been discovered.

Even more exciting, perhaps, are various hybrids between this cultivar and more dwarf forms of zauschneria which Ron has produced recently. He is scrutinizing these in order to select a few for propagation and distribution that would be better rock garden plants than the vigorous pink parent. This represents an exciting color break in this already exciting group of plants. I anticipate that in the near future much greater emphasis will be placed on selecting superior clones among zauschnerias so that the right plant for the right spot will be available. There is such a tremendous range in size and vigor among these plants. It is important to know what their ultimate size will be in order to keep from having too weedy a plant in your garden.

Obviously, the last word on zauschnerias has not yet been uttered. As with so many native American plants, we really have no idea what the true climatic parameters of this wonderful genus are. Can they grow in the Midwest? The Northeast? How reliably will they perform without summer irrigation in the Rocky Mountain states? How much hardier will hybrids prove than their parents in marginal climatic regions?

From our experience in recent years at Denver Botanic Gardens, we can piously affirm that zauschnerias are not only hardy but potential weeds in the Rocky Mountain region. We have grown them in a variety of soils from peaty loams in full sun to the nastiest "Bentonite" clays. They seem to prefer a rather light loam on a sloping bank that captures a maximum of sun. They show no resentment of watering throughout the summer provided that they never stand in stagnant pools of water. I would describe the general response of zauschnerias to cultivation here as roughly comparable to that of penstemons, which is to say that they are virtually indestructible in our climate once they are established.

Zauschnerias are easily grown from seed. Open pollinated seed from a garden containing several species is more than likely to prove to be a hybrid. Several hybrids we have grown have proven so much more adaptable and larger flowered than their parents that I believe this to be a promising avenue to pursue. Surely such beautiful, adaptable native plants cannot remain forever misunderstood.

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* *Botanical Reference*: "Phylogenetic Implications from Cuticular Wax Analyses in *Zauschneria* (Onagraceae)," Robert N. Bowman, 1978. A dissertation submitted in partial satisfaction for a Ph.D. in Botany, University of California in Davis.

Interim to Interim: A Look Both Ways

Having recently spent some late autumn days in the Rocky Mountain precinct, perhaps I ought to beam a warning alert to anybody considering the Second Interim Conference a year down the road: There is going to be very much to see and do, and not all of it on Rocky Mountain peaks and passes.

Colorado has had notable gardens featuring native plants since the days of D. M. Andrews and Kathleen Marriage; more recently, Claude Barr and Frank Rose championed those of the Great Plains and Northern Rockies. New to the total scene is the fine series of plantings at Denver Botanic Gardens, especially those of the rock garden itself, with a concentration of native plants. Nurserymen have been quick to respond to the wants of a new breed of gardeners, and stocks of woody natives are in especially good supply.

Visitors to the Denver Rock Alpine Garden are to be found on all but the meanest of wintery days, for it has become a magnet to this newest garden conscience, an inspiration to both the novice and not-so-novice in the handling of the native bentonite clays as well as in the construction of screes and peat beds -- gardening as nature does it, in the mountains and on the plains.

My own visit proved a manifold joy. The 3-foot snowfall of October had slunk away as snow does in bright sun, without a muddy trace. Days were brisk, yet balmy, if you dressed accordingly. Cheesman Park next door to DBC had its all-but-nude sun worshippers while snowbanks still remained in cold corners and a new sifting of fluffy white came lower and lower on the Front Range. Low sun richly backlighted the auburn of Bradford pears in the heart of the garden and also made shadow patterns on mountain snow scenes from the horizon right down to Boulder's Flatirons.

We saw gardens yet in the building as well as some mature at 20 years and more, some quite modest, others quite ambitious, some aspiring to emulate the rugged mountain terrain, some content at being simply large scree beds, and still others happily reflecting the simplicity of the buffalo grass prairies — and needing to be mowed only once a year!

A catchy new term *xeriscape* is popularizing the idea of the unwatered garden. In one such we found a minimum of expected cacti and yucca, but a wealth of mats and mounds that both clothe and cool the earth: such carpeters as antennarias, *Phlox austromontana, Verbena bipinnatifida,* and the striking ericopsis penstemons. These and many more give a full year of texture and color plus long seasons of flower. Here were also such xeric genera as *Ephedra, Eurotia,* and *Atriplex,* not often seen in cultivation.

Just following this I was in British Columbia for a few days and of course paid a visit to Vancouver's rock gardens and wild gardens and bog gardens and trough gardens that had been such an inspiration to those who came to the First Interim Conference. It is amazing and rewarding to note how all these have developed in the 9 years past. There is not any doubt that the

Rocky Mountain influence and the xeriscape will become part and parcel of rock gardening remembered, following the second Interim.

While the impressive gardens of these two cities are rather alike, at the same time they are not at all so, in spite of growing many of the same plants. Each in its own way, in its own environment, has its own individuality and lessons to bestow. It has been found that Denver's climate is favorable to the "hardiness" of many plants not easily accommodated in a maritime climate. No, not all the lessons, nor all the inspiration, will be found in Rocky Mountain wilds — not by a long shot.

— Virginia Creeper

★ ★ ★

Alpines '86 Conference, Colorado — Reading List #1

If you plan to attend the conference in Colorado next summer, you may wish to review or preview the flora and areas you will visit; if you do not plan to attend, you may wish to know what you are missing. These *Bulletin* articles will help.

Spring 1980, Vol. 38, No. 2	"The Mount Evans Region: Overview" (map)
Summer 1980, Vol. 38, No. 3	"Alpine Plants on Mount Goliath (Pesman Trail, Mount Evans)"
Winter 1981, Vol. 39, No. 1	"Plants for Denver's New Rock Garden"
Summer 1981, Vol. 39, No. 3	"Pikes Peak — And How the Tundra Got There"
Autumn 1981, Vol. 39, No. 4	"Rocky Mountain National Park Overview" (map)
	Book review: annotated Colorado flora booklist
Winter 1982, Vol. 40, No. 1	"The Sandstone Barrens of Uncompahgre Plateau"

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Clay Butte: The Start of a Journey

Thomas Vanderpoel
Barrington, Illinois

The Beartooth Mountains are a high and forbidding range along the Wyoming and Montana border about 50 miles northeast of Yellowstone National Park. Though they have a diverse alpine flora, I have always avoided backpacking there for one reason: the weather. Every time I have even been near the range, it has been nasty. Cold, snow, rain, hailstorms, whichever would be most uncomfortable, occurred. So this time when I awoke from my tent and saw crystal blue skies I was hopeful, if a little suspicious.

I was going to hike up Clay Butte, a mountain with an elevation of about 10,000 feet. What makes this butte so interesting is the limestone rock on the ridge. Whenever I have found limestone, unique and rare plants weren't far behind; Clay Butte was no exception!

I scrambled 1000 feet up a steep, dangerous, and shifting slope, trusting my balance to keep me from scrambling much faster down the slope. When I finally reached the top, I was breathing hard — too much rock gardening and not enough basketball.

The views around me were absolutely stunning. The narrow butte gradually ascended north with parallel basins of tundra on either side hundreds of feet below. To the south towered the Absaroka range and to the north rose those sinister Beartooths. Other peaks combined to create some of the greatest scenery I had ever seen.

After a short walk, I was on the limestone ridge and there the plants rivaled the scenery. Phlox, *Erigeron simplex* and *E. rydbergii, Astragalus kentrophyta, Silene acaulis,* and *Arenaria obtusiloba* were everywhere.

Clay Butte is famous for drabas, and it certainly lived up to its reputation. Eight of ten possible species were found including *Draba incerta, paysonii, densifolia, oligosperma, incana, lonchocarpa, pectinipila,* and *nivalis* var. *brevicauda,* the latter apparently endemic to Clay Butte and its near neighbor.

I was finding new plants and seeds so fast that I was missing the incredible sights around me. A barking coyote caught my attention. It followed warily until I was out of its territory. Two merlins streaked out of the bright blue sky hunting for their unfortunate prey. Black rosy finches were common. Limestone caves bored straight down into the hillside. Never passing up the chance to play Tom Sawyer, I proceeded to toss rocks down the caverns, listening for them to stop falling. It took many seconds. But since there was no Becky Thatcher to rescue, I went on with my search for plants.

Dryas octopetala mixed with *Saxifraga oppositifolia* in one location. *Besseya wyomingensis, Townsendia parryi* and *T. alpigena, Eriogonum ovalifolium,* a super dwarf *Salix rotundifolia, S. arctica, Polemonium viscosum,*

P. pulcherrimum, Senecio canus, S. fremontii, S. dimorphophyllus, S. werneriifolius, Saxifraga caespitosa, Claytonia megarhiza, Erigeron humilis, and the furry *Eritrichium nanum* were all discovered. Two gentians were found as were the rare *Antennaria aromatica, Castilleja nivea,* and *Parrya nudicaulis,* this population apparently disjunct from its source in Alaska.

The ridge alternated between stony fields, turf, rock outcroppings, and soft open soils. Species were sometimes found in only one spot and were then not repeated again on the ridge. Instead, different species took the same niche which made for interesting plant hunting.

After about 2 miles I came to the end of the butte where the drop was very steep. There on a treacherous overhanging crag was the most beautiful plant I had seen: *Penstemon montanus* in full bloom. As I edged out onto the crag to get cuttings, the penstemon seemed to remind me of something. Before I could reflect on this reminder, a dark cloud covered the sun and a cold breeze suddenly blew. It seemed to be an omen, and since I couldn't quite reach the penstemon, I backed away to surer ground. I was disappointed because *P. montanus* is a difficult plant to come by, and I had searched a long time for it. This time I would have to leave it to its cold and unforgiving cliff and hope there would be another chance on a different mountain.

I quickly made my way back, knowing I had witnessed one of the best plant areas in the west and some of the most magnificent scenery possible. I hated to leave the wild and free spaces, but the daylight was dwindling and the Bighorns were waiting. Before I started down, though, I took one look back to remember this butte. There are so many places to visit. I knew I wouldn't return here, but I wanted to give Clay Butte what it deserved: a thumbs up!

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Massachusetts Horticultural Society Award

The Spring 1985 issue of *The Leaflet,* the quarterly publication of the Massachusetts Horticultural Society, reports that a Large Gold Medal was awarded for 1984 "to The American Rock Garden Society, whose dedicated members have for 50 years collected and distributed alpines, wildflowers, and dwarf shrubs, and introduced them to the home garden."

The Massachusetts Horticultural Society has long been a supporter of rock gardening. The American Rock Garden Society is honored to be the recipient of one of its medals.

In the Shadow of Sigunian Shan
Trekking for Plants in Western Sichuan

Dr. Nickolas Nickou
Branford, Connecticut

I was fortunate to be part of a group of nine gathered by Reuben Hatch, a first-class plantsman from Vancouver, Washington, to explore the Zhan Pin Valley in western Sichuan. It is thought that the valley has never been botanized by outsiders. Wilson and Rock had been in the area but never into this particular valley; Wilson explored to the south, Rock to the north.

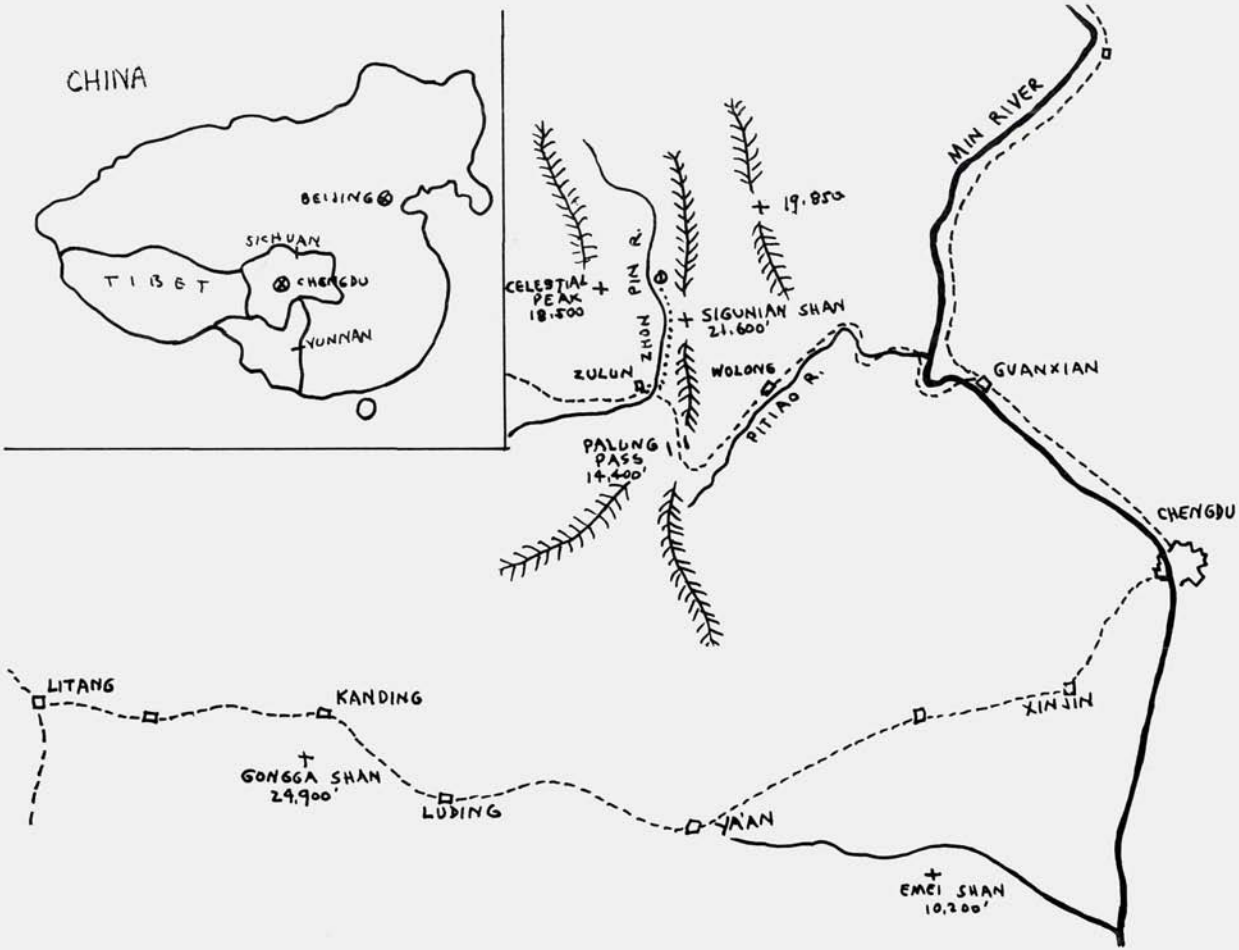
We were not botanists, but we were avid and reasonably well-prepared plant people. Reuben, Jacob Sigg, and I being fairly well-rounded in our interests did an acceptable job as amateurs in identifying most of the material as to family and genus. By late October of 1983 many of the woody plants had lost their leaves; some had identifiable fruits and some were complete mysteries.

A study of Wilson's works was a help as was the listing of plants found to the south in the Kanding area on the trip led by Roy Lancaster two years ago. Some of the plant material was identified easily even down to the species, i.e., *Rosa roxburghii, R. sericea* var. *pteracantha,* and *Lonicera pileata.* Many need further study from written descriptions and others may, alas, remain unknown. Only the unfettered collection of all types of material and a first-rate taxonomist familiar with the area and literature could give an accurate and useful assessment of all of the interesting plants we saw.

All arrangements for the expedition were made by Mountain Travel who took care of transport, staff, and baggage handling, and a good job they did. But they were geared for trekking and were not always able to accede to our requests to leap out of our minibus every time a choice item appeared along the roadside or on a nearby cliff. If we had been allowed to make the number of stops we craved, we could never have reached our scheduled destination each day. Frequent stops were impossible because of road conditions and oncoming or following military or lumber trucks.

Once the trek started and after reaching the base camp, botanizing was to be done at each individual's leisure and guided by each person's interests. Some of the rhododendron people were almost exclusively in pursuit of that wonderful genus. Our resident experts were Warren Berg, Reuben Hatch, and David Goheen. The rest of us were excited by everything green and a lot of things which were brown and withered in late October. The other members of the group were Patricia Berg, Kathryn Green, Janet Lindgren, and Fred Nilsen, all from our great Northwest.

I will not dwell long on Chengdu with its population of millions; as the capital of the province of Sichuan, it has been described before. It has a few attractive wide streets, tortuous side streets with wonderful markets and friend-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ly people. It is rare to see a tourist and any attempt we made to negotiate even a small purchase, either on the street or in a shop, instantly drew a curious, solemn, wide-eyed, but friendly crowd. I stopped to buy a painting at the restored home of a famous poet and attracted an interested group of about twenty which by the end of the transaction had increased to fifty or more. They spoke not; what were they thinking? With the exception of people we saw in the hotel lobby, all the other tourists we saw at points of interest were Asians.

The environs of Chengdu are devoted to a most intensive agriculture. Every arable inch is put to a crop. There is plenty of water for irrigation and there are armies of people in the fields. Mechanization is minimal, but I would suspect that production per acre is high. It is a mild area so each piece of land can be cropped two or three times a year.

When the time came to leave for the mountains, we required a minibus for ourselves and a truck to carry food, equipment, and fuel. We didn't realize it, but the vehicular aspect of the trip was in itself a formidable affair. To go toward the west, toward Tibet, requires the penetration of north-south ridges of high mountains via passes which are generally over 14,000 feet high and on roads which can be a trial. The main road, used for millenia, is The Great Silk Route which goes first to the southwest then due west toward Kanding (Ta Chien Lu) and on toward Lhasa, a journey by vehicle of several more days. The road goes fairly close to Mt. Emei and farther to the west it passes to the north of Mt. Minya Konka.

On the lower slopes of these mountains grow many subtropical plants: species of *Bauhinia* (orchid tree, grown in Florida), *Macuna* (related to the red jade vine), *Camptotheca acuminata*, and others.

We had left Chengdu and proceeded northwest toward Guan Xian through the extensive, fertile plains of western Sichuan. Along the way we picked up the imposing Min River, a branch of the Yangtse, which at the time was full of saw logs cut from the mountains far to the north. Guan Xian is a major irrigation center with an extensive dam complex watering much of Sichuan. In this area we left the plains and started to enter the higher lands. We were following the Pitiao River to Wolong and gaining elevation. Near this junction, beautifully located on a high promontory with a commanding view of several valleys, was an imposing but neglected pagoda. It heralded our entry into some great plant country.

At the lower levels we saw species of *Keteleeria*; the palm *Trachycarpus*; a striking epiphitic-lithophitic fern resembling *Elaphoglossum*, a greenhouse plant for us; *Musa*, up to the 3000-foot level; *Ruscus*, butcher's broom; another epiphitic fern, *Pyrrhosis*; and *Cinnamomum*. Botanizing from the vehicle, I thought the latter was one of the Melastomaceae, possibly *Osbeckia*, but a fortuitous comfort stop helped change my mind; it was *Cinnamomum*. During that particular stop we saw numerous buddleias, two species of *Elscholtzia*, *Cunninghamia*, *Paulownia*, *Hypericum*, and *Hydrangea*. Along the road and near homes and public buildings was *Acer truncatum*, a common tree even

in the city. The chief attraction closer to the ground was the pink *Anemone hupehensis* which was with us from the 2000- to 5000-foot level. It was in full pink bloom and accompanied by an attractive yellow senecio-like plant. With greater elevation there were frequent eye-catching patches of *Rodgersia aesculifolia*. There was much more to see — but only from a moving minibus.

On the way back from the trek we were given about an hour to walk this highly productive area and we added *Cornus controversa*, species of *Tilia, Lonicera, Sorbaria, Sambucus, Philadelphus*, several of *Smilax*, a maple of large shrub-small tree proportions, and atill another maple with cordate leaves and striped bark, possibly *Acer davidii*. Another attractive shrub with 1-inch aronia-like fruits borne singly at present remains a mystery. The few remaining leaves were not typical of the genus. Seen from the minibus and while on foot was the unmistakable *Salix magnifica* with its immense magnolia-like leaves and bright red petioles. It is hardy even in many parts of the northeastern United States as proven by the 4-year-old specimen making a respectable showing in my own garden. There were also many other willows, as well as *Berberis, Cotoneaster*, and *Rosa* species.

Part way up the valley, we spent the night at Wolong, center of the Panda Reserve at 6435 feet. We were still on the Pitiao River with its beautiful falls and rapids. River chats and brown dippers were the common birds to be seen.

Of great interest was the increasing Tibetan presence: the faces, costumes, the architecture of the farmhouses and, when we finally got to Zulun late the next day, the yaks. Yaks carried all of our baggage to the base camp. These ponderous, sure-footed beasts varied in color from black to black and white with even a touch of brown in their coats. They stood quietly while the loads were being adjusted and when unloaded. They are the common beast of burden at the high altitudes and are a symbol of Tibet.

The domestic yak is a smaller relation of the wild, generally all-black yak which can stand as high as 6 feet at the withers and is seen grazing at extremely high elevations, feeding on tough wiry grasses which would not support any other bovine.

A long stay at Wolong, just to explore the Pitiao, I believe, would be highly productive and certainly prove China to be the Mother of Gardens. Its potential for the acquisition of material hardy in temperate gardens is enormous.

After Wolong, the larches (possibly *Larix potaninii*) started to appear. For many miles as we climbed toward the Palung Pass (14,500 feet) the opposite, north-facing side of the valley was covered with literally millions of rhododendrons. What a sight they must be in bloom!

The hand-made, hand-maintained road over the Palung Pass was an impressive engineering feat. But it was the endless miles of elepidote rhododendrons and the shorter, browner, and less obvious lepidotes which interested our rhododendron enthusiasts. Conjectures as to species identity flew animatedly about the minibus. It was safe to stop only a few times when,

unfortunately, the larger-leaved *Rhododendron* species were not always accessible. We had to wait for the trek and base camp to really start our explorations. One of the stops was made inadvertently when the vehicle bogged down in deep mud. We, of course, were up and running, checking every leaf and twig popping above the rubble. It was here that we saw three species of *Meconopsis* loaded with seed at 10,000 feet. In the same area we noted species of *Swertia, Hemiphragma,* prostrate *Juniperus, Lonicera,* and *Cotoneaster.*

Military and lumber trucks constantly pounding along the narrow dirt and stone road which was subject to washouts and rockfalls made it necessary to keep a road crew working at making repairs almost every day. Because of the nature of the terrain, much of the repair work was needed in exactly the same spot week after weary week.

Our stops in the traffic of the narrow road were few. Just getting from Chengdu to Wolong in one day was an effort and getting over the Palung Pass to Zulun before dark was done only by hard, persistent, and at times difficult and dangerous driving. Any passing of another vehicle always seemed a desperate affair. One small truck had a wheel hanging over the edge as it slipped by. The horns are used constantly.

In and about the streams were dippers and redstarts with kestrels over open areas and lammergeiers, the masters of the mountain tops, only at very high elevations. There were also choughs, crows, eagles, and other raptors. The few pheasants gave us only the quickest of views.

The real alpine scenery with high peaks and grazing yaks began after we started down the other side of Palung Pass.

Zulun (10,500 feet), though still in Sichuan, has a chiefly Tibetan population but with a considerable Chinese presence. Unlike what would formerly have been expected, no prayer flags were allowed. Our hostel was reasonably clean. The toilets can only be imagined. The people were, again, very friendly, very curious, and very camera-shy.

When we awakened in Zulun the following morning, we looked down onto the courtyard and a scene of considerable activity. The Tibetans were loading the yaks with our luggage while a good portion of the townspeople looked on.

The expedition members were served a quick breakfast and in a short time we were walking along a road out of town following the pack animals and our Tibetan helpers. I carried a light pack but soon realized that it was going to be a long hard day. I was completely unaware of what lay ahead: wonderful scenery, wonderful plants, but all to be paid for by a maximum of physical effort.

We crossed the bridge to the east side of the Zhan Pin River and walked along its banks all the way to our base camp in the shadow of Sigunian Shan. Scattered trees of *Prunus serrula* with their bright, shining mahogany-colored bark were seen as we passed the last habitations. It was not in evidence later, but in its place we saw *Betula albo-sinensis.*

Our plan was to trek into and explore the Zhan Pin Valley over which towered the Sigunian Shan (Four Sisters Range). While ascending the valley, ahead and to the left towered the dramatically granitic, sharply pyramidal Celestial Peak (18,500 feet). Once established, we were to backtrack to a side stream and follow its valley toward this Chinese Matterhorn. That particular day-long trek was very productive of some choice photography and the discovery of more new plants.

Mt. Sigunian itself is 21,600 feet high. Our base camp was to be at approximately 12,500 feet. We were scheduled to camp along the way so as to enjoy a "leisurely" walk from Zulun and in approximately 5 hours reach our first camp at 11,500 feet and then proceed the next day to the base camp. Not so! Our guide and leader, Bruce Klepinger, a bounding mountain-climbing trekker thought it best to skip the intermediate camp and go directly to base camp so that we could enjoy the valley for 6 rather than 4 days.

David Goheen and I, in our early sixties, found this quite difficult so that the last few miles were done in a painful dyspneic trance, despite the fact that Bruce stayed with us and was very supportive. He cajoled, coaxed, and all but carried us. But, as we topped the last rise and saw the tents arranged on a mountain meadow with a spectacular alpine view, we rather rapidly gained a reasonable state of equanimity.

The trek was difficult but botanically marvelous. We were charmed by the grandeur of the surrounding mountains and awed by the torrential streams and the utterly unpeopled terrain. We traversed numerous habitats which each could bear a full year of study. In particular, the spruce-fir-juniper forest was most productive. We found three species of *Primula* and several liliaceous genera: *Fritillaria, Paris, Polygonatum, Smilacina,* several species of *Allium,* and a *Zigadenus elegans* look-alike.

As a student of plant distribution particularly intrigued by the Pleistocene Shift, I was most interested to see such familiar genera as *Polygonatum* and *Smilacina.* These and many other genera occurring in eastern North America closely resemble similar relations found in parts of Asia. As I have pointed out in an article in the Spring 1974 *Bulletin,* this aspect of the Pleistocene Shift has been thoroughly discussed by Hui-Lin Li.

In areas near streams or of higher humidity, the trees were draped with the lichen usnea (old man's beard). It was like a fairyland. Here and there was a white-trunked birch as well as another birch, *Betula albo-sinensis,* with delightfully papery bark of pink, reddish orange, all the way to mahogany red. The trunks glowed very colorfully when lit from behind by the sun.

The major tree in drier areas was *Hippophae salicifolia* with nicely patterned trunks 1 to 2 feet in diameter, the trees 20 to 30 feet tall. With their dark green linear foliage and abundant clear yellow berries, they were a sight. Closer to the ground were many plants of *Daphne retusa,* 1 to 2 feet tall and equally wide, with some plants in full bloom late in October. There were fields of a minute *Gentiana* species, 1 to 2 inches tall, in full bloom varying from almost white to a rich dark blue. The blossoms were long tubed

with dark stripes on the side. Those leaves which remained were rather tiny, one-eighth inch wide by only three-fourths inch long. In addition, there was a caulescent *Gentianella* species 8 to 10 inches high and of a uniform clear light blue, also a beauty.

We were attracted to some small red berries on drier slopes. They proved to be on *Hemiphragma heterophylla*, a unique plant of the Scrophulariaceae. The first set of roundish leaves three-fourths inch in diameter had almost all dried and fallen off. They were being replaced by tufts of completely different short awl-like leaves. The berries were hard, red, and quite attractive. Despite the fact that we found it at such a high elevation, this is a tender plant for most gardeners and would require alpine house culture.

Needless to say, there were many "mystery" plants, some with minimal parts still above ground bearing enough features to help with identification. There were numerous labiates, several aconitums and delphiniums, and what appeared to be a species of *Morina*, a plant obviously in the Dipsacaceae. We found many plants of *Ligularia wilsonii* and just a few of *L. przwalskii*. At least three species of elepidote rhododendrons were seen. *Rhododendron oreodoxa* was at 10,000 to 11,000 feet; still higher were several species given tentative names, and some fine specimens of *R. bureavioides* were found. Warren Berg found one magnificent form on a jaunt he and I took up one of the side valleys to about the 12,800-foot level. It was one of the finest indumented rhododendrons I have ever seen.

On another day we crossed the river by a bridge that was merely a single log spanning the main stream. Up a tributary course of the river we found a large sorbus with pale pink berries bending over the dry stream bed. It made a grand picture. At the base of the cliffs David Goheen found a herbaceous plant which bore some attractive red berries. It was an exciting find. We saw more plants later to photograph and study. I thought it might be a spigelia relative but labeled it questionable pending further research.

When I returned home and reviewed my notes and researched books of our own native flora, I came upon the genus *Triosteum* in Rickett's *Wild Flowers of the Northeastern United States*. This triggered a consultation with the R. H. S. *Dictionary of Gardening* which mentioned at least two species of *Triosteum* occurring in China, but none fit my sketches and the written description in my field notes. The fortuitous arrival of the Fall 1983 ARGS *Bulletin* resolved the identification. There, pictured on page 172, was *my* plant in Carla Teune's article. It was *Triosteum himalayanum*.

Our more vigorous and high-climbing members found a *Gaultheria* and an empetrum-like plant (but, alas, with capsules rather than berries) and one species of *Ephedra*. At 14,000 feet Jacob Sigg found a dwarf lonicera-like shrub bearing bright orange pendulous berries about three-eighths inch in diameter hanging under a prominent bract or involucre. Although it was not positively identified, from his description this plant would make a fine ornamental.

Several umbellifers were common, particularly a massive plant that was

probably a *Heracleum*. It grew to well over the 12,000-foot level. The old rhizomes, not the current year's growth, were harvested by the Tibetans. The rhizomes were dug out, cut to about 16 inches long, and stacked neatly into large bundles which they carried to town and sold to the Chinese for "medicine." It was the only Tibetan activity in the valley. We could see two or three loads carried down the valley each day.

A number of species of *Sedum* were also found, one of them a rhodiola-like plant with a half-inch-diameter stem of current year's growth that was a continuation of a hard woody stem running on rocks, under mosses and leaf mold for 12 to 18 inches or more. The current year's trunk bore at its end some deciduous stems which supported equally deciduous fine leaves so dry that it was impossible to assess their appearance when at their peak of growth. Further research on returning home indicated that it was probably *Sedum dumulosum*.

In a number of places, particularly of higher humidity, on mossy logs and on the ground itself were masses of rhododendron seedlings all uniform and remarkably free of disease and insect injury. It was almost as if one were looking at a flat of seedlings grown by an avid and expert gardener. In fact, all the rhododendrons we saw were in remarkably good health.

In the same area was an epiphitic fern with thick, sickle-shaped leaves, far more handsome than our well-known polypodys, and found to at least 12,000 feet.

In drier areas there was a most interesting 3-foot-high shrub which bore its verticillate leaves in threes. Its fall color was purplish and it bore sweet small (one-third inch) bright red berries in twos and threes. The berries were borne at the terminal end of the previous year's growth. I still have no idea of its identity. Its fall color alone and its small (one-fourth by 1 inch) leaves would recommend it for the front of the shrub border.

At the elevation of our camp and higher I found a *Hedysarum*, a 12-inch *Fritillaria*, an 18- to 24-inch labiate bearing several tiers of old flowers, several species of *Pedicularis*, a fine *Pyrola*, and a number of unidentified monocots and dicots.

Along the edges of the Zhan Pin River, *Myricaria germanica* in ruddy autumnal splendor grew on sandy gravelly bars as it was also seen in equally colorful bloom along the watercourses of Kashmir 10 years ago.

We were fortunate to have excellent weather while in the highlands. The lowest temperatures at night reached approximately 25° F. One morning we awoke to find 4 inches of snow on the ground and a threatening gray sky. With great trepidation we discussed the anticipated heavier snows and the difficulty of retreat to lower elevations. But Mother Nature was kind. The skies cleared by afternoon and the snow melted away. The last two days at camp and our descent to Zulun were completed under blue skies.

It was still a long walk to Zulun, but we had fresh views for picture taking and found several new plants. Kathryn Green traveled with David Goheen and me and we negotiated the 10 miles downhill together. Kathy adopted

the two oldsters and by coercion, humor, and a firm hand got us out of the mountains intact. This time it was the sight of Zulun in the distance which alleviated all fatigue.

We stayed the night in Zulun. The long drive back to Chengdu was no easier; however, the thought of getting to a hotel for a good hot soak and a more relaxed time (with more oxygen) helped sustain us.

Chengdu is noted for silk embroidery and other arts and crafts, so I managed to complete my Christmas shopping. The paintings I bought, one depicting two species of *Rhododendron* and two magpie-like birds, were beautifully packed in slim wooden boxes and traveled easily and safely.

A highlight of the trip was a visit with Professor Wen-Pei Fang at Sichuan University who kindly gave us autographed copies of his *Icones Plantarum Omiensium*, printed in English and Chinese and lavishly illustrated. Approximately 40 years ago Dr. Fang spent a number of years at Harvard University and at the Arnold Arboretum which he recalled with great pleasure. His son, who was present, is also a botanist and a member of the Sichuan University staff. Dr. Fang insisted on touring with us outside his laboratory building despite the fact that officials wanted him to stay put because he was "too sick." Fragile he was, as well as determined, but not sick. He seemed to enjoy autographing the books and talking with us.

We used chopsticks from the time we landed in Beijing and were never without them until the day we left the same city for home. We "ate Chinese" for 3 weeks. The food was excellent: always innumerable courses, always including peanuts in one form or another, always the rice, the soup, the noodles. And always what I called "chopstick concentration." Some days I was great in my facility and other times it was a struggle. At times I hated to put them down when things were working right. Other times I lost the battle for select morsels from the duck platter because of temporary loss of coordination despite guidance by Warren Berg, a 747 pilot who goes to Tokyo regularly. Still, it was fun. Some of the meals were memorable, but remarkable was the word for our cook who at 12,000 feet, in a small tent, worked miracles — Chinese miracles.

In the cities we were entertained a number of times by members of the Chinese Mountaineering Association, among others. The courses would follow in lengthy delicious succession, but I was unable to match the Chinese in their toasting competitions.

When we had arrived in Beijing in early October, Reuben made reservations to have the famous "Peking Duck" at the world-famous restaurant serving this noted dish. It was necessary to make reservations 3 weeks in advance, so we arranged a date for after our return from the mountains. We all went and ate that superb meal with much appreciation.

It was also during this final stay in Beijing that I had one of the five best meals of my life in a pavilion on the shores of Beihai Lake. The only other guests we saw at that establishment were obviously well-placed Chinese.

Tipping as the western world conceives it has not yet come to China.

Proffered tips were refused and certainly none were ever sought for any service no matter how large or small. A shampoo and a fine haircut in the barber shop of the Jing Jang Hotel in Chengdu cost me $1.25 American. An attempt to surreptitiously leave behind a one juang (65¢) tip was gently and smilingly repulsed by the pleasant, meticulously dressed young barber.

My horticultural impressions of the Beijing area involved, among others, the persimmon, *Diospyrus kaki.* It was the most common fruit sold on the street and in shops. It did not resemble the persimmon we buy in the supermarket but was flatter and had an indentation around its waist. It was grown in extensive groves around and in the city itself. Beijing has a fairly severe winter and I asked myself why their persimmons could not be grown in our Northeast.

In one public garden we saw a near relative, *Diospyrus lotus,* which has smaller fruit. Also in this area were some magnificent specimens of *Pinus bungeana* with their attractive bark exfoliating in a mottled pattern. In the hills around the Great Wall north of Beijing we saw a spectacular display of the brilliant red foliage of *Cotinus coggygria.* It would match any foliage display of our Northeast.

The Great Wall, possibly China's premier attraction, was alive with tourists — Chinese tourists. The section we saw was beautifully maintained and it was a revelation to find that parts of it were a series of high stairs. Thus we found it necessary to use the provided handrail. This dispelled any notions of chariots drawn by horses patrolling the road atop the wall. It was a roadway strictly suited for foot traffic and careful, slow passage in some spots.

Along the city streets the most common trees we saw were *Sophora japonica, Acer truncatum, Gingko biloba,* paulownias, and their own *Ailanthus altissima,* and our tough *Robinia pseudoacacia.* The latter is the fragrant, white-flowered disease-resistant black locust which I have seen also in Turkey, Kashmir, and Greece.

My memories of China are all good ones. The first chance I get I hope to return. I would strongly recommend this trip or a similar one to western Sichuan, but of paramount importance is that the participant get into his own best possible physical condition before leaving home.

★ ★ ★

Fortunately, nature has not known how to design plants of really bad design or really hideous color, so that even if our own taste is deplorable we are often saved by the subtlety and grace of the plants we use.

— Henry Mitchell
from *The Essential Earthman*

Lysimachia Congestiflora
Another of Mount Emei's Treasures

Don L. Jacobs
Decatur, Georgia

[Photograph by Author]

Not all the treasures of sacred Mr. Emei rest in
museums, shrines, or temples.
Not all are associated with some historic dynasty.
Not all are valued in gold or yuans.
Some may be as old as the mountain itself, and
some of more recent genesis.
Some have been described and reversed since Western
explorers first penetrated the eastern approaches
to Tibet, and
some still rest quietly between the slippery, worn
trails with their daily processions of pilgrims
ascending to the 10,000-foot summit for a special
blessing, and, hopefully, a parting of the summit-
clouds long enough to glimpse from whence they
came — a pilgrim's ultimate reward.

Mt. Emei (=Oemei) is better known to botanists for its plants than for its shrines. Several species bear the epithets *omeiana*, or *omeiensis*. As we ascend the mountain, we soon become aware of the climatic and vegetational zonation. In coves along the lower slopes (below 4000 feet), where native vegetation has not been destroyed, we pass through rich, warm-temperate, broad-evergreen forest with giant-leaved *Schefflera, Camphora, Camellia*, oaks, *Daphniphyllum, Michelia*, hollies, maples. In the ground cover are numerous species of *Ardisia, Begonia*, ferns, *Selaginella, Chloranthus*, ginger-lilies. Windmill palms (*Trachycarpus*) are conspicuous on the mid-slopes to about 5500 feet, but most of the original vegetation here has been decimated and replaced by nearly pure stands of cunninghamia and cryptomeria intermixed with dove tree (*Davidia*) often supporting "Kiwi" vines (several species of *Actinidia*) with leaves that resemble those of the davidia. Scattered among these are numerous species of *Viburnum*, dogwoods, privits, tea camellias, and the omnipresent handsome ferns. Here also are numerous rhododendrons, some over 50 feet tall.

At about 7500 feet, cool air, clouds, and lush fir forest take over. Here it is where I would like to have tarried longer. And here, at about 8500 feet, oblivious of the rest of the world, I experienced my only curtailment of freedom of movement during a month in China. Deep in a briary thicket, on a steep slope, and reaching for one more strange plant, I felt a tap on

my shoulder. I turned and was looking into the smiling face of a taller-than-usual young woodsman in the characteristic dark blue jacket and pants. He quietly took my arm and led me back to a trail, apparently concerned about my safety.

Here it was that I had already collected a 3-inch plant capped by a 2-inch cluster of brilliant yellow up-facing bells with red centers, each about three-fourths inch in diameter. The few leaves were ovate and less than an inch long. My first guess was that it was a loosestrife (*Lysimachia*), the most charming I had ever seen. Later research identified it as *L. congestiflora* in the primrose family. The five-volume illustrated flora of China, *Iconographia Cormophytorum Sinicorum*, totaling over 5000 pages printed in Chinese characters, describes thirty-one species of *Lysimachia* compared to about ten, plus several introduced species, for the eastern United States.

I collected several other interesting plants from this site. *Tiarella polyphylla*, a small, compact foam flower was abundant. *Impatiens omeiana* was just beginning to push its beautiful foliage through the forest litter, and it was already early July. The velvety blue-green of its leaves is divided by a golden area along the midrib. Its rhizomes are winter hardy, so speculating on the garden potential of such a tropical-looking colonial plant is truly exciting. *Saururus* sp., a close kin of our lizard's tail, *S. cernuus*, was growing here as a moist-woodland plant. It is a much more handsome plant: more compact, with branches top to bottom; leaves more lustrous and broader heart-shape, acute but blunt-tipped instead of acuminate and sharp-pointed as in our species. The American species is largely restricted to flooded sites, unbranched and leggy below, weakly branched above, somewhat taller, and has less showy flower tails.

The only *Rhododendron* seen flowering on Mt. Emei in early July was a form of *R. ambiguum* with small yellow flowers on a 6-foot shrub. Dr. Fang of Sichuan University separates this as *R. chengshienianum*. It grows near the summit.

Now, as to the little loosestrife plant: it had succumbed by the time I returned to Atlanta, but some of its seeds had matured. These were promptly planted and seven seedlings resulted. They grew rapidly and gave me concern because they were so different from the 3-inch shoots terminating in a rosette of small pubescent leaves and capped by a cluster of yellow bells. The young plants soon began to spread horizontally into loose mats with paired nearly round leaves about 1½ inches long and nearly as broad. They rooted and branched at the nodes. Since each branch turns erect and eventually terminates in small leaves below a flower cluster, the mat suddenly becomes a spectacular yellow pancake as large as 2 feet across and 5 inches high. Erect shoots die to the ground in winter leaving only horizontal rooted stems covered by litter to survive the winter. In their cool mountain home, spring growth begins late but proceeds promptly to short flowering shoots, and this is what I had collected. Under favorable conditions, vigorous horizontal growth may follow flowering as well as precede it. Furthermore, flower-

Lysimachia congestiflora from China

ing is considerably extended by filtered sunlight or half shade, as opposed to full exposure. In rich humusy soil with abundant moisture, the plants attain their full glory, but they are very adaptable to less ideal conditions and at Eco-Gardens have been free of disease and ignored by insect pests and slugs except for a small amount of flower damage.

Among the seven original seedlings, one was unique. This one first stood out because its leaves had a ruddy glow. Then a satiny sheen, absent from the others, was noted. Closer examination revealed that the bristle hairs which covered the leaves of the other six plants were absent from the upper surface of its leaves. It began flowering two weeks later than the others, grew vigorously, and flowered for about 8 weeks instead of the usual 4 weeks. Its flowers are slightly more flared; some are nearly an inch in diameter, whereas five-eighths inch is average. It also differs in having flowers with a red-orange rather than red eye. I am calling this cultivar 'Eco-Dark-Satin.'

During June, July, and August visitors in Eco-Gardens have raised voices in excitement when asking about this immigrant from Mt. Emei. The extent of its hardiness, soil tolerances, and limitations in cultivation are not yet fully known, but I have distributed enough plants to key locations across our country so that vital statistics should soon be available. Here in Georgia it has demonstrated its ability to tolerate summer heat far better than I anticipated. As to winter hardiness, I feel it will survive at least into USDA Zone 6. The importance of a cover of litter or snow to protect against winter desic-

cation was verified here this past winter. On December 26 we experienced a rather devastating sudden drop to 0° F. Plants of many kinds, normally hardy here, were severely damaged or killed outright. Lysimachia plants under pine needle litter were undamaged and began new growth in April. One colony left entirely exposed did not survive. A colony uncovered too early in March began new growth and was killed back by frost. It was slow to recover but caught up and flowered with some of the others.

Yes, hidden treasure still exists, and a gardener's search is endless. Some are still concealed in nearby woodlots, but a special aura follows those from distant places.

★ ★ ★

A Unique Jack-in-the-Pulpit

Several years ago while visiting a garden in Wilton, Connecticut, the owner, Mrs. D. C. French, asked me to examine a plant which she felt was unique. My immediate response was, "Do you have any extra corms?"

Well, she had a few extra but they had been promised to someone else but, "Not to worry, I'll send you some seed later this year." I went into my inner deprived pout, but I think she sensed my discomfiture and brightly added, "But they do come true from seed."

Instant gratification was not for me that year. I don't trust seed to get a reproduction of a unique variant of a species, in this case a Jack-in-the-Pulpit (*Arisaema triphyllum*) which has pronouncedly white-veined leaves. However, all of the seedlings developed into exact facsimilies of their parent. It *did* come true from seed. I have distributed seed to several of our members and they have had the same results. Seed is being submitted to the ARGS seed exchange for the first time this year.

Whether there will be further variations of this character in the future, I don't know; time will tell. Perusal by and advice from an expert will determine whether or not this variant warrants a special name.

— Nickolas Nickou
Branford, Connecticut

Amateur's Luck and Other Small Miracles

Anne D. Toumey
Wexford, Pennsylvania

Well, yes, I could have marigolds, petunias, and red salvia, but I don't. Instead I pursue the elusive: *Meconopsis betonicifolia, Centaurea achtarovii, Moltkia petraea.* And it's not because the marigolds, petunias, et al. are common. After all, what is more common than violets and daisies? And I wouldn't want to live through a spring without violets or a summer without daisies. Somehow for me the marigolds, etc., just don't have the charm these wildlings do. And we can all have them. I think the Good Lord must have said, "I'm going to keep *Eritrichium nanum* up here close to me and you lowlanders can have violets and daisies in abundance." Thank God.

Violets in the rock garden, daisies in the perennial garden. They are abundant. It's not that I don't want them there; it's just that I want some other things as well. I am simply unable to throw them away so I spend hours taking them out and transplanting them to some far reaches of the woods or meadow. People tell me that I'll reach a certain age when I'll be able to throw them over my shoulders with abandon and get down to the real work in the garden. That day hasn't arrived.

As for meconopsis, I get seed every year. They germinate and then they fizzle out when I transplant them. I have a place reserved for them: the right location, the right soil mix a la Virginia Briggs who must be singularly blessed in that she has had them in bloom. It's not just a picture postcard dream. I've seen them in bloom. I know whereof I dream. Now I know (theoretically) that I can't raise meconopsis, after all I garden in western Pennsylvania. Masochistically I order it year after year. And moltkia. I've seen it in Olga Duchacova's garden in Prague. I've had fresh seed from Olga, but no luck. Fortunately for me, my obsession for moltkia has not reached the heights of my obsession for meconopsis.

Ah, *Centaurea achtarovii.* I'm crazy about centaurea, the annual and the perennial *C. montana,* so when I read Zdenek Zvolanek's article on *C. achtarovii,* I knew I wanted it. This is a post card dream. I've never seen the plant. It is from central Europe, and I'd never seen it in the seed exchange so I needed not agonize over it. And then lo and behold a couple of years ago it did appear in the seed exchange. There it was in print. Accessible. I sent for it, never dreaming that I would get it. After all, everyone must want it. I got it. Who sent the seed in? Surely it must have been someone from Czechoslovakia. By golly, it was from Maryland. Maybe it is possible to raise it here. I wrote to the donor for cultural instructions. He accommodatingly wrote back. It germinated. One seed, that is. He had said it was hard to germinate. It lived. It lived through the second year. It was ready to bloom just as I was about to take off for Asheville. Rotten luck. I got back and it had

bloomed. It was a common silene. Why do we go through this, this self-inflicted pain? If it's ever on the seed list again, I'll ask for it. After all, I've become a glutton for punishment. This madness, maybe close to a divine madness, is the hallmark of a rock gardener.

But then there was lewisia. Didn't think I had a ghost of a chance with it, but I sent for it. What would one more failure matter? I was becoming hardened to it. *Lewisia cotyledon,* probably the easiest of the bunch. I didn't pay much attention to it. After all, I didn't have that much hope for it. And then one day that pan was alive with green. It grew and grew. I had to put it in another tray and then another tray and another one. It went on and on. I was running out of trays, potting soil, space, and patience. Every one of those seeds must have lived. I was giving them away. I planted thirty in the garden, I'd run out of crevices. One of the plants is the size of a plate and the others aren't bad. Someone told me they wouldn't bloom until the third year, but this bunch had never heard about it. They bloomed the first year. They bloomed and bloomed. Well, as fools rush in, I began to think of lewisia as a cinch. Wouldn't you? Last February I planted seeds of *L. cotyledon, L. nevadensis, L. columbiana,* and *L. tweedyi.* Why not? So what do I have from this batch of seeds? Three cotyledons, a couple of nevadensis, and one tweedyi. It just goes to show you — pride and all that.

I guess the desire for these elusive devils outweighs the pain of disappointment. Hope springs eternal, and Lord knows we rock gardeners have to have hope above and beyond the usual. At the same time last February, I planted *Soldanella hungarica* and S. *montana,* another couple of elusive plants I yearn for. Well, they are out in the cold frame now, and they aren't silene. I know by their leaves that they are soldanella. Not in great abundance, but there are at least five in each pot. Compared to what I thought I'd get, zero, this is a plus and another miracle born of hope.

I've had *Anchusa caespitosa* in the scree (and the scree is another story) for 5 years. Every spring I was elated that it was still alive. One time that little plant had twenty-five blossoms. Honestly. Another dream come true.

Well, with all those failures, you might surmise that I have little but violets in the rock garden. Not so. There are hundreds of primulas, well, it seems like hundreds: 'Inshriach Hybrid,' *P. bulleyana, P. japonica, P. vialli, P. frondosa, P. sieboldii.* Of course, I'd like *P. reidii* and *P. nutans,* maybe someday. I have gentians, campanula, draba, phlox, saxifraga, a whole host of things, and about every small bulb Lyons carries. So there is happiness in the rock garden despite many unfulfilled dreams. After all, at one time the things that are there now were impossible dreams.

And then there are other miracles in the garden. Last year an absolutely glorious iris appeared from out of nowhere. I have *Iris versicolor,* but this iris was even more fragile and delicate. I keyed it out — *I. prismatica.* I had never seen it before. And it wasn't in the garden or anywhere near where I would have planted it. It was at the end of the driveway in wicked soil and nowhere near water where it is said to grow. It doesn't belong in this area

so it couldn't have been a bird unless it was some long distance flyer way off course. Though birds have spread *I. versicolor* from the original plant I have in all sorts of places, the nearest stands of versicolor that I know of are 80 miles to the north (where I got my plant) and 80 miles to the east at F. L. Wright's Falling Waters. Wouldn't you know. Back to *I. prismatica*: its tall stem, its delicate flower, its reed-like leaves all in perfect scale, I can find only one word for it — elegant. Not one of those fat bloated dwarf iris that look like miniature bearded iris, a hybrid horrible. I saw prismatica later in the Shinn garden in Asheville growing in a wet ditch, pristine, elegant. None of my friends have it so I didn't get it from them. It haunts me. I have no way to explain its presence. It remains a lovely mystery and a miracle for me.

We could all have marigolds, petunias, and red salvia, but a rock gardener reaches for something finer, and life wavers between the depth of depression and the heights of elation. Madness, yes, a lovely madness.

Postscript

There's a castilleja in my garden! I say it with the same sense of wonder and delight as the Thurber man who saw the unicorn in his garden eating his roses. Now who of us wouldn't give up a few roses for a unicorn in his garden or better yet, a castilleja?

I think I can say, without fear of contradiction, that it is probably the only *Castilleja coccinea* growing in western Pennsylvania. Unlike the *Iris prismatica*, for which I can find no explanation, there might be an answer to the castilleja — a miracle, nonetheless. And it isn't really in the garden.

About 3 years ago I had the fields brushhogged to keep out the encroaching forest. One section was badly scarred from this operation, and I rototilled it and planted a package of wildflowers, possibly Parks, but I'm not sure. From this planting I got Shasta daisies (*Chrysanthemum maximum*, not the native *C. leucanthemum*), *Coreopsis lanceolata*, linum, *Centaurea cyanus*, *Impatiens balsamina* (for heaven's sakes), portulaca, and *Silene armeria*. Quite a cast for a wildflower bunch! But it was colorful. The next year it was Shasta daisies and coreopsis. You could count on it for cut flowers. And this year — Shasta daisies, coreopsis, and one castilleja. Of course, who knows what the packager meant by "wild"? Possibly they put in a few seeds of castilleja to justify calling the package "wildflowers." I certainly never transplanted it nor knowingly planted the seeds. But there it is growing in poor, dry soil. Some gardener's instinct stilled my hand from pulling the weeds among which it grows. I know better than to transplant it. Those who want to see it will just have to trample through the meadow weeds to see it. It's worth it.

And then there is something else. Four years ago I transplanted a single *Polygala paucifolia* from a woods in New York State where it was growing in abundance. Since it didn't bloom the next year I gave it up for lost. And then last year, something pink appeared and this year it bloomed again and is spreading. I planted it near *Mitchella repens*, though I don't remember

it growing near it. I think it is the original plant I transplanted and maybe it just took a while for it to become acclimated to this spot, or it could have come from seeds of the original plant. I'm not sure. I shall plant seeds this fall in an attempt to clear up this mystery. Moral: Leave the weeds alone — they are sitting pretty.

Request

It has taken 3 years for the castilleja to germinate and flower. I see that Wayne Roderick sent in seeds of *C. applegatei* for the last seed exchange so he must be growing it. Also Janet Logg of Ravensdale, Washington, sent in collected seeds of *C. miniata* from Chinook Pass, Washington. I wonder if Janet has planted those seeds or if anyone else has planted the seeds which she sent in. It would be interesting to see what results they have.

I will plant the seeds from my castilleja as soon as they are ripe in the fall. Now how will I know when they are ripe? And should I cut down the field in the fall or let it alone? The field has not been cut down since I planted the so-called wildflowers. If anyone has tips on keeping this plant alive, I would like to hear from you.

Growing Castilleja Miniata

I have had *Castilleja miniata* in the garden for at least 15 years and consider it to be one of the easiest and most trouble-free plants that I grow. No pest bothers it, it blooms all summer when color in the alpine garden is scarce, and hummingbirds visit it daily, an added bonus.

If you can grow *Raoulia australis*, you can grow *C. miniata*. Here is how to do it. Get some seed. That is no problem here in the Northwest as it grows from sea level to mountain top and puts out copious, easily collectible seed. If you live where it doesn't grow, you will find it offered in our seed exchange occasionally. Rub the seed into the mat of *R. australis*.

That is all there is to it. You will probably have flowering size plants by late summer. Next year try some seed in other mat-type plants such as *Parahebe canescens* or *Penstemon rupicola*. You will probably get some more plants and soon you will be able to harvest your own seed.

I leave half of the seed to sow itself naturally and am finding plants appearing in surprising places. But it never threatens its companion and I would welcome many more than the twenty or so plants that I have.

I stress trying to grow it first in *R. australis* because that is where I can count on it appearing and where it seems to grow on most vigorously. Happy gardening!

— Florence Free
Seattle, Washington

[Editor's Note: Florence Free's "how to" on growing castilleja came in the same mail as Anne Toumey's postscript. Another small miracle?]

In Search of Primula Allionii

Paul H. Halladin
Geneva, Switzerland

Some of us have that urge to start the season earlier than we should. So, in February, I searched through old bulletins and journals of the various societies for some place to make an early start and also for some plant on which to focus, one that had not been thoroughly covered by someone else. The plant that really stood out was *Primula allionii*, one of the earliest to bloom.

I have always been curious about the locations and forms of *P. allionii* in its natural habitat, information that seems to be scarce. It is one of the first alpine house plants that I started with 10 years ago and has long been a favorite. Anyone who has tried this primula knows only too well how easy it seems in the United States if a few rules are followed. The usual procedure is to keep all water off the leaves, be meticulous in grooming (very prompt removal of anything that could induce rot or fungus growth such as spent blossoms and damaged leaves), repotting with fresh compost every 2 years, good air circulation, no strong sunlight May through September (in New Jersey), and good light (no deep shade) during the entire year. This formula has provided large, healthy, and floriferous plants. Yet those of us familiar with this plant know only too well also how quickly fungal growth can consume an entire rosette or an entire pot of rosettes even during what we believe is a dry spell with low humidity. What highly unusual conditions must prevail in order to allow this temperamental plant to exist in the wild.

Various writers and plantsmen who have either noted where this primula grows or have visited the area where it is believed to be located all, without exception, mention visiting later in the year than its normal blossoming time assumed to be February through March in the wild.

So with this in mind, Margaret and I decided to visit the Maritime Alps of southern France in early March. Not knowing a thing about snow conditions, we planned to play it safe and make a base at Menton right on the coast, mindful of the fact that the French Riviera had suffered its worst cold spell in 30 years including the most snow in one day, 12-14 inches in February. We were somewhat apprehensive at first, but quickly realized after landing at Nice airport (temperature 50 ° F.) that we did not have to worry about snow during the few days we would be there.

Renting a car was easy; English was spoken and special off-season discounts were offered. The drive from the airport to Menton (25 minutes) was mostly on superhighway. We noticed damage on much of the roadside flora. Palms and succulents were particularly hard hit by the extreme cold. Menton proved to be a clean, attractive town right on the French-Italian border. Noteworthy also was the unexpected steepness of the hills immediately on the coast.

Our first day's venture was to see how far we could go on the mountain

road before reaching snow. The principal road north to the reputed *P. allionii* area follows various valleys and traverses several passes. The most common blossoming plant between Menton and Sospel was the yellow mimosa tree which was in evidence near the coast and on hills facing the coast. The first pass, Col de Castillon (706 meters or almost 2600 feet), about 20 minutes from Menton, ended in a short tunnel through the mountain and emerged to a magnificent view of the snow-capped peaks beyond Sospel. The valleys between this pass and Sospel were devoid of flowers at this time of year. We could not look anywhere in this area without noticing the endless rock and stone retaining walls on countless terraces cut into the hillsides. Those of us who fancy ourselves as rock wall builders can only speculate about the man-years needed to build so many walls.

Eureka! The first patch of floral color that would interest a rock gardener. On the Col de Brouis (about 2800 feet) just past Sospel, a large clump of a dark blue *Viola* species was spotted by the side of the road on a south-facing slope, and very close to it was a solitary *Muscari atlanticum*. The temperature here was about 40° F.

Nearly 5 miles farther north from this last pass, we entered the Gorge of Saorge, a spectacular canyon cut through the mountains by the action of the Roya River. The cliffs towered so steeply above the road and river that it seemed in places as if the sides were about to touch. The river at this point was a raging torrent swollen by melt waters of the distant snow-covered mountains. Now I could see why this area might be a habitat for *P. allionii*. The cliffs were stratified to an extreme from river level all the way to the top, layers ranging from a few inches to as much as 3 feet. Many of the stratification layers were broken apart in such a way that large overhangs remained, forming ideal locations for our sought-after plant.

Many interesting plants grew in this multitude of crevices including ferns, sedums, primulas, and many saxifrages. The only one we could easily identify was *Saxifraga cuneifolia*. Nothing was in flower except one unidentifiable euphorbia. Nowhere could we spot *P. allionii*. Of course, it was difficult to examine the cliffs above about 20 feet. They were unclimbable except with special equipment and great courage — or foolhardiness, and we had neglected to bring binoculars, having no idea that the cliffs would be so steep.

Farther up this canyon at a bend in the road we sighted a village half way up the precipice (it was almost like a mirage), sitting on the edge of a sheer dropoff in the soft Provencal sun. It seemed as is if we were suddenly transported to another world. Here were 15th century houses in a fortified village considered impregnable in its day. The village, Saorge, is one of the lesser-known historical monuments of France. The only way into the village was over a hazardous road with many switchbacks and sheer dropoffs on one side.

The next canyon, about 3 miles beyond Saorge village, was the Gorge de Berghe, another deep cut made by the Roya River. It was a dark, forbidding place because of the very dark red and purple cliffs streaked with a varicolored green stone. Far fewer crevices and consequently less vegeta-

tion here. Off to one side we caught a glimpse of an ancient bridge partially in ruins marking the old road through this area, a location that we did not have time to explore.

The last canyon before St. Dalmas was the Gorge des Paganin characterized by beige and off-white stone cliffs with red and gray-green streaks and still less stratification. There was even less vegetation here than in the previous canyon. It was an unlikely place for *P. allionii* although we stopped and continued our search everywhere accessible.

St. Dalmas de Tende is certainly more convenient than Menton as a base for plant hunting in the Maritime Alps; it is so much closer to the action. A careful driver must add 3 hours round trip to the day if staying in Menton, 3 hours that could be enjoyed observing plants instead of negotiating corkscrew turns in the road. We had not intended to stay in St. Dalmas because we did not want to do extensive driving in snow on unknown roads. As it turned out, our fears were unfounded; the first snow of substance was encounted about 5 miles above St. Dalmas at an elevations of over 3000 feet near the Italian border. As the road had been cleared, we decided to go through the long tunnel to the Italian side. The Col de Tende was above the tunnel and not open. Here it was still deep winter at about 5800 feet. A foot of fresh snow had fallen overnight on top of a snow pack of over 2 feet. We quickly made an about face and returned to St. Dalmas.

The side roads near St. Dalmas appeared to be the only promising places to look at this early a date. On one roadside near Morignole village at about 3000 feet, we spotted a large sloping rock ledge in a shady spot just covered with *Hepatica nobilis* in bloom. One striking plant with larger than normal flowers of a very dark blue had fourteen open blossoms and about ten unopened. From both a botanic and photographic point of view, this turned out to be the high point of the trip.

Just after sighting the hepatica, we emerged into a large clearing. The sun broke through the clouds and not a soul was in sight, so we decided to enjoy the solitude and have lunch alongside a murmuring brook with snow-covered peaks off to one side, their lower levels bedecked with evergreen forests, and a sweeping vista of a small narrow valley just beginning to green. The sun warmed us just enough to make us slightly drowsy to the point of dreaming about the hugh cushions of *P. allionii* that Farrer wrote about to be found in a distant grotto in full bloom, pink flowers dancing in a light breeze.

After lunch, and coming back to reality, we took the road to Casterine and the Vallon des Merveilles (15,000-year-old inscriptions on the rock faces), but the road was closed above 4000 feet due to recent heavy snows. As far as we could go, we noted that rock faces in many places were bare of snow and new growth had started on many of the crevice plants even though over 12 inches of snow lay in level places. On the day we were there the temperature was about 38 ° F., but ice-covered puddles in shady spots indicated that nighttime temperatures went well below freezing. *P. allionii* bloomed in my New Jersey alpine house in January within a temperature range of 32 ° to

45° F., so it is entirely possible that it could be blooming here in March in a protected spot on a bare rock face inaccessible to anyone without skis or snowshoes.

On another day we headed toward St. Martin Vesubie over the Col de Turini, a pass at 4000 feet and totally covered with snow aside from the cleared road. Just past the Col, we entered the Gorge de Paion, another massive canyon. Here the canyon widened considerably in places and the lower areas were covered with the blue form of *Hepatica nobilis* and the yellow *Primula vulgaris*, a lovely combination interspersed with an occasional group of blue *Viola* species and *Helleborus foetidus* just starting to bloom.

St. Martin Vesubie is another attractive town which could also be used as a base. We tried the road to the Madonne de la Fenestre, reputed to be a good location for flowers, but could proceed no farther than the 3500-foot level due to deep snow on the road. Nothing in bloom here. We did not attempt to take the road to Boreon, another good location, because it lay still farther north at a higher elevation and most certainly had even more snow cover.

On the way back from St. Martin, we drove through the Gorge de Vesubie, another deep canyon. Nothing was in flower and it was very difficult to identify anything without binoculars because most of the plants were on the rock face on the opposite side of the Vesubie River and there was no way to cross. This canyon is noted for the extreme instability of the stratified layers of rock. Slate-like layers were separated by what looked like natural layers of large gravel, pieces of which were constantly falling down, sometimes even onto the road.

So our mission was unsuccessful. We did not see one *Primula allionii* in or out of flower. It is quite possible, if it still exists in these mountains, that it resides in remote or high inaccessible places and not on the low hot limestones as indicated by Farrer. I carefully read all the literature available to me regarding this area and noted that other plantsmen were far more knowledgeable about the area and certainly more agile than I recently admitted that they were unable to find the plant. Another curious thing about this plant is the manner in which it is mentioned in various articles. Many writers go into great detail regarding fine points about *other* plants, about minute differences in such things as leaf shape, form, and size. It strikes me as quite odd indeed that no article I have read since 1975 mentioning *P. allionii* as being in this area goes into any detail whatsoever regarding leaf size and shape, rosette proximity to adjoining rosettes, trunk or stem length and thickness, or type of habitat, either affirming or disaffirming Farrer's descriptions. If the plant was actually seen, it would seem to me that such information would be of interest, even if the plant was not observed in flower. This is a mystery that either deserves an answer or calls for more exploratory trips to determine whether or not *P. allionii* still exists in nature.

Now that we realize how attractive this area is with its great variety of terrain and its diverse flora, we will make every attempt to return to resume the search for this elusive plant.

Construction of a Rock Garden

Karl H. Grieshaber
Bronx, New York

[Drawings by Author]

The form and style we select for the rock garden and the way it is actually constructed will depend in part on the inclination and physical ability of the person who will cultivate the garden. The form and style may also, in part, depend on the natural features of the location and the building materials available locally.

We will discuss applications of the many principles we have examined and see how those which have proved practical and successful may be used in building rock gardens. After all, a garden is not nature, but a work of art, something artificially created which merely makes use of natural means to form a different but always harmonic picture. A rock garden is always a work of art just because in it nature is outwitted and plants are made to grow in places where under normal circumstances they might grow only very sparsely or not at all. We want to attain in a rock garden visual effects which nature would never venture on its own.

Visualizing the Effect

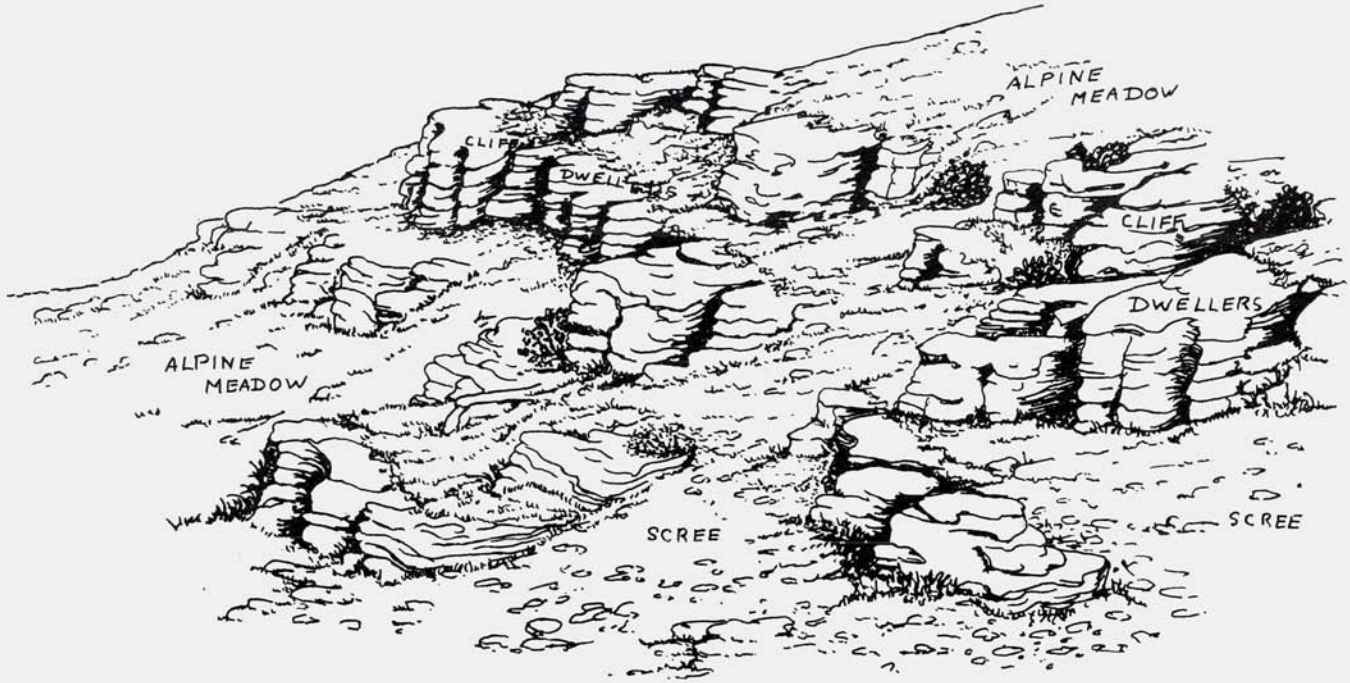
This is the first and most fundamental consideration in the construction. The landscape architect, a master of materials, always keeps in mind the plants' value to the composition at maturity. The amateur, without this knowledge, often becomes bewildered by the very abundance from which to choose. He decides in desperation that one thing will do as well as another.

To this same principle belongs the choice of style most suitable to the locality and the proper scale of the design when applied to the ground. The interrelation of mass, texture, form, color, and detail is the product of the rock gardener's degree of adherence to the principles of composition. The garden must relate to the human scale — no miniature Matterhorns. We have to reduce the overpowering size of the universe and bring it down to cozier proportions in a small private world. A rock garden must have a definite unity of design with both esthetic and utilitarian functions.

Siting the Garden

The particular effect to be developed in any rock garden depends largely upon the portion of the property that is used. Quite often the first choice for a rock garden is that part not needed for anything else, or the one that has proven difficult to tie into the general design of the total landscape. This is not always the best spot.

Generally speaking, most rock gardens can be classified under formal and unformal or naturalistic. With that in mind we must visualize which kind will fit best into the existing landscape. The formal style is usually best close



Rock garden constructed on a slope with weathered limestone rocks.

to the house, sometimes in the form of terraced walls, raised beds, or as wide steps with enough open space for plants.

Observe the exposure of the sun at different parts of the day on various portions of the property. A southern exposure ensures the maximum amount of sunlight to sun-loving plants; however, it also exposes them to prolonged summer heat and to the injurious effects of alternate freezing and thawing in winter. A northern or even an eastern exposure is generally preferable for plant growth. Consider also the prevailing wind direction.

Avoid a site which cannot be properly drained. Bear in mind that though alpines grow under widely differing aspects and conditions, they do not tolerate sour, badly drained soil. Neither will they do well when exposed to drought and cutting winds. Do not build a rock garden for alpines under overhanging branches of trees or between buildings where drafts and shade will discomfort the plants growing there.

A factor which may indirectly affect the choice of a location is the provision of water for pools and streams. Only in a few gardens is natural water found so, if this feature is desired, it must usually be introduced artificially. A rock garden doesn't necessarily need a watercourse, but water surely enhances its character.

In selecting a spot for the future rock garden, there is one point which may seem of secondary importance but is really quite essential. That is having easy access for the bulky and often heavy material and equipment which will be required. Disregarding this point could add considerably to the cost of construction, to say nothing of damage done to lawns or other parts of the garden.

No work should be started before a suitable position has been selected and it has been decided from which direction the garden is most likely to be viewed. Foreground and background are part of the composition and have to be considered. Objects of a distracting nature should be eliminated or concealed to prevent the eye from straying away from the garden itself. The immediate foreground of a hillside planting should be part of the design. Here is a perfect place for an alpine lawn with stepping stones set among the plants for easy access to the rock outcropping at the rear.

The Stone Material

In constructing a naturalistic rock garden the aim is to select and arrange rocks in such a manner that each appears as a natural deposit which has not been disturbed by man. A rock garden should not be a meaningless jumble of rocks showing drill marks and glaring or newly exposed surfaces, nor should the rocks be set up in unnatural and unstable positions. The best stone for use in the rock garden is that of local origin. The porousness of the stone is a factor of considerable importance because the stone stores moisture and is always cool underground. Alpine plants like a situation where they can press their roots as close as possible to the side of a rock. In this respect, the sandstones and limestones are the best material for rock gardens. Granite may also be used but is hard and gives an acid reaction to the soil.

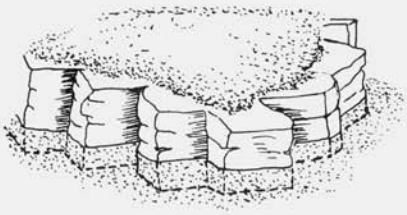
Quartz is too hard and too conspicuous.

As a rule, unstratified stone such as granite, trap, glacial boulders, and conglomerate weather in round forms. These boulders and hardheads can never be made into a stratified outcropping; their place is on a rugged, boulder-strewn slope, some scattered, others in dense steep clusters. On a rather steep slope the rock should give the effect of a stream-cut bank where the softer material has been eroded away to expose the outcropping boulders. Stream valleys and pond areas are excellent locations for such arrangements of rock. The size of the rocks used should be determined by the scale of the garden. Large rocks give the effect of strength; however, a big boulder in a small garden makes the area seem smaller. Too many small rocks give an artificial and weak effect. Only weathered boulders should be selected, and these should be embedded in the soil to their weathered line or their widest circumference.

Another good way to use unmatched rounded stone is in a moraine. Glaciers transported erratic blocks from a distance millenia ago. The action of frost, rain, and wind changed the surface of granite, feldspar, and porphyry blocks so that everything on them is round, smoothed off, and dome shaped. No one block matches the others.

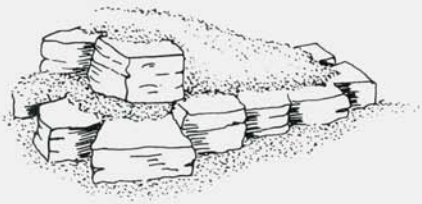
Moraine: the debris of earth and rocks collected in ridges or heaps by a glacier.

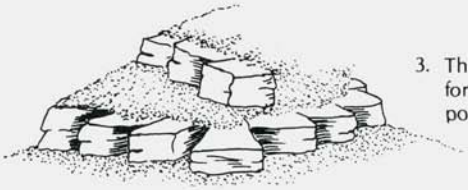
The individual character of each rock must be considered when constructing a moraine. Erratic blocks cannot be used in the same way as matching stratified or sedimentary stone. They must be embedded in the soil as if they had been resting there unmoved since the glacier left them stranded. To do this is not an easy task. The individual rocks should all face in a common main direction. If the moraine is resting against a stone wall in a small garden, then the main direction should be parallel to the wall. The joints between the rocks should be diagonal to this main direction. Or a rock garden of such blocks may be built on a gentle mound evenly sloped from side to side. Here the largest rock should dominate. The surface of the rocks must all be given the same inclined plane to the lowest point. This order in the direction is an architectonic device to avoid confusion.



1. The first planting pocket is completed. The rocks have only one-third to one-fourth of their heights in the ground and each one is slightly overlapping the rock behind.

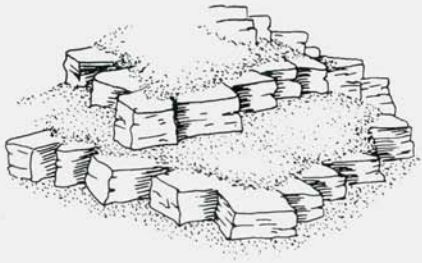
2. Beginning of the next elevation. The corner rock touches the rock below.





3. The baseline of the next elevation forms a somewhat triangular planting pocket in the lower bed.

4. The procession of stepped planting pockets can be continued indefinitely.



When building with stratified stones such as limestone and sandstone, it is necessary to understand its stratification and jointing in order to obtain a natural effect. The lines of stratification are traceable throughout the entire formation. In the garden it does not matter at what angle the strata are inclined so long as this angle is kept throughout. A backward tilt has the advantage of holding some of the rainfall and conducting it into the soil. With some ingenuity it is possible with this kind of stone to provide a variety of crevices and planting spots, some in full sun, others where it is cool and shaded behind a bend or larger rock.

A limestone or sandstone formation is suitable for most informal garden effects. Where this type of stone occurs naturally, it would be difficult to find better or easier material for the garden, especially if it is porous, irregular in form, and already weathered to a rather neutral color. Avoid, however, sandstones which disintegrate easily and mellow limestones which crumble away because of atmospheric action.

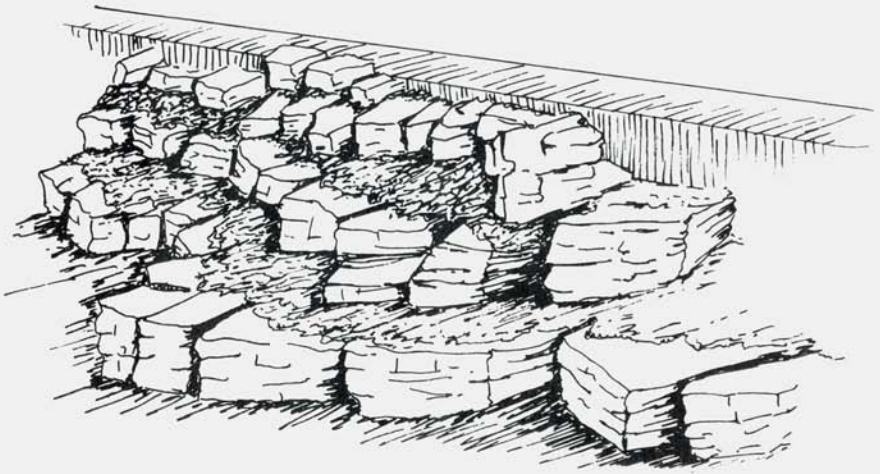
Hillocks and Stone Knolls

The remains of many old artificial hillocks, planted with alpines, can still be seen in botanical gardens in Europe. Even today many collectors of alpine plants insist that this is the most practical construction for growing and displaying plants that are all native to the same habitat. This is especially important for gardens and institutions which consider it their obligation to educate the public and stimulate interest in wild plants. To do this, public and botanical gardens often find it most practical to arrange stony hillocks to correspond to the mountainous areas of a continent or the mountain ranges of a country. Alpine plants can then be distributed on the hillocks representing the mountains of their native habitat. Moreover, this method of display presents an opportunity to select for the individual knolls the kind of stone that corresponds to the terrain of the mountains being represented. Thus the layout offers all at the same time an orographic, geognostic, and phytogeographic picture of a mountain or district to the student and lover of alpines. For all of their good points, however, the knolls or hillocks will always look somewhat artificial.

Depending on the form and space available and the goals aspired to in growing alpines, some modifications are necessary if this concept is to be tried in the home garden. If the space for the rock garden happens to be along a low wall or the face of a cliff or on the side of an excavated bank of soil, it would be suitable to pile up the rocks in such a manner as to form elongated terraces running parallel to the wall or cliff or bank and rising like stairs up to the top.

On the other hand, hillocks that are freestanding and constructed as modified terraced pyramids have the advantage of being conveniently accessible from all sides and presenting a multitude of suitable planting exposures for a wider variety of plants. As a rule, it is better to build several stone knolls close together, each with steep sides, rather than a single large mountain of boulders. This makes it easy to walk around each hillock to care for and examine the plants. It also means that during winter the plants are less exposed to drying winds and that drifting snow may fill the hollows between the knolls, or the hollows can be filled with snow and covered with branches. These snow-filled depressions resemble the little snow valleys we find in the mountains where snow remains even into early summer. This is precisely what we try to accomplish, to prolong the rest period as far into spring as possible.

The traditional hillocks had a height of not more than 6 feet and a base not more than 4 feet in diameter. These towering stone knolls provided



Terraced rock garden against a wall.

enough crevices for cliff dwellers, gave maximum drainage, and raised the plants close to the eye level of the observer. The visitor stood within the garden, surrounded on all sides by an alpine environment, rather than looking from outside at the garden which faced in only one direction. In addition, most of these hillocks had a built-in mist or sprinkler system which could be turned on to simulate the clouds and fog of the mountains, thus keeping the plants cool and moist in hot, dry weather.

The old-fashioned stone knolls are ideal for growing plants but will always look artificial.

The construction of the individual stone knolls and the way in which they are interrelated is important. A knoll should never give the appearance of a piece of dry wall, nor should the rocks be scattered carelessly on top of a soil mound. The natural effect of erosion caused by water and wind, rather than a man-made construction, is what we are striving for here. Such a garden, of course, will look more natural when built on a slope or, even better, on two opposite slopes with a small stream running between them. However, if done skillfully, level ground will do as well. In that case the construction should be designed more or less as a sunken garden with the excavated soil piled at the top of the sides.

In building these knolls it is important that their lower layers and interiors be made of material through which excess water can trickle and drain. Broken rock of all sizes, fragments of brick, and sand should be alternated with a peat moss and loam mixture to form strata-like layers. This nucleus should then be faced with weathered stone, quarried stone, or rocks from old stone walls in such a way that many little niches, clefts, crevices, and terraces are formed on the sides of each hillock. Even here natural strata must be kept in mind. All rocks should be set in a common main direction and all tilt at the same angle.

Since some alpine plants from higher elevations grow naturally in very meager soil, it is advantageous to work a heather soil into the upper part of the knoll. This soil is a dry humus and can be made of decomposed pine needles mixed with a gritty sand. Otherwise a good stone or gravel mulch is sufficient.

★ ★ ★

Book Reviews

Collectors' Alpines by Royton E. Heath, Reprint, Timber Press, Beaverton, Oregon. $39.95.

Rock Plants for Small Gardens by Royton E. Heath, Reprint, Collingridge Books, available in United States through ISBS, Portland, Oregon, $17.95.

The titles of these two books are somewhat deceptive. The first, *Collectors' Alpines,* is subtitled *Their Cultivation in Frames and Alpine Houses.* This does inform the reader that the focus of the book will be on plants in containers, their management and care. The title of the second book, *Rock Plants for Small Gardens,* is the one that most led me astray. I had recently had a Scottish visitor who after touring gardens in Connecticut and Massachusetts with me plaintively asked, "Has no one in America a small garden, then?" Now with this book I thought to find out what she expected in a garden. I was wrong; the book refers to really tiny gardens, those made

in troughs and sinks. As both books are by the same author, it becomes obvious that plants in pans, pots, troughs, and containers have a special fascination for him.

The two books dovetail very neatly; there is not as much overlap in information as I expected. Both begin with structural details. *Collectors' Alpines* has all the information on siting and building an alpine house that a resident of Great Britain or other areas of moderate climate could want. Individual gardeners must consider that conditions in America vary too widely for any general prescription to apply everywhere. It is interesting that Mr. Heath suggests the building of a water tank within the alpine house. This is designed to collect rain water which would be free of chlorination and would not be hard or chalky. Current solar greenhouse design often calls for just this sort of "thermal mass" to help with heating. In colder, often overcast climates, back-up heating would undoubtedly be essential even in a solar greenhouse.

Having moved past the Cadillac — the alpine house — we now come to all sorts of frames: alpine, propagating, plunge beds, etc. It is Mr. Heath's contention that frames should be raised off the ground to prevent stooping and back fatigue. In moderate climates or if not used in winter in harsher climates, raised frames become a valuable adjunct to the alpine house.

Rock Plants for Small Gardens, which is a much slimmer volume, has a brief discussion of troughs and sinks and details of their construction, accompanied by very clear, detailed line drawings. Mention is made of conditioning cement troughs, drainage, preparation of various soil mixes, and placement of rocks. Here, *Collectors' Alpines* is clearly superior. It gives much more information on watering, feeding, record keeping, pests and diseases, and showing. It becomes clear that the major aim of growing plants in pots is for the purpose of exhibiting the plants. A trough can have the esthetic appeal of a miniature landscape; a bonsai can be a feature in the garden. Pots enable the gardener to grow, as individual specimens, plants that may or may not be difficult in the garden, but will certainly be easier to transport.

The remainder of both books is devoted to plant material. Both begin with dwarf conifers. The information is presented in the form of a brief paragraph on each plant. The descriptions in *Rock Plants for Small Gardens* vary widely in quality, from a fairly complete verbal portrait to a couple of sentences. *Collectors' Alpines* does a more thorough job. In both cases it is well to remember that this is a brief section devoted to a large and complex group of plants which have had entire books written about them.

And now to the information that is the gardener's *raison d'etre* — the rock plants. And here the books vary widely in style. *Rock Plants for Small Gardens,* the slender volume, presents the information in tabular form. Data is presented in columns under such headings as name of plant, suitability, type, position and protection, and propagation. Very good. This is a way to describe plants briefly and in a very small amount of space. But, even more space was saved by using a letter of the alphabet to refer to an entire chunk of information. For example, under *Suitability,* the possibilities are

A, B, or C. A is the code for "This signifies that the plant can be grown in sinks, troughs, pans or scree beds." Not too bad, except that the other columns may also contain an A, B, or C with different meanings. In the column for *Soils*, one is referred back to Chapter 2, not the opening pages of the descriptive list. I found this very distracting, causing me to flip back and forth through the book for each plant I looked up. If symbols must be used, it is easier to remember their meaning if peculiar to each heading and if keyed conveniently.

The hefty tome, *Collectors' Alpines*, without the constraints of limited space, provides the information in a more comprehensible fashion. The genus heading is in bold type with the plant family in parentheses next to it. Below is a brief sentence giving a reason for cultivation (flowering in winter, for example). Next, under the heading *Cultivation* are details of compost, drainage, watering, shading. Following this is *Propagation* with recommendations on when to divide if appropriate, when to sow seed in which compost, and repotting. After these preliminaries come the individual species described with their salient points. This is my preference for format when such information is given.

Both books conclude with an index. In this case, the slimmer book has the larger index.

These are both volumes on a particular specialty within alpine rock gardening. *Collectors' Alpines*, however, could have application to general rock gardening particularly for plant descriptions and propagation. The two books do go well together. I would consider them as interesting additions to a personal library. — J. G.

★ ★ ★

Omnium-Gatherum

Hardiness What does it really mean? This is an exciting, expanding, barrier-breaking concept. Let's explore it in the pages of the *Bulletin*. Share with us, even through short notes, the benefit of your thought, experience, and research.

Correspondence If you haven't heard from me and you think that you should have done so, you are probably right. I am having a difficult time getting everything done on all fronts. Let me explain. There are two parts to this problem. First is the fact that correspondence has piled up faster than I can answer it. This is an age-old problem and there are at least two classic ways of attacking it. One is to plod along answering letters chronologically, offending everyone by always being late until either catching up or giving up. Another is to call a halt in trying to answer old mail and start anew

by responding to each fresh piece of mail as it comes in. This system puts you in ever deeper trouble with those unfortunates who wrote before the cut-off date, but the new people think you are most marvelously prompt — until the system overloads again. Then there are two sets of irate folk. I have tried both ways. Neither works.

The second part of the problem involves the post office. First there was the Seattle address, then the mail was held for the Walnut Street address, then the small P.O. box that squished all of the mail, and now finally a large P.O. drawer. (My current temporary address in Port Townsend is P.O. Box 1371. The Walnut address works too but takes an extra day.) All of this choppy sea was navigated with little apparent difficulty until a substitute sorter, thinking he was being helpful, held all of my mail that he came across because he remembered that it was being held when he was first on duty. At that time my bills were still going to the Seattle address with the exception of the electricity bill (that's another story) and though the mail flow did seem a bit strange and sporadic, there was nothing concrete missing that I could pin a definite suspicion on. One day I opened the drawer at the post office and it was FULL. The sub sorter's secret stash had been discovered and I was awash in mail, very old mail, months-old mail.

There you have it. I tell you all this not by way of excuse to get me off the hook, but as an explanation and a comfort to those of you who may be waiting and wondering and feeling unloved and neglected. Not so. I appreciate each one of you and your letters. I'll be answering again as soon as the *Bulletin* is safely at the printer's and I've had a good night's sleep.

Tolerance Direct feedback about the *Bulletin* has been positive and constructive. There have been good suggestions for improvement. Please keep it coming. Where tolerance comes in, or lack of it, is with the Fettered-thinking Fusser. This species is noted for underground grumblings about anything that does not exactly fit his limited preferences and view of the world. He is often heard to object (something he does constantly and well) to articles about plants he can't grow, to attention paid to or books that apply to climates other than his own, to pieces on plants that he doesn't like, to travel articles that might open his eyes to the customs and joys to be found in other parts of the world, to articles about new propagating techniques he won't try and to new gardening ideas that couldn't possibly be any good. Poor dear, what a lot of good stuff he misses.

★ ★ ★

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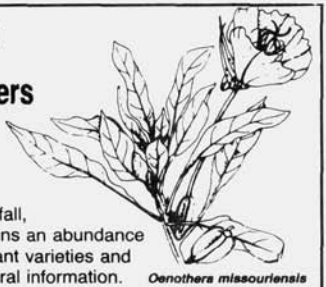

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