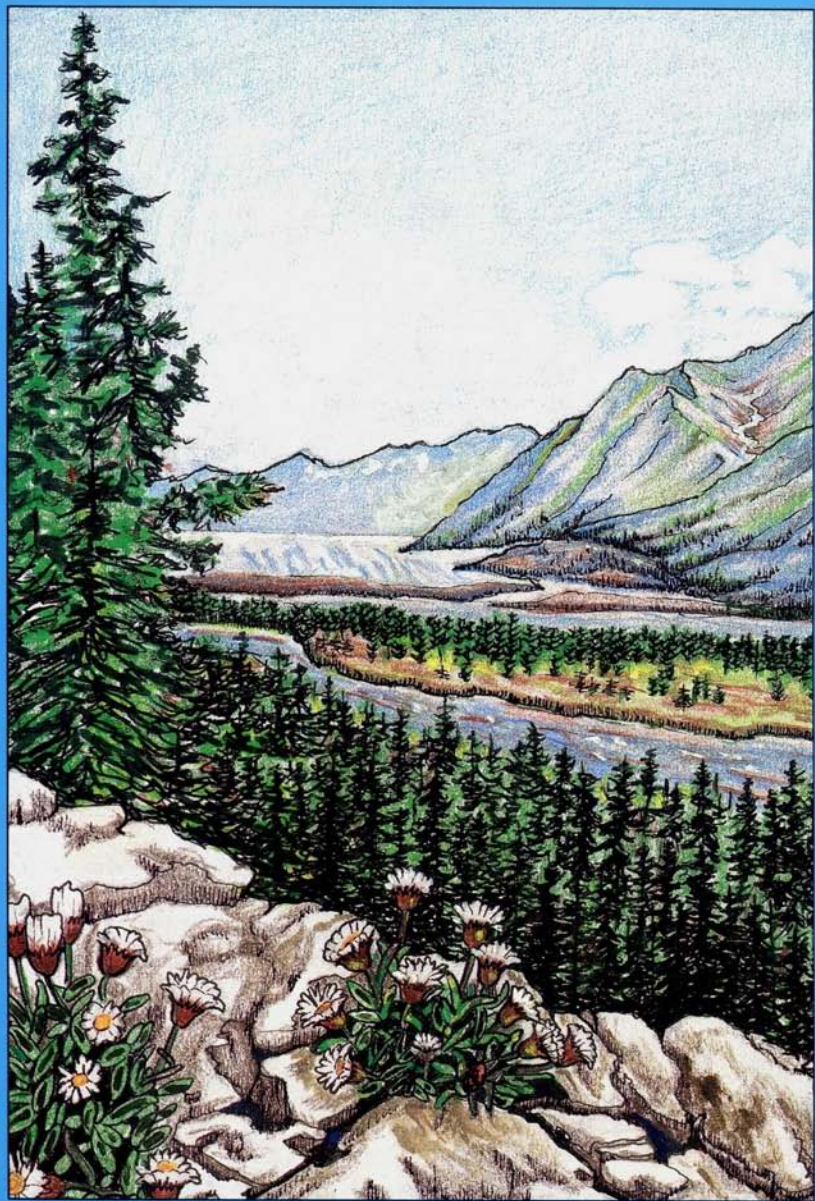


ROCK GARDEN



QUARTERLY

VOLUME 58 NUMBER 1

WINTER 2000

COVER: *Eriophorum scheuchzeri*
by Rhonda Williams, Wasilla, Alaska

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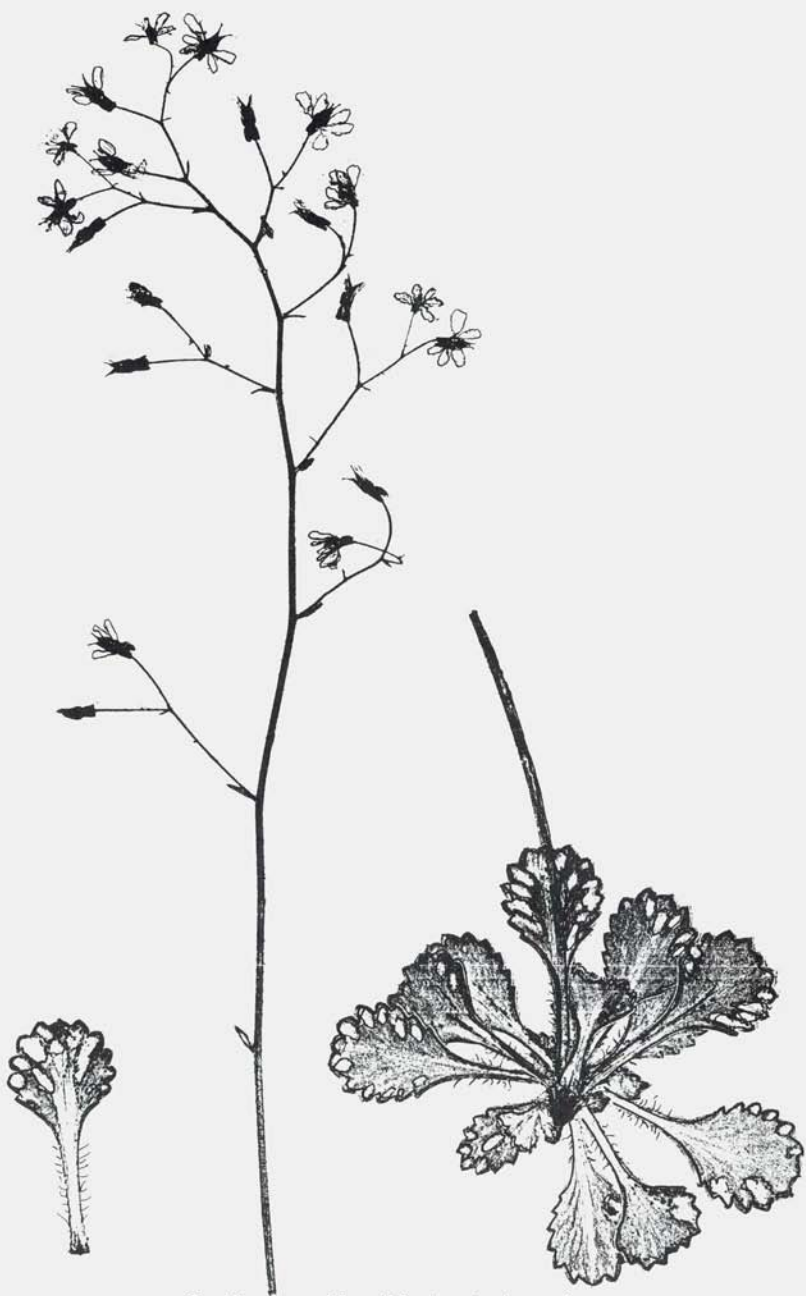
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Saxifraga x urbiium 'Variegata Aurea'
gold spots on the leaves

IN PRAISE OF LEAFY SAXIFRAGES

by Eva Gallagher

Once you start to get serious about rock gardening you quickly become familiar with that great alpine family, the saxifrages. These include the mossy types with their crowded rosettes of multi-dissected leaves that spread into bright green mats just an inch or so high. There are also the encrusted types with strap-shaped leaves edged in white lime; these form stiff, leathery rosettes of various sizes. Representatives from both of these sections are readily available from nurseries and make great rock garden plants, as they are relatively easy to grow. Then there are the elite species—members of the *kabschia* and *engleria* groups. These form tight, low hummocks of hard, often sharp-pointed leaves and are valued for their huge, short-stemmed flowers in hues of white, pink, or yellow. You have to look to specialist nurseries for these, as they require harder-to-provide conditions, such as a scree or trough.

But there are about a dozen more sections in the genus *Saxifraga*, many with choice species. It is some of these species that I lump into what I here call the leafy saxifrages. The only way to obtain many of them is to grow them

from seed, either from the exchanges or from specialist collectors. Although their flowers may not be as showy as those from the better-known groups, they are all beautiful foliage plants, and some of them are evergreen. The value of these plants increases exponentially once you realize that several are candidates for dry shade.

The best known of the “leafies” belong to the section *Gymnoptera* (as classified in the 1992 version of *Saxifrages—A Gardener’s Guide to the Genus*, by Winton Harding). The four species and three main hybrids in this section are all endemic to Europe. These are all easy to grow with fleshy, loose, evergreen rosettes that throw high panicles of red-speckled, white flowers on scapes that can be up to 40 cm high. They are indifferent as to soil type and will actually thrive in deep shade. Like many of the saxifrages, this group hybridizes freely, so it is difficult to know if plants grown from seed produced in cultivation are the real species. To add to the confusion, leaf shape can vary, and so many nurseries mislabel them.

The most commonly grown plant from this group is *S. x urbium*, the true

"London pride." It is unknown in the wild and is a very old hybrid of garden origin (*S. umbrosa* x *S. spathularis*). It was first mentioned in 1697 in Britain. The common name has always intrigued me, and I only recently learned of its origin. In the book, *Saxifrages, The Complete Cultivars and Hybrids*, recently put out by the Saxifrage Society, Martyn is quoted in 1785: [The plant] "was formerly much shown out at windows and balconies in smoky towns, and hence with its being really beautiful had the names of London pride and none-so-pretty. Other names used were St. Patrick's cabbage, pretty Nancy, prattling Parnel, and prince's feather. Evidently it was a great favorite during the early Industrial Revolution! Unfortunately, it is often listed in books and nurseries as *S. umbrosa*. (The true *S. umbrosa* is rare in cultivation and is native to the Pyrenees.) Until recently, I have not seen it in Ontario, although it is still a common plant in Great Britain, where it is valued for its ability to grow in dry shade. The fact that some American gardening books list its hardiness as zone 6 or even 7 may have discouraged gardeners in eastern Canada. I have found it perfectly hardy, apart from a tendency to winter burn if exposed to sun. Even then it recovers readily once new growth begins in the spring.

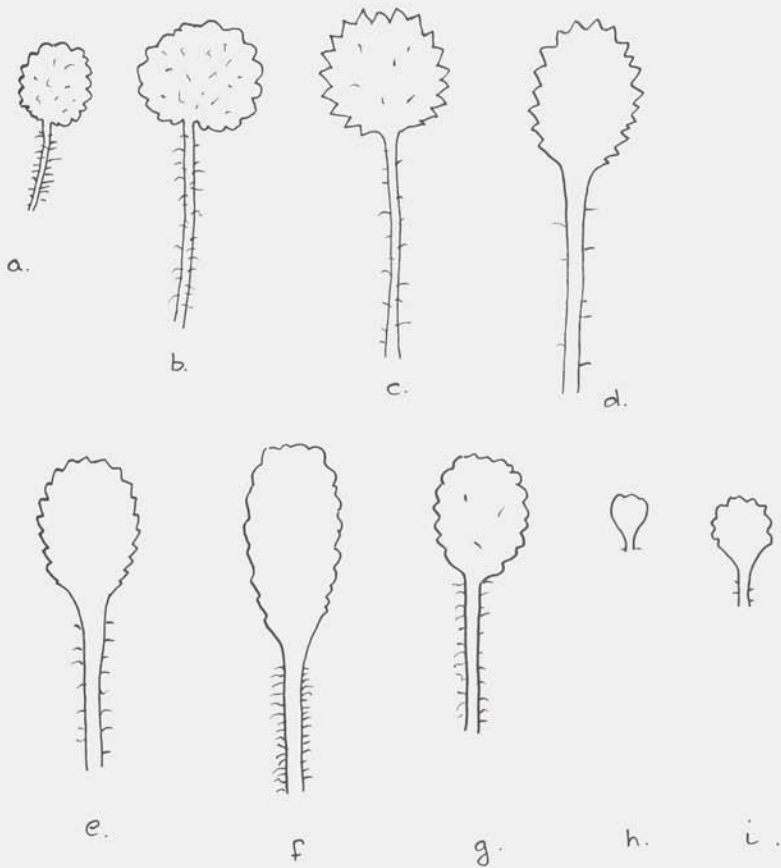
I grew my London Pride from seed, and it seems to have come true, matching the description in *A Manual of Saxifrages*, by Webb and Gornall. The panicle of white flowers is tinged pink due to the pink anthers, pink ovaries, and red dots on the petals. It is spreading at a moderate rate in sandy, acid soil. I recently bought a cultivar, *S. x urbium* 'Aureopunctata', which has smaller leaves that are splashed and dotted yellow, giving it a rather untidy appearance.

Another very worthwhile plant that

I bought was labeled *S. 'Primuloides'*. This is supposedly a more compact form of the true *S. urbium*. After spending hours with a magnifying glass and reference books, I have concluded that it must be mislabeled. It more closely matches the description and picture of *S. cuneifolia* in Webb and Gornall. The leaves are a much darker green and are about one-sixth the size of those of *S. x urbium*. They also have no hairs on the petiole, and the flowers have a yellowish-green ovary rather than a pink one. As well, the flower panicle on a greenish brown stem is rather sparse—all characteristics of *S. cuneifolia*. As this cultivar was distributed by a large wholesale nursery there are probably a lot of mislabeled plants out there. The true *S. urbium* var. *primuloides* has reddish stems and lots of red speckles on the petals and pinkish ovaries. Selections *S. urbium* var. *primuloides* 'Clarence Elliot' and 'Walter Inwerson' sound extremely attractive, both with 15-cm tall, red stems, and pink flowers that perform best on a starvation diet. Regrettably, they remain on my wish list.

Saxifraga spathularis, seed of which I managed to get last year, has now formed rosettes 3–5 cm across in a shady peat bed. It looks to be a promising variation with longer-petioled leaves. Typically, seedlings in this section take a year or more to get going and form full-sized rosettes. A natural hybrid, *S. x geum* (*S. umbrosa* x *S. hirsuta*, found in the Pyrenees) was also grown from seed and is again slightly different, with flowers stalks and flowers more strongly red-colored. It does not seem to be doing too well in a dry, shady crevice, but this could be as one of the parents is *S. hirsuta*, the one species in this group which really likes dampish conditions. Species in this leathery-rosetted group

Leaf Outlines of Saxifrages in Section *Gymnopera*



- a. *Saxifraga hirsuta* ssp. *paucicrenata*—hairs on leaves and stems
 b. *S. hirsuta* ssp. *hirsuta*—hairs on leaves and stems
 c. *S. x polita* (*S. hirsuta* x *S. spathularis*)—just a few hairs on leaf
 d. *S. spathularis*
 e. *S. x urbium*
 f. *S. umbrosa*
 g. *S. x geum* (*S. hirsuta* x *S. umbrosa*)—just a few hairs on leaf
 h. *S. cuneifolia* ssp. *cuneifolia*
 i. h. *S. cuneifolia* ssp. *robusta*

Modified from *A Manual of Saxifrages*, Webb & Gornall

that are still on my search list include the true *S. urbium*, *S. hirsuta*, and *S. x polita* (*S. hirsuta* x *S. spathularis*), the latter a natural hybrid found in Ireland.

All three species in the Section *Cotylea* sound as if they would be worthwhile to grow. All are evergreen and native to mountain woods in Europe and Asia. As they tend to require more moisture than the London pride group, they are a bit more difficult to please. *Saxifraga rotundifolia* has fleshy, rounded, coarsely-lobed leaves with characteristic, long petioles. Flower stalks can be up to 50 cm high and are white, with the typical, delicate red speckling. If happy, it forms thick clumps. I have another plant which is a more compact version of *S. rotundifolia*, with thicker, less serrated leaves. This thrives in drier conditions, sometimes drying out, but recovering once moisture is again available. It could be *S. taygetea*, except that it lacks the numerous pur-

ple-red spots on the petals. Both these plants are easy from seed, germinating at warm temperatures. The third species, *S. coriifolia*, though not very different from *S. rotundifolia*, unfortunately never seems to be offered in the exchanges.

Saxifraga granulata is the only species of saxifrage that was consistently so labeled by 16th and 17th century botanists. As such, it is the type species for the genus—the species around which the whole concept of the saxifrage genus gradually formed. It is a dainty plant with small, long-stalked, kidney-shaped leaves that are thin-textured but hairy. The flower scape can be up to 20 cm high, and the flowers are quite large and pure white (rarely with red veins). This plant has a very widespread distribution in Europe, being found in grassy meadows (the common name is meadow saxifrage), as well as on dry, rocky ground. In my garden it seems to appreciate semi-shade. It is deciduous,

going dormant after flowering. The species name refers to the brown bulbils that are formed at the base of the plant and that can be used for propagation. Seed also germinates readily at warm temperatures. In Britain, there is a double form that sounds wonderful, but so far I have not found this plant in Canada.

A closely related species is *S. sibirica*, which has large, drooping flowers. Farrer writes that it "has a delicate daintiness of charm." It is not common in cultivation and is rarely seen in the exchanges, but I managed to receive some seed from the Scottish Rock Garden



Saxifraga fortunei
'*Rubrifolia*'

Club this year. The seeds started to germinate in about three weeks, while still being stratified in the refrigerator. Unfortunately, I waited too long to transplant the crowded seedlings, and they damped off. Hopefully, another batch of seed will be available again from the exchanges.

A very different plant with striking, deciduous foliage is *Saxifraga manschuriensis*, a native of the Far East. The large, round leaves on 15-cm stalks are very lustrous and look like they have been cut out by pinking shears. It blooms in the late summer and early fall with thick, fuzzy, 30-cm stems ending in a bold cluster of flowers, tinged a peachy pink due to the orange anthers and stigmas. It does best in damp conditions, even boggy ones, so it is great for the edge of a water garden, though it will survive ordinary garden conditions if in shade. There it may wilt during periods of drought, but recovers quickly once watered. My latest batch of plants came from seed collected in Siberia by Dr. Berkutenko. Due perhaps to our early spring, they have started to bloom at the beginning of August, about three weeks earlier than normal. Hopefully, they will keep repeating this trait, as the more usual September bloom can be spoiled by frosts. This again is easy from seed, germinating at warm temperatures.

Eastern North America also has some leafy species. Locally in the Ottawa Valley, *S. virginensis* grows under a variety of conditions—from shady cliff seepages to rocky pastures—but all habitats that

dry out completely in the summer. In mid-May, its white flowers on thick, fuzzy stalks produce a delicate, white haze that hovers above the previous year's dead roadside grasses. Its small, ground-hugging rosettes of thick, wedge-shaped leaves often disappear once the plant sets seed, so it appears to be a biennial. However, it self-seeds readily around the parent. A close relation is *S. pennsylvanica*—probably the largest saxifrage. Although the greenish flowers with orange anthers are insignificant, the plant has strong architectural appeal. The leaves form a flattened rosette up to 30 cm across, with leaves covered in soft, gray fuzz. In June, it sends up a sturdy, fuzzy flower stalk that can be up to a meter tall. There are varieties with supposedly cleaner white flowers, and these would be worth looking for. After having the plants for half a dozen or so years in my boggy area, I finally relegated them to the compost heap to make room for better plants. If I had



*Saxifraga
manschuriensis*

more space, I would have kept them—though Farrer derides this species as “wild and coarse and undeserving.”

My latest acquisitions are two species from the Irregulares Section, a group of leafy saxifrages from eastern Asia that are summer- and fall-blooming. The flowers have characteristic longer, lower flower petals that give them an orchid-like appearance. They are shade-loving and have a reputation for being not very hardy—but I can't resist trying. From the houseplant section of the local nursery I bought *S. stolonifera* (syn. *S. sarmen-tosa*), commonly called mother-of-thousands. In Japan it inhabits shady cliffs and mossy rocks at low altitudes. Phillips and Rix in their book *Perennials*, Vols. I and II, give it a hardiness rating of -10°C . Mine made it through this past winter under natural leaf fall at the base of a north-facing wall. It is now sending out long runners and colonizing the top of nearby moss-covered rocks. Avoid the variegated or red-leaved forms, as these are less hardy.

The second species I bought in a gallon pot out West in Vancouver last year, and I lugged it home on the airplane. It came labeled as *S. cortusifolia* 'Rubrifolia'. Unfortunately, *S. cortusifolia* is reputed to be a very late bloomer—September—so I may never get to see the graceful flower panicles. However, the foliage is truly spectacular, and even though Phillips and Rix rate it at -15°C , it came through this past winter, again in a protected position at the base of a north wall, with flying colors—dark red stems and leaves burnished into shades of dark green, light bronze, mahogany, and even a true dark red. Dying leaves turn a brilliant orange.

The latest edition of *Saxifrages*, by Winton Harding, now has this classified as *S. fortunei* 'Rubrifolia', so I

guess that I will have to change the label. There are several additional tantalizing cultivars of this species out there—'Mt. Nachi' and 'Minima', which are supposedly much reduced forms. If only there was a way to obtain them in Canada! This plant extends from Japan to Manchuria, so perhaps even hardier clones will eventually be brought into cultivation.

My success regards hardiness has encouraged me to look for others in this section—such as *S. nipponica*, *S. rufescens*, and *S. veitchiana*—all worth trying, as they bloom in the summer. In addition, several others are still not in cultivation—so there is much to look forward to! As seeds are so infrequently available, I urge anyone growing these plants to make an extra effort to collect seeds and send them to the exchanges.

There are many other saxifrages that would be worth trying, such as *S. aquatica*, a large species with handsome, buttercup leaves; and the delightful brook saxifrage, *S. odontoloma* (syn. *S. punctata* ssp. *arguta*) from the western coastal mountains—yet again hardly ever seen.

If you see some of the above species in the exchanges, give them a try, and you may end up as I have—an unabashed leafy saxifrage addict.

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A Manual of Saxifrages, Webb and Gornall. 1989. Timber Press:Portland, OR and Christopher Helm(Publishers) Ltd: Bromley, Kent, England.

Saxifrages—A Gardener's Guide to the Genus, by Winton Harding. 1992 ed. Alpine Garden Society: Pershore, England.

Eva Gallagher gardens in Deep River, Ontario.

ALLIUMS FOR LATE SUMMER & FALL BLOOM

by Mark McDonough

In August, the number of *Allium* species in bloom increases, particularly among the rhizomatous onions. A garden full of late summer onions is a sea of lavender and pink drumsticks lasting for many weeks well into September, soft and comforting, harmonious colors. The following onions were at their peak mid-August:

✿ *Allium nutans* (photo, p. 14)—From Siberia, this is a bold species with heavy, strap-like leaves, typically gray and twisting, but green foliage types exist too. Stubby, nodding buds turn upright into large, packed globes of lavender, pink, or white blooms. The species is closely allied to the ubiquitous *A. senescens*, and like that species, grows from horizontal iris-like rhizomes often showing above soil level. The plant is extremely variable...some are lovely, and others are mediocre.

I was given a good, robust form with white flowers but found that the older foliage yellows while the flowers appear, which make the plant look messy. More recently I received another robust form, with exceptionally broad (to 1" wide), heavy, strap leaves that are more green than gray, twisting gently as they ascend. I like it for the impressive, thick foliage alone. The husky, winged stems grow to 2.5' tall, topped with spheres up to 3.5" across, composed of a hundred or more fragrant, white, "star-cup" florets with blush-pink ovaries.

Allium nutans is highly fertile and hybridizes with *A. senescens* (photo, p. 14) and other rhizomatous alliums with wild abandon. The progeny is variable and fascinating, often combining its worst traits into poor plants, and only occasionally does something special result. I'm surprised this group of onions hasn't been exploited previously for its horticultural potential. The best hybrids have neat, persistent foliage, and perfectly spherical heads of bloom produced in August and September, creating a new class of ornamental *Allium*, ideal for the late summer and early autumn flower border.

One such hybrid I selected this year will be called...you guessed it...*Allium* 'Millennium'. It has deep green, strap-like leaves in a leafy, basal clump to 18" across and a bouquet of intense rose, pincushion pompoms in surprisingly large

heads on top of sturdy, 24" stems. Like most of the *senescens-nutans* clan, the flowers are fragrant and a super attraction for bees and butterflies.

☀ *Allium* 'Sugar Melt'—This plant is a selected seedling from *A.* 'Pink Pepper', a dwarf, fall-blooming sort described later. This cultivar is truly exceptional, making beautiful clumps to 18" across of mildly curled, glossy, deep green, strap-like leaves to 6" tall. In August a literal forest of even-height, 16" stems are topped with a profusion of clear, light pink hemispheres, peppered with yellow anthers. This is an exceptionally neat and free-flowering cultivar.

☀ *Allium angulosum*—This is a widespread species found over much of Europe, Russia, and Asia. Often confused with *A. senescens*, this species is tall and slender, with an upright growth habit and narrow leaves that are keeled on the underside, and tight, somewhat capitate heads of rose, pink, or white flowers. Some forms furnish pleasant summer bloom, particularly those with deep rose flowers. Dwarf forms growing only 12" or less can be had by seedling selection.

☀ *Allium daghestanicum*—This is an alpine species from the Caucasus that is among my favorite of all rhizomatous onions. The true species is difficult to come by, with *A. senescens* usually shipped out in its place. This is a neat onion with tough rhizomes that build into congested clumps, and arching, filiform, green leaves like a magnified *A. cyaneum*, 8" tall and 16" across, and numerous, wire-thin stems with open, airy sprays of palest pink star-cups. The stems reach 12–14" but splay out gracefully in all directions. I have contributed seed of this species to the NARGS seed exchange this year. It is easy and reliable in sandy loam, thus far without unwanted seedlings.

☀ *Allium cupanii* ssp. *hirtovaginatum*—From Turkey, this is a BIO (Botanical Interest Only) plant that is easy to grow, small, and hardy, but almost invisible. In spring it makes a number of hairy, filiform, stiffly upright leaves to about 4–6" tall, like a few needles of grass. These mostly die down in summer, leaving behind a few dried "spears." In mid-July to August, the spears come to life, and tiny sprays of pinkish, tubular flowers appear. The flowering stems reach 4–9". I grow this species in almost pure sand. Get a magnifying glass to appreciate this one.

☀ *Allium togasii* (sometimes spelled *togashii*)—From Japan and China, this is another favorite. Good clumps of flat, grass-like foliage appear in spring and early summer, making small tufts 6–8" across and 6" tall. The foliage suddenly goes brown and dries up obligingly as a mini-forest of 5–6" stems appear in August, topped with a profusion of 1", light pink pompoms with exerted stamens. The flowers are fragrant and attract scads of bees. Despite what you might think since the species comes from Japan, the bulbs do best in sand or loose, sandy loam in full sun, tolerating considerable heat and drought.

There are several varying forms of this species. The best is a tall form that looks identical except the stems reach 12–16", it is even more floriferous, has slightly deeper pink flowers held in tighter heads, and flowers about three weeks after the other forms (some flower heads are still looking good now).

✿ *Allium tuberosum* (photo, p. 16)—The well-known garlic chives is sometimes confused with the earlier-blooming *A. ramosum*, but the two are really quite distinct. Some forms of this widespread European and Asian species flower in August, while others flower later in September. *Allium tuberosum* also has a propensity to keep sending up new flower buds well into autumn. This plant is a lovely thug that should only be planted in rougher parts of the garden where it is allowed to naturalize. The seed capsules form extremely quickly and can even shed seed while fresh flowers are still present in the same inflorescence. The light orange, fibrous rhizomes are deeply rooted, tenacious, and highly resistant to being pulled out by hand. Upright, domed clusters of pure white, starry flowers (often with clear red midribs on the back of the tepals) on 2' stems are pretty with autumn asters and fragrant to boot. But be forewarned, it is a true thug that will seed itself far and wide.

✿ *Allium carinatum* ssp. *pulchellum* (photo, p. 15; often listed simply as *A. pulchellum*)—This is a beautiful European and Mediterranean species that is popularly grown. Similar in appearance to *A. flavum*, but with rosy purple bells on long, drooping pedicels of the same color. Typically a tall plant to 2' or more, there are some dwarf forms. A desirable, pure white form exists and looks nice planted with the purple ones. The plant is variable, and wild-collected seed should be opted for. One from an Archibald collection is particularly robust, with many-flowered heads of a soft lilac color with an almost bluish tinge. Flowering is in July to August; cultivation is easy in any sunny spot.

✿ *Allium cernuum* 'Groton'—I gave this plant the name 'Groton' as I found it offered for sale as *Allium cernuum* in a local nursery in Groton, Massachusetts. Somewhat of a puzzle, I now consider this very-late-flowering form of nodding onion to actually be a *A. cernuum* x *stellatum* hybrid. The nodding buds open into almost spherical heads of various-colored flowers, mostly pinks, but also white, rose, and two-tone pink and white, on stems that reach 2'. It flowers in August.

FALL BLOOMING ONIONS (INCLUDING ANY THAT BLOOM IN SEPTEMBER):

notes made on September 14, 1999

✿ *Allium potosiense*—A new arrival to my collection, from central Mexico, in dry, gravelly soils, this was received a couple week ago. The flowers on 5" stems were just going over, white with a rosy-purplish tinge, with up to three stems per fat and squat bulb. Once replanted and watered, I noticed today that fresh buds are coming! Hardiness unknown.

✿ *Allium glandulosum*—The true "type" plant from San Luis Potosi, Mexico, favors wet soils. This is a small plant with narrow, channeled leaves, curious rhizomes, and thus far a single, slender bud on a 4"-tall stem. The flowers are described as maroon-red with a shiny nectary in the center. It is said to bloom in October. According to southwestern bulb expert Thad Howard, this is not to be confused with the so-called *A. glandulosum* found in Texas and Arizona, which is actually a different species!

☀ *Allium traubii*—I have grown this for about five years. The plant comes “alive” in late summer and produces 7–9 slender, channeled, green leaves that arch sideways and are minutely scabrid. Since the buds appear so late in October to November, I always move the potted plant inside for protection, but then the buds invariably abort. Reputedly, the flowers are pinkish white.

☀ *Allium stracheyi*—From the Himalayas, this species is known to cultivation in several forms. Here in the northeastern USA I rarely see the flowers, as they are produced too late, and they get killed by heavy frosts in October and November. In my Seattle-area garden, it was a more reliable and satisfactory species. It has flat, upright, grayish leaves and flowers that can vary from pale yellow to rose. At this writing there are no sign of buds on my plants...but it is early yet!

☀ *Allium suaveolens*—From northern Europe, the true plant is rarely cultivated, with everything under this name typically being *A. senescens*. My plants have suffered from our drought this summer, and only one bloom head appeared. It has narrow, filiform, upright leaves and 12–18" stems in early September with few-flowered heads of white, rose-tinged flowers that are indeed very fragrant. I must move it to a more moist position.

☀ *Allium ericetorum* (syn. *A. ochroleucum*)—My specimens originated in Passo S. Baldo, Treviso, Italy. Another variable species, it is valued for its late bloom. In sandy soil the plant remained dwarf and grew 8" tall, but in better soil the plants are much happier and make dense clumps with numerous 10–20" stems. The first florets opened today, with another week or two until flowering reaches its peak in October. The capitate heads have 40–80 flowers each, of a pale yellow color, diffusely stained dull rose on the back of the tepals.

☀ *Allium thunbergii*, *A. virgunculae*, and a plant labeled as *A. tacquetii* (the last from the US National Arboretum). This whole group of October-blooming onions needs to be studied and clarified. *Allium thunbergii* is a popular plant, especially the cultivar known as ‘Ozawa’, with lively clusters of deep rosy-purple flowers on 8–10" stems, flowering October to November and amazingly resistant to snow and freezing weather. Regular *A. thunbergii* is highly variable and has as one of its synonyms *Allium tacquetii*.

The plant I received as *A. tacquetii* is distinct, making a wild-looking clump of tough, flat or channeled, yellowish-green leaves, the lower leaves drying and making a messy clump, and numerous 12–24" stems topped with buds that won't open for weeks to come. The flowers look like typical *A. thunbergii*, being rich purple with long, exerted stamens and yellow to orangish anthers. *Allium virgunculae* (of horticulture) is a puzzle, a delightful miniature to 4–6" with flowers varying from white, rose, to the same deep rosy-purple color. Plants in cultivation do not match Ohwi's description in the *Flora of Japan*. All of these plants seem to appreciate light shade and good garden soil.

☀ *Allium senescens* var. *glaucum* ‘Blue Eddy’—Not all “glaucums” are the same, as seed-propagated material results in highly variable seedling progeny. Typically, plants under this name in cultivation have swirling gray leaves that



Allium nutans (pp. 9–10)

photos, Mark McDonough

Allium 'Satellite', a hybrid between *A. senescens* and *A. nutans*





Allium nutans (pp. 9–10)

Allium senescens (pp. 9–17)





Allium carinatum ssp. *pulchellum* (p. 11)

Allium plummerae

photos, Mark McDonough





Allium tuberosum (p. 11)

Allium sieheanum, compact head (Vol.57[4],p. 264)

photos, Mark McDonough



distinctively twist around in one direction, making ornamental cowlicks for the garden. It is also a late summer to fall bloomer, with light pink hemispheres appearing in September. The selected clone 'Blue Eddy' has a particularly dwarf habit and swirling habit, with stenciled swirls of silvery blue foliage, well worth growing if it never flowered. It makes a gorgeous groundcover only 4–5" tall. The foliage is a nice foil to the hemispheres of light lavender-pink flowers, on 6–8" stems, that open in September.

Allium senescens 'Summer Pink' (photo, V. 57(4), p. 276) —This is one of my first hybrids and remains one of the best. It is a cross between *A. senescens* var. *glaucum* and a typical, tall form of *A. senescens*. The result is a strong-growing plant that looks like *A. senescens* var. *glaucum* on steroids, being much larger, but with the same lovely, swirling, gray foliage. This cultivar flowers in July with a profusion of soft pink flowers held in ample heads. Its floriferous habit is due to the fact each bulb produces up to three flowering stems. The flowers are fragrant and highly attractive to bees, wasps, and butterflies.

Allium 'Pink Pepper' —This is a rather unique allium which should become popular among rock gardeners. Like a shiny, green-leaf version of *A. senescens* var. *glaucum*, this plant hugs the ground with swirling mats of shiny green straps, and even more numerous hemisphere-buttons of pure light pink atop 4–5" stems, visibly "peppered" with yellow anthers. In full bloom right now, it's a perfect complement to 'Blue Eddy'. It should be noted that almost all seeds of 'Pink Pepper' yield earlier-blooming, taller plants, which are usually inferior to the original.

✿ *Caloscordum neriniflorum* —Last but not least comes this plant, whose name is still under debate today. Some authors place this Chinese plant within the genus *Allium* as *Allium neriniflorum*. To my way of thinking, it looks unlike any *Allium* I've grown, mostly due to the tepals being fused together into a tube. My plants started flowering in July and are still flowering in September. Naked stalks appear in midsummer, reaching only 4–6", and each loose, amaryllid-like inflorescence opens a few rich pink florets at a time, lasting for an incredibly long time. New flower buds shoot up from the ground. It is hardy, yet very slow growing, in a warm, light loamy soil. This is a real cutie.

For those who enjoy growing bulbs, there are few genera comparable to *Allium* to provide such a wide selection of species from spring, summer, and fall. I hope that I have stirred some interest in growing these fascinating plants.

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THOSE INTERESTING VACCINIUMS

by Arthur P. Dome

The genus *Vaccinium* is a very diverse and important group in the plant kingdom. There are many endemic species in all regions of the world, wherever the environment is suitable. These plants like to grow out in the open sun or in partial shade, in a lime-free, sandy to organic type soil that never completely dries out. Adequate humidity is also necessary. For cultivating these species in the home landscape, the ideal is to recreate a situation like that in which the species grow naturally. There are evergreen and deciduous species available to enhance the interest and beauty of almost any garden or native landscape. The genus also includes species of great economic importance such as cranberries, blueberries, and florist greens.

There are over 450 species of *Vaccinium* in the world, some of which grow only a few inches high and others that reach a height of 10'. *Vacciniums* offer a unique selection of growth habits and foliage types, as well as a multitude of flower shapes and shades. This article will deal with some of the most desirable species that are also readily available in North America.

Vaccinium crassifolium is from the southeastern USA. It is a creeping, low-growing, evergreen shrub with dark green leaves that sometimes spreads from underground shoots. Its campanulate-urceolate-shaped flowers vary in shades of white to pink, sometimes with pink stripes. The flowers are borne in axillary racemes near the ends of the branches. There are two popular clones, both of which are worth growing as individual plants or as ground covers. *Vaccinium crassifolium* 'Well's Delight' has small, narrow, shiny leaves. *Vaccinium crassifolium* 'Bloodstone' (photo, p. 22) is also known as *V. sempervirens* 'Bloodstone'. The new growth has a tinge of red on the mature, oval-shaped, dark green leaves. Both leaves and stems turn reddish in the winter when in exposed locations. The fruit is a purplish black. Zone 7.

Vaccinium delavayi (photo, p. 23) is from Yunnan, China. It is a compact, slow-growing, evergreen shrub with dark green, obovate leaves that might grow to

15" wide by 8" high in 10 years. Its globose-urceolate flowers are creamy, or sometimes white with a tinge of pink, and are borne in racemes at the tips of the branches. The fruit can vary in color from carmine to deep purple. Zone 7.

Vaccinium floribundum, syn. *V. mortinia*, (photos, pp. 24–25) is from Ecuador. It is an upright-growing, evergreen plant that might reach 30" high in time. It has small, ovate, dark green leaves that are a lighter color on the underside. The new growth in spring is a very bright red. The white-to-pink, urn-shaped flowers are borne on axillary racemes. The fruit is shiny and dark purple to black. Zone 9.

Vaccinium glauco-album (photo, p. 22) is native to the Himalayas. It is an upright-growing, evergreen plant that sends out underground shoots and reaches 24" in 10 years. It has dark green, oval leaves 2-3" long with very white, glaucous undersides. Its light to deep pink, tubular-ovoid flowers are borne on racemes arising from the axils of the leaves. The fruit is black. Zone 9.

Vaccinium x intermedium is a natural hybrid occurring mostly in Europe where populations of *V. myrtillus* and *V. vitis-idaea* are intermixed. It is an upright-growing, evergreen shrub that may get up to 24" in 10 years. It has small, ob-elliptic, medium green leaves that are lighter in color on the underside. The urn-shaped flowers are usually in axillary racemes and can vary in different shades of red. The fruit is a dark violet color. Zone 6.

Vaccinium macrocarpon (photo, p. 24) originates in eastern North America and northern Asia. It is a prostrate, creeping, mat-forming, evergreen shrub with very small, dark green, elliptic-oblong leaves that are a lighter color on the underside. The flowers are small, axillary, light pink to light purple, and four-lobed. The fruit is red. Many acres of *V. macrocarpon* supply us with cranberries. The clone *V. macrocarpon* 'Hamilton' is the one usually sold to home gardeners. Zone 2.

Vaccinium moupinense (photo, p. 25) is from the Himalayas. It is an evergreen shrub similar to *V. delavayi* and grows 12–18" high, with deep brownish-green leaves. The urn-shaped, brownish-red flowers are borne on axillary racemes. The fruit is reddish black. Zone 9.

Vaccinium nummularia (photos, p. 26, 27) is another plant from the Himalayas. It is a spreading, semi-upright, evergreen plant that seldom reaches more than 10–12" in height. It has dark green, rugose leaves with paler undersides. The stems are light brown and covered with tiny bristles. The urn-shaped flowers are light pink to a deeper pink at the mouth of the corolla and are borne on axillary racemes. The fruit is a shiny black. There is a Ludlow and Sherriff form (L & S 17924) that is a stiffer, compact, upright plant that may grow to 30" in 10 years. This form is very floriferous. Also, the plant seems to be easier to cultivate. Zone 7.

Vaccinium ovatum (photo, p. 27) grows wild in western North America. It is an evergreen shrub with dark green, shiny, oval-oblong leaves that are lighter color on the underside. Forms have been found that are only a few inches high (very suitable for troughs) to some 10–12' tall. The campanulate flowers are various



Vaccinium angustifolium at Branklyn Gardens (p. 34)

Vaccinium angustifolium (p. 34)

photos, Arthur P. Dome





Vaccinium glauco-album, berries (p. 20)

Vaccinium crassifolium 'Bloodstone' (p. 19)





Vaccinium delavayi, berries (pp. 19–20)

Vaccinium delavayi, flowers

photos, Arthur P. Dome





Vaccinium macrocarpon 'Hamilton' (p. 20)

Vaccinium floribundum, flowers (p. 20)





Vaccinium moupinense (p. 20)

photos, Arthur P. Dome

Vaccinium floribundum, berries (p. 20)





Vaccinium nummularia, flowers (p. 20)

Vaccinium nummularia, berries

photos, Arthur Dome





Vaccinium ovatum (pp. 20, 33)

Vaccinium nummularia, plant (p. 20)

photos, Arthur P. Dome





Vaccinium retusum, flowers (p. 33)

Vaccinium padifolium (p. 33)

photos,





Vaccinium retusum, berries (p. 33)

Vaccinium sikkimense (p. 33)

photos, Arthur Dome





Vaccinium vitis-idaea 'Minus', flowers (p. 33)

Vaccinium vitis-idaea, flowers (p. 33)





Vaccinium vitis-idaea 'Minus', berries (p. 33)

Vaccinium vitis-idaea 'Erntdank', berries (p. 33)

photos, Arthur P. Dome





Vaccinium vitis-idaea 'Koralle' (p. 33)

Vaccinium uliginosum (p. 34)

photos, Arthur P. Dome



shades from white to pink and are borne in clusters in the axils of the leaves. The fruit is a shiny purplish-black. Zone 6.

Vaccinium padifolium (photo, p. 28) is from the mountains on the island of Madeira. It is an erect, much-branched, evergreen shrub with bright green, elliptic-oblong leaves, and it can reach 6' tall in time. Granted, this is a bit too tall to put in a rock garden, but it can make an excellent background plant in areas where it can be protected from strong freezing winds. The interesting flowers and fruits much enhance the desirability of this plant. The campanulate flowers are borne in the axils of the new shoots and are mixed shades of yellow and red. It produces an abundance of purplish-black fruit that is quite tasty. Zone 9.

Vaccinium retusum (photo, pp. 28, 29) is another plant from the Himalayas. It is an evergreen shrub, up to 24" height in time. It has bright green, oblong leaves that are lighter on the underside; the tan-colored stem really sets off the leaves. The ovoid-urceolate flowers, borne singly or in racemes, are pink with deep pink stripes. Sometimes there are large, deciduous bracts on the flower shoots. The fruit is a purplish-black. Zone 9.

Vaccinium sikkimense (photo, p. 29) is, as the name implies, endemic to Sikkim and the Himalayas. It is a small, evergreen, compact, upright plant. The obovate leaves, 2–2.5" long, are dark green above and a lighter green on the underside. There is a form with rugose leaves that give it special interest the year around. The small, urn-shaped, pink flowers are borne in terminal clusters and racemes. The plant has never set fruit for me, and the literature usually indicates "fruit never seen." Probably Zone 9.

Vaccinium vitis-idaea (photo, pp. 30–32) is found in many temperate regions of the Northern Hemisphere, from alpine areas and meadows to forested and maritime areas. It is commonly known as lingonberry. The fruits are edible; one can enjoy their produce in one's own garden.

Vaccinium vitis-idaea is an evergreen shrublet with many forms that range from a few inches high to those about 18" high. When happy, it can be quite invasive. It has small, shiny, green, obovate leaves that are a lighter color on the underside. The flowers are campanulate, vary from white to pink, and are borne in short racemes. The fruit is a bright red. Fruit set is enhanced when there are two or more clones of the species growing close together.

Vaccinium vitis-idaea 'Minus' is a very slow-growing plant forming thick mats 3–6" high. It is ideal for troughs and small rock gardens. There are some new introductions from Europe that make good garden plants and produce greater yields, usually twice a year. *Vaccinium vitis-idaea* 'Koralle' is a new clone from Scandinavia that produces larger fruit and is not as invasive as others. *Vaccinium vitis-idaea* 'Erntdank' is from Germany; *V. vitis-idaea* 'Masonia' is from the Warsaw Agricultural University in Poland.

There are fine deciduous species of *Vaccinium*, many of which produce magnificent foliage colors in shades of red to orange in the late summer and fall. This is especially true in areas of intense, bright light and very cold temperatures. For good or for bad, this does not include the Puget Sound region.

Vaccinium angustifolium (photo, p. 21) comes from northeastern North America into central Canada and the Midwest. It is fairly compact, 12–18" high, with many narrow, bright green, lanceolate leaves. The flowers can vary from urn-shaped to campanulate and in color from pink to greenish. The fruit is blue-black. Zone 2.

Vaccinium uliginosum (photo, p. 32) can be found in many of the mountains, meadows, and bogs of North America and Europe. It is a deciduous, erect, much-branched plant that might become 24" tall in time. The obovate leaves are bright green and a bit over 1" long. Beginning in late summer, then into the fall, they start to turn a purple color. The white-to-light-pink, urn-shaped flowers are borne on small racemes from the axils of the leaves. The fruit is blue-black with a whitish tinge. Zone 2.

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THYMES

FOR THE ROCK GARDEN

by Rexford Talbert

Linnaeus named eight species of the genus *Thymus* in his 1753 publication, *Species Plantarum*. Taxonomists now generally agree that the species of thyme number between 400 and 500. Confusion is compounded by the publication of several thousand names since the 18th Century (ref. *Index Kewensis*). The species range in distribution throughout the temperate world in Europe and Asia, northwest to Iceland and Greenland, southward to North Africa and to the Azores and Canary Islands, and eastward to Japan, and the diversity of the taxa is astounding.

The morphological characters that are most important in delimiting species of thymes are stem branching structure, stem hairs, leaf margin, leaf venation, and to a lesser degree, usually, floral characters, leaf size, shape, and degree of hairiness. These lesser delimiters are useful in separating lower orders of taxonomic classification, i.e., subspecies, varieties, and forms.

In the world of small, hardy thymes that are most interesting for our rockeries and rock gardens, two species and their subspecies are prominent, *Thymus praecox* and *T. serpyllum*. These two species are also interesting to the gardener for paradoxical reasons, the former for its ubiquity in the North American herbal trade and gardens, and the latter for its rarity. A comprehensive look at the literature, both catalogs and gardening books as well as magazine articles, belies the scarcity of *T. serpyllum*. This apparent state of misinformation is caused principally by the name *T. serpyllum* being erroneously applied to *T. praecox* and its more available subspecies, *T. praecox* ssp. *arcticus*. Current British horticultural literature still insists on assigning the names *T. serpyllum* and *T. drucei* to cultivated taxa currently identified and designated as *T. praecox* ssp. *arcticus*.

In the original description of *Thymus serpyllum*, one of his originally published species, Linnaeus described a thyme with capitate flowers and creeping stems, having flat, obtuse leaves with hairs at the base. A more complete description would include additional characters. Schmidt and J alas in *Flora Europaea* divided this species, on the basis of leaf and calyx character differences and on geographic distribution, into two subspecies, *T. serpyllum* ssp. *serpyllum* and *T. serpyllum* ssp. *tanaensis*. A native of northern Europe primarily, the type

subspecies ranges from northern and eastern France, to northern Austria, through central Europe to the northern and eastern parts of the former USSR and Scandinavia. *Thymus serpyllum* ssp. *tanaensis* has a more limited distribution, being restricted to northern Russia and northeastern Scandinavia. Occurrence of *Thymus serpyllum* in England is rare, and the species has a very restricted range there.

Stems of *Thymus serpyllum* have short hairs on all four sides. (Calling the sides of the stem "four sides" in this case is stretching a point, since the stem of this species is not totally square, often being described as 'rotundacaul'.) The subsessile or shortly petiolate leaves are variable in shape and are 5–13 mm long, 2–5 mm wide. The upper calyx teeth are triangular and usually have a fringe of hairs along the margin. You can check your plants for these characters. A chromosome number of $2n=24$ has been reported in this species by several authors, but you can't check that, unless you have access to proper equipment and are proficient in the required karyological technique.

Thymus praecox is distinguished from *T. serpyllum* by having hairs only on two sides of the stem and a chromosome number of $2n=56$, as well as by a number of lesser floral and leaf characters. Nevertheless, in spite of the rarity of this species in cultivation, the name *serpyllum* (and its puzzling misspelling "*serphyllum*") continue to occur frequently in US plant catalogs, nurseries, and related literature. Dr. Harriet Phillips, in her very valuable 1982 thesis, *A Study of the Taxa of Thymus L. (Labiatae) Cultivated in the United States*, identified the following eleven distinct cultivars of *T. praecox* ssp. *arcticus*: 'Albus', 'Annie Hall', 'Coccineus', 'Emerald Cushion', 'Hall's Woolly', 'Lanuginosus', 'Mayfair', 'Minor', 'Pink Chintz', 'White Moss' and 'Wild Garden Lavender'.

Why are these thymes of interest to the rock gardener? They are from cold climes and have a great deal of hardiness; they are quite small. In *Thymus praecox* ssp. *arcticus* 'Minor' leaf size is typically 2.5–3.5 mm long and 1.5–2.5 mm wide. The glabrous, closely related, dark-green-leaved 'Emerald Cushion', with its white corollas, has an exceedingly tiny growth footprint. These cultivars may also possess unique and vivid coloration in the corolla, as in the deep red-purple 'Coccineus'; an unusual and distinctive budding appearance, as in 'White Moss', which resembles clubmoss; an eye-pleasing fuzziness in 'Hall's Woolly' and 'Lanuginosus'; and a grandfathered longevity in the sweet, somewhat fruity fragrance of 'Annie Hall'. This last has been found in United States nurseries since the late 1930s.

In the trade, polymorphic variation in *Thymus praecox* ssp. *arcticus* 'Minor' has resulted in a proliferation of a large number of ill-applied cultivar names. The persistent use of the incorrect Latin form "Minus" for this cultivar has proven an especially difficult-to-eradicate misspelling.

An unfortunate and incorrect pairing of the name *Thymus praecox* ssp. *arcticus* 'Albus' with a newly created common name for the much-different cultivar 'White Moss' was applied to the description of a single taxon in a popular herbal magazine. This, and the subsequent creation of plant labels containing the corrupted name, has resulted in the two cultivars rarely appearing for sale under their proper names and in the almost complete disappearance of the cultivar 'White Moss' in the trade. In a different muddling, 'Mayfair', with its slight lemon scent and seasonally variable variegation, is often confounded with *T.*

'Doone Valley', which has somewhat similar but, to the careful eye, notably different attributes of scent and leaf coloration. Correctly classified as *T. 'Doone Valley'* without any specific epithet, it is frequently given, in error, the taxonomic appellation of *T. praecox* ssp. *arcticus*, because of superficial similarities. A visit to the key and perceptive attention to detail is all that is needed to solve these two mock riddles.

Leaving the realm of these, the tiniest of the thymes in cultivation, we enter a world of other, only slightly larger species. The Orient yields two beautiful taxa of the species *Thymus quinquecostatus*. The corollas of *T. quinquecostatus* f. *quinquecostatus* are rosy purple; those of *T. quinquecostatus* f. *albiflorus* are a bright, highly reflective white borne in such dense inflorescences that often the leaves are completely obscured. Native to China, Japan, Manchuria, and Siberia, these plants are overlooked treasures. Although they are larger than *T. praecox* ssp. *praecox* and not creeping in their growth habit, they are prostrate to slightly erect, with a tendency for the stems to raise up and then fall back to the ground as lateral growth continues.

Another beautiful and interesting thyme with an open, low-growing habit perfect for rock gardening is *T. caespititus*. It occurs in the northwest Atlantic region of the Iberian Peninsula and also in Madeira and the Azores. A synonym for this plant was once *T. azoricus*, indicating the western extent of its geographic range. The cultivar 'Tuffet' has an attractive, compact growth habit. *Thymus caespititus* is the only thyme that has been reported to have a wax-like covering on its succulent-appearing leaves. This is presumably an adaptation for limiting water loss through transpiration.

Thymus cherlerioides from the Balkan Peninsula and western Turkey is a slow-growing thyme with beautiful, gray-green foliage and a creeping habit. It has leaves with thickened margins and is particularly attractive where its planting location affords the possibility of it cascading over large rocks. The legitimacy of the taxonomic name *Thymus neiceffii* and its relationship to *Thymus cherlerioides* and to a subshrub cousin *Thymus leucotrichus* from the same geographic area is still questionable, but the desirability of a rock garden specimen of this repand beauty is not—if its gray-hirsute foliage and plentiful flowers are your cup of tea.

From central Europe comes a exceedingly attractive, fuzzy thyme called *T. doerfleri*. It has a low-growing habit and rose-purple corollas. This is my personal favorite of the hirsute thymes and does not have a problem with humidity and poor air circulation, as does *T. praecox* ssp. *arcticus* 'Lanuginosus'. *Thymus hirsutus* is not currently an accepted name; specimens of *T. doerfleri* are often sold under this designation.

The last thyme considered here is one of the most easily grown, its sprawling, loose, trailing habit and leaf arrangement ensuring great air circulation through the foliage and the exposure of all its leaves to the maximum sunlight. *Thymus herba-barona* is the apparent product of an unusual evolution. The islands where this thyme is endemic resulted from the outpouring of magma released in the collision of the North African and European geologic plates. This is a thyme that bears little or no resemblance morphologically or chemically to its European or African neighbors. Native to Sardinia and Corsica, *Thymus herba-barona* has at least three chemical variants, the most common being the carvone-rich chemo-

type. This is the only thyme identified to date with this chemical. Carvone is subjectively perceived as the fragrance of caraway. There are also citral- and carvacrol-bearing forms of this species. The citral-bearing form has only recently been introduced into the trade.

An excellent discussion of the confusion surrounding the cultivar and sometimes taxonomic names of *Thymus lanuginosus*, *T. pseudolanuginosus*, and *T. praecox* ssp. *arcticus* 'Lanuginosus' is to be found in Dr. Harriet Phillip's (nee Flannery) brilliant thesis (*op. cit.*) and would properly be the subject of another article. It suffices to say that taxonomic opinion varies, and it is this author's personal belief, but not an exclusive one, that *Hortus III* alone is not a proper reference for genus *Thymus*. Much of the better information on genus *Thymus* comes from technical journals and old floras, but it must be chewed thoroughly before it is either spit out or swallowed. An effort is currently underway by the botanist Ramon Morales to produce a monograph of the genus. For now, *Flora Europaea*, the articles and notes of its contributors, and Dr. Phillip's thesis are my references. *Flora Europaea* can now be accessed on line from the Internet, and Dr. Phillip's thesis is available from University Microfilms recovered from microfiche.

Any rock gardener who admires subtle floral beauty and remarkable variation in color, form, in leaf structure, and growth habit will be more than pleased by these few representatives of *Thymus*.

Rex Talbert has grown over 300 taxa of thymes, including about 70 species. He has a particular interest in the botany, taxonomy, and chemistry of mints. *Capsicum* is a special interest, also. Rex is also an expert in cooking with herbs. He has authored many articles on herbs and is a recipient of the Herb Society of America's Nancy Putnam Award for Horticultural Excellence.



*Elmera
racemosa* ssp. *puberulenta*

THE PASAYTEN WILDERNESS

AND ENVIRONS

by Coleman Leuthy

Geologic contributions by Neal Jacques

Located south of the British Columbia border and east of North Cascades National Park and Ross Lake National Recreation Area lies the Pasayten Wilderness. It straddles the Cascade Mountain crest with a breadth along the Canadian border of some 52 miles and extends south an average of 18 miles. The extensive Okanogan National Forest nestles against its southern margin, providing the closest access routes. As there are no roads within the Wilderness, the primary mode of travel is hiking and horses. At least one wilderness airfield is still used for fire control and to supply packers in the back country. Many hikers hike the Cascade Crest Trail to or from the British Columbian Manning Provincial Park in Canada. Interestingly, there is no border crossing record and seemingly no requirement to check in; the hikers just go their trekking way. In the late 1800s, rich ore led to the opening of a number of mining areas which were active for three decades. Now there is very little activity at the old claims.

The region is reached year around from the east side of the Cascades via US 97, which continues from

Wenatchee, Washington north up the Columbia and Okanogan Rivers to British Columbia. State Routes 20 and 153 West take one to Twisp and on to Winthrop. To the south and east the primary river drainages are the Okanogan, the Methow (pronounced Met-ow) and its tributary the Chewuch (formerly Chewack and pronounced Cha-Uch). From these drainages a number of USFS roads take one to or near the Wilderness boundary. In the summer, Rt. 20 the North Cascades Highway, over Rainy Pass (4,800') and Washington Pass (5,500'), is open from the west to Mazama and Winthrop.

GEOLOGY

Glacial and stream erosion has cut deeply into the mountains, exposing a complex past on both sides of the Cascade Mountains. The rocks were created at the forward edge of a continental plate, which overrode marine volcanics and sediments originating at a mid-ocean ridge. Today, this ridge is located in the Pacific Ocean approximately 70 miles off the Washington Coast. Moving from the west over the Cascades, there is a change into an

area of deep volcanic rocks which form the Crystalline or Metamorphic Core, and other sediments, which have been called the Methow Domain. Individual assemblages of rocks at the continental margin are called terranes.

Each of the domains consists of several terranes, or areas which have become attached to the continental edge. The Puget Lowlands, a product of continental glaciation, and the western slope of the Cascades form the Western Domain and are composed of deep ocean volcanics and sediments. Further east, an outstanding roadcut exposure and geological exhibit in the zone of metamorphic gneisses can be examined at the Diablo Lake Overlook. Continuing east to Washington Pass, close examination of the surrounding mountains reveals the Golden Horn Batholith. It is a mass of molten rock that was intruded into the terranes subsequent to their attachment to the continent. Further east, the Methow Valley occupies a fault-bounded basin shaped by glaciation. These rocks, east of the core complex, consist of weaker sediments that are buttressed by basalt and rhyolite dikes extending from the Golden Horn Batholith. As a result, the topography assumes a gentler contour, since these formations are more easily eroded. Prominent cliff faces are formed along the dike faces.

The Hart's Pass Road leads through these sediments to a higher elevation, providing many fine views, as well as travelling past a dark siltstone containing fossil snails. From Slate Peak above Hart's Pass, a view eastward contains the Pasayten Wilderness Area. The Methow Basin is bounded on its east side by the Pasayten Fault. The Pasayten terrane continues east to a fault forming the west wall of the Okanogan Basin. The mountains in between form a terrane consisting of

metamorphosed intrusives and volcanics which, in turn, have been partially replaced by later intrusive bodies, thus forming an area which is almost exclusively crystalline. Contours are more gentle than those found along the Cascade Crest, perhaps due to less glaciation and a drier climate. Southeast of the Pasayten, the Columbia River is entrenched along the western margin of the Columbia River Basalts.

CLIMATE

The climate of this region is unique, as the high mountains range from 6,000–9,000' in elevation, all east of and protected by the Cascade Range. The river valleys are deep. The Columbia River, at the mouth of the Methow, is at 778' elevation descended from about 1,000' at the Canadian border. Along the Methow at Winthrop the elevation is 1,760'. Consequently, in the summer the low areas are hot, dry, and display Upper Sonoran Desert vegetation. Here summer temperatures reach 80–100°F or more, and winters may bring 2–3' of snow and extremes of –50°F or more. There is great cross-country skiing in the Winthrop area, with several hundred miles of groomed trails. High areas have wonderful subalpine flora and summer weather is more comfortable and brings less rain than to the west. Winter snow can be a moderate 6–10' or considerably heavier. In early June, 1999, there was still 12' of snow at Hart's Pass, elevation 6,200'.

PLANTS

The dominant vegetation of the Hudsonian and subalpine zones at 6,000–7,000' includes *Picea engelmannii* (Engelman spruce), *Larix lyalii* (Lyal's larch), *Abies lasiocarpa* (subalpine fir), *Pinus albicaulis* (white-bark pine), *Tsuga mertensiana* (mountain hemlock),



View from Washington Pass overlook, headwaters of Early Winter Creek
(pp. 39–46)

photo, Coleman Leuthy



Returning from Hart's Pass, Washington (p. 45)

Lewisia columbiana growing in mass near the head of Trout Creek, Washington





Swertia perennis, a rarity in Washington



Castilleja and *Erigeron*

Pinguicula vulgaris

photos, Coleman Leuthy





Lomatium brandegei

Haplopappus lyallii



Plants of Hart's Pass and Vicinity

This list was compiled from 146 records on July 10–12, 1998, by Don Knoke, Coleman Leuthy, and Jim Riley.

| | | |
|---|--------------------------------|----------------------------------|
| <i>Anemone drummondii</i> | <i>Fritillaria lanceolata</i> | <i>Penstemon davidsonii</i> |
| <i>Anemone occidentalis</i> | <i>Gaultheria humifusa</i> | <i>Penstemon serrulatus</i> |
| <i>Arabis lyalli</i> | <i>Habenaria dilitata</i> | <i>Phacelia sericea</i> |
| <i>Arnica cordifolia</i> | <i>Hackelia micrantha</i> | <i>Phyllodoce empetriformis</i> |
| <i>Arnica latifolia</i> | <i>Haplopappus lyallii</i> | <i>Phyllodoce glanduliflora</i> |
| <i>Arnica parryi</i> | <i>Hieracium gracile</i> | <i>Polemonium elegans</i> |
| <i>Artemisia michauxiana</i> | <i>Leptarrhena pyrolifolia</i> | <i>Polemonium pulcherrimum</i> |
| <i>Aster engelmannii</i> | <i>Lewisia columbiana</i> | <i>Polemonium viscosum</i> |
| <i>Caltha leptosepala</i> | <i>Lewisia triphylla</i> | <i>Rhododendron albiflorum</i> |
| <i>Cassiope mertensiana</i> | <i>Lewisia pygmaea</i> | <i>Romanzoffia sitchensis</i> |
| <i>Castilleja humifusa</i> | <i>Lutkea pectinata</i> | <i>Saxifraga bronchialis</i> |
| <i>Circium edule</i> | <i>Mitella breweri</i> | <i>Sedum divergens</i> |
| <i>Delphinium nuttallianum</i> | <i>Mitella pentandra</i> | <i>Sedum lanceolatum</i> |
| <i>Draba stenoloba</i> ssp. <i>nana</i> | <i>Mitella trifida</i> | <i>Stenanthium occidentale</i> |
| <i>Elmera racemosa</i> | <i>Parnassia fimbriata</i> | <i>Suksdorfia ranunculifolia</i> |
| ssp. <i>puberulenta</i> | <i>Pedicularis bracteosa</i> | <i>Tofieldia glutinosa</i> ssp. |
| <i>Erigeron compositus</i> | | <i>brevistyla</i> |
| <i>Erigeron peregrinus</i> | <i>Pedicularis racemosa</i> | <i>Viola purpurea</i> ssp. |
| | | <i>venosa</i> |

The following species were added to the Washington Native Plant Societies' list of plants of Hart's Pass and Vicinity (listing 195 species) in 1997 by Larry Baxter and Coleman Leuthy.

| | | |
|------------------------------|---------------------------------|------------------------------|
| <i>Arenaria macrophylla</i> | <i>Arenaria nuttaliana</i> | <i>Arnica rydbergii</i> |
| <i>Collomia linearis</i> | <i>Habenaria unalaskensis</i> | <i>Lycopodium sitchensis</i> |
| <i>Orobanche uniflora</i> | <i>Polygonum kelloggii</i> | <i>Phyllodoce intermedia</i> |
| <i>Potentilla nivea</i> | <i>Ranunculus eschscholtzii</i> | <i>Saxifraga caespitosa</i> |
| <i>Saxifraga tolmiei</i> | <i>Sorbus sitchensis</i> | <i>Sorbus scopulina</i> |
| <i>Shepherdia canadensis</i> | | |

Added July 15, 1999 by Neil Jacques and Coleman Leuthy, Tiffany Lake Botanical Area:
Swertia perennis

Juniperus communis (mountain juniper), a variety of ericaceous shrubs, and several willows.

To view and study the flora of the Pasayten there are two great and reasonably easy areas to visit. At Hart's Pass, 6,200' elevation, you can drive or walk up to about 7,000' and then walk to the top of Slate Peak at 7,450'. Plants abound along the road banks and in seeps moist from snow melt.

A short drive from Hart's Pass over to the Cascade Crest Trailhead above Meadows Campground and a walk of a mile or so south along the trail brings you around a corner to grandiose mountainsides full of flowers. The trail continues to a 7,000' saddle with a view of impressive mountains. Going up an easy ridge unfolds more flowers and an even greater panorama.

The Tiffany Mt. area offers a variation farther east in the Okanogan National Forest. First at Freezeout Ridge (6,500'), a superb, moderate ridge walk leads through open trees, then grassy meadows, and open, rock-strewn, steeper slopes to the summit. Here at 8,242', you will be standing on crystalline bedrock with views west to distant peaks of the North Cascades, north into the Pasayten Wilderness, and east to farmlands of the Okanogan. Interesting alpinines show up along the rocky ridges and scattered in the grass meadows.

Four miles past Freezeout Ridge, at a campground 6,240', the Tiffany Lake trail descends gently through open forest and rock outcrops into the Botanical Area. There is a good representation of species in both dry and wet areas and along the lake shore. The trail then climbs beyond the lake to a saddle among forest and wetlands. When openings appear in the forest to the left, leave the trail and follow these upward, through open,

grassy meadows to an exposed, rocky ridge. From this saddle there is easy access left to Rock Mt. or right to Middle Tiffany Mt. Both of these slopes offer superb views and opportunities to discover fine plant specimens. There is a great sense of freedom up high in these open places.

Swertia perennis of the Gentianaceae, a spectacular plant new to me and not common, was found in the forested, wet area along the trail and near the lake. This is the first time this species has been recorded in the county. Dr. Douglas Post, who did his Master's thesis on *Frasera* and *Swertia*, knew of only two other locations where this plant has been found in Washington. According to him, it is a widely disjunct species found at high elevations in open, dry areas which have moisture in spring or early summer. It ranges from Alaska to California and east to the Rocky Mountain States.

On page 41 is a brief, partial list of higher-elevation plants one is apt to encounter while rambling along rocky slopes and ridges or in moist meadows and snow-melt seep areas near Hunt's Pass. You may have to hunt for some of these—and the hunt will be worthwhile.

Coleman Leuthy has been "banging around" the mountains four out of five weekends, winter and summer, since he was a child. His primary interest is in wild species and natural hybrids. Coleman has studied with C.L. Hitchcock and Arthur Kruckeberg and "field tripped" with Marvin Black, Dennis Thompson, Roy Davidson and George Schenk.

Neal and Coleman will be leading a 4-day pre-conference trip to the Pasayten before the Annual Meeting this summer

EXPLORING SOUTHEASTERN HABITATS FOR ROCK GARDEN PLANTS

by *Rekha Morris*

Rock gardening in the southeastern United States, with its long, hot, humid summers, is challenging but not impossible, as several articles in the Fall 1998 issue of the *Rock Garden Quarterly* admirably demonstrate. I had become an avid rock gardener while working in England and was frustrated to find that the plants I had grown to love had no tolerance for our hot summers and torrential rains. Attempts with low, spreading plants, which are not strictly speaking rock garden plants, such as *Helianthemum* and *Corydalis*, but which had grown out of the brick fissures of the old wall around my small garden in Kent, ended in failure. As a member of the South Carolina Native Plant Society, I began to visit various distinct habitats in South Carolina, concentrating on those in our northwestern section. Some of these are rocky outcrops sustaining a fairly diverse group of dwarf plants suitable for rock gardening in zone 7 of the Piedmont.

A friend and member of our society familiar with the flora of the Carolinas introduced me to one such rocky terrain. This is a large, granite-gneiss outcrop in Pickens County in northwest-

ern South Carolina known as Boggs' Rock. Although this outcrop, approximately seven acres in size, is privately owned, its plant communities are for the most part undisturbed. Surrounded by a mixed hardwood-pine forest, the rock outcrop is hidden from general view and therefore subject to less disturbance than one would expect from its location close to the intersection of two highways. Trash scattered in areas of this outcrop that are close to one of these highways is indicative of some human disturbance, although this has not yet become severe enough to be alarmingly destructive.

The wooded areas are dominated by several species of *Quercus*, *Carya*, *Fraxinus*, *Pinus*, and by *Juniperus virginiana*, *Liriodendron tulipifera*, and *Oxydendrum arboreum*, while the understory trees include *Cornus florida*, *Ilex opaca*, *Amelanchier arborea*, and *Viburnum rufidulum*. Several species of *Usnea* grow on the branches of these trees, draping them much as Spanish moss does in the coastal areas of South Carolina. Vines such as *Gelsemium sempervirens*, *Decumaria barbara*, and *Parthenocissus quinquefolia* clamor up these trees and here and there



Polypodium polypodioides, or resurrection fern, creates a lacy green envelope around and at the base of tree trunks. A large number of shrubs and woodland plants native to this area add to the diversity and richness of these woods surrounding Boggs' Rock.

This dome-shaped outcrop, encrusted with lichens creating irregular patterns in dark charcoal, gray, and green, is most striking where *Sedum smallii* (photo, p. 52), an annual, has established itself. Growing either in moss or in a combination of sand and tiny rock flakes barely half a centimeter deep, this deep rich crimson sedum has a jewel-like quality as if some profligate genie had spilled caskets of rubies on a platinum surface. Seeing it for the first time in March, it seemed incredible that anything besides lichen would thrive in such extreme xeric conditions. However, a chance visit in May shortly after a rainfall indicated that there are clearly defined, meandering patterns of slight dips and depressions where moisture collects and enables not only the sedum but

also several mosses to flourish. May is also the time when this sedum blooms, its tiny white flowers flecking the patches of crimson as if lightly dusted by snow. Seen against the backdrop of dark green trees and shrubs, the silvery rock face with brilliant drifts of *S. smallii* in bloom offers an unforgettable experience. The mosses through which the sedum grows are established in seepage paths but with full exposure to the sun. The combination of dark, slate-colored cushions of *Hedwigia ciliata* during its drier phase in March had provided a dramatic contrast to the red of the sedum. After the rain, the *Hedwigia* and the lighter green of *Bryoandersonia illecebra* softened both the visual and tactile impact of this expanse of rock, mellowing its stark and ponderous surface with fluid patterns in red, white, and several shades of green.

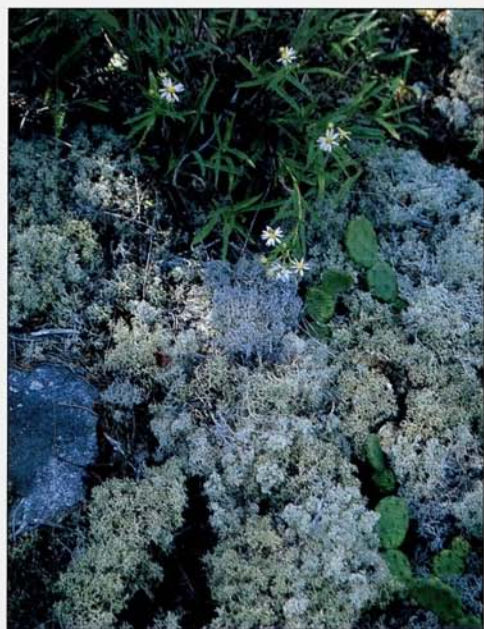
Mediating between the rock outcrop and the tree line are undulating swathes of lichen and moss. Several species of *Cladonia* form silvery billows interspersed with the greens of



Campanula piperi, white and blue (p. 56)

photos, Carla Lankow



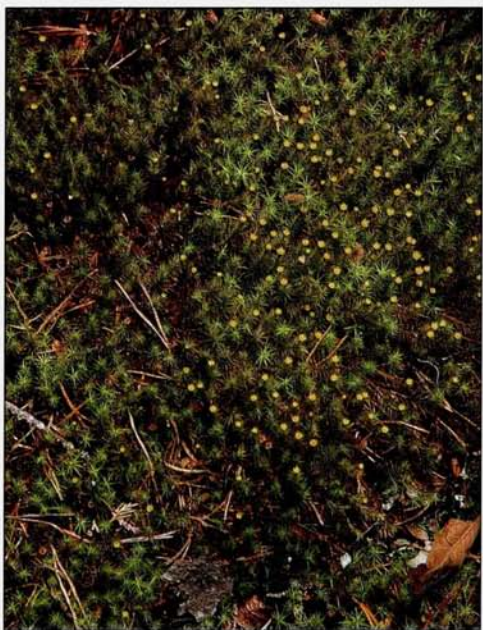


Bogg's Rock with *Aster avitus* (pp. 48, 53)
photos, Rekha Morris



Bogg's Rock, *Tradescantia hirsuticaulis*,
Arenaria uniflora (pp. 48, 53)

Allium bivalve, *Senecio tomentosus* (p. 48)



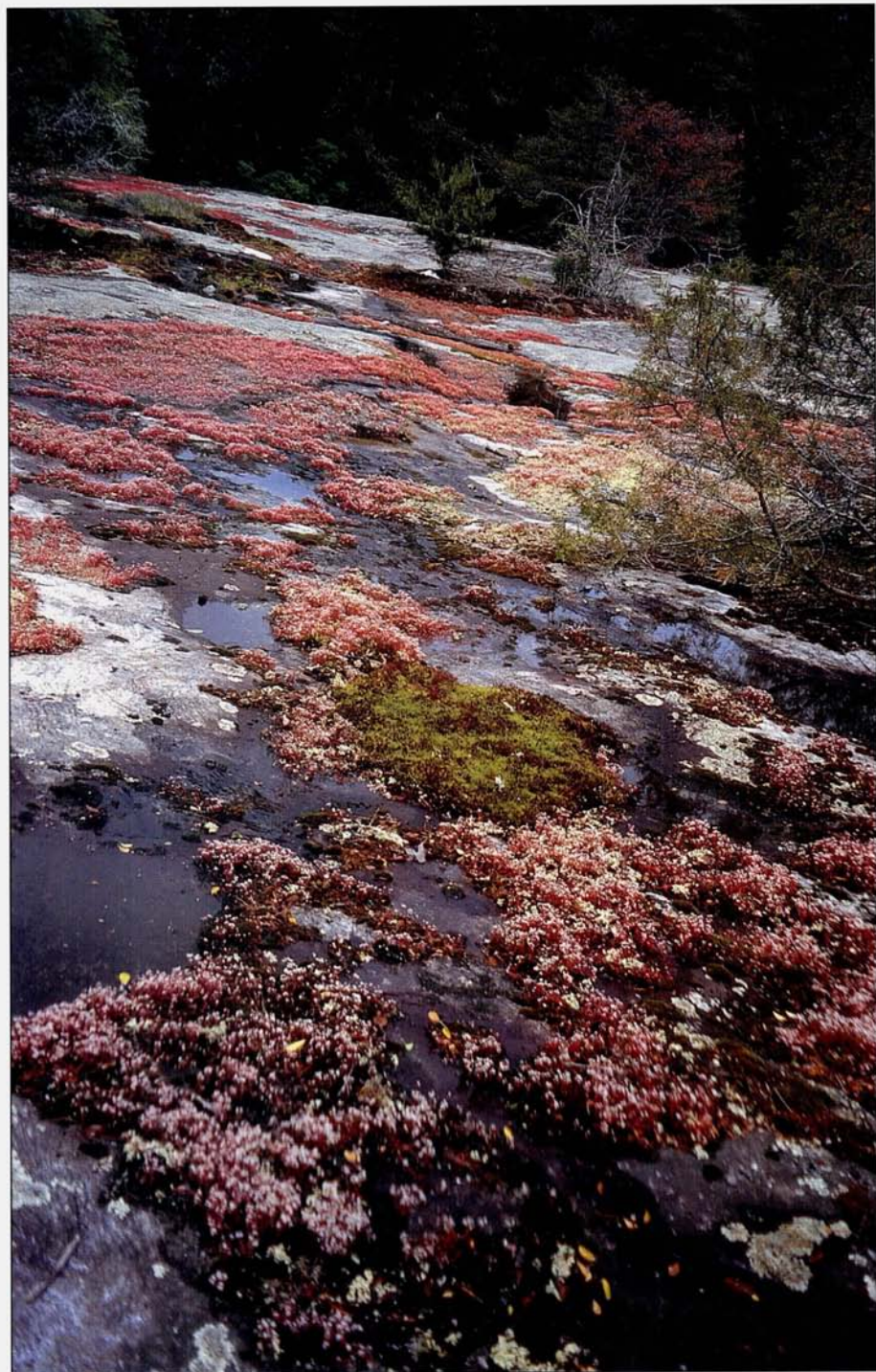
Bogg's Rock, antherial heads on *Polytrichum*
moss (pp. 48, 53)



Tradescantia hirsuticaulis (pp. 48, 53)

Bogg's Rock, South Carolina, with lichen (pp. 47–54) photos, Rekha Morris





Sedum smallii in bloom on Bogg's Rock
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photos, Rekha Morris

mosses, of which *Polytrichum ohioense*, or hair-cap moss, is predominant. In May when *S. smallii* is in full bloom, the *Polytrichum* also seems to be in bloom, as it is dotted with bright golden antherial heads (photo, p. 50).

Along this marginal area where the soil buildup varies from a few inches to nearly 10–12", there is an amazing floral diversity that includes several endemics, such as *Juncus georgianus*, *Senecio tomentosus*, *Phacelia maculata*, and *Aster avitus*. In March the aqua-green blades of *Tradescantia hirsuticaulis* (photo, p. 50), the dark-veined, silvery foliage of *Heuchera americana*, and the emerging leaf tips of *Senecio tomentosus* add textural variation to the velvet carpeting of mosses. In May the infusion of color from the flowers sprinkled randomly adds luster and sparkle to the fresh green undercoat of mosses. *Tradescantia hirsuticaulis*, growing some 10–12" high, blooms in variable shades of lilac-purple and fuchsia with contrasting yellow stamens. Its arching, glaucous foliage creates bold, linear patterns against the silver and green of *Cladonia* and *Polytrichum*. In some areas the upright, ovoid, aqua-green leaves and golden flowers of *Senecio tomentosus* intermingle with the grass-like foliage and white blooms of *Allium bivalve* to create a bright and cheerful collage amongst the moss and lichen (photo, p. 50). In other areas the same white-and-gold palette is repeated by the intermingled blooms of *Senecio smallii* and *Houstonia caerulea*. Here and there *Senecio smallii* grows in solitary clumps, its golden floral discs held aloft above narrow, blue-green, serrated foliage, harmonizing with the silvery gray tussocks of *Cladonia*. In some areas drifts of *Arenaria uniflora*, now re-classified in the genus *Minuartia*, contour luxuriant patches of *T. hirsuticaulis*, their white and lavender-pink

blooms placed as adroitly as if by plan for maximum impact.

Although I have grown accustomed to seeing *Opuntia* in sunny gardens in the Southeast, I have never seen them combined with mosses. At Boggs' Rock, *Opuntia compressa* creates sharp sculptural accents curiously at odds both with the suppleness and pliancy of mosses and *Juncus georgianus*, which also grows in these marginal areas. Along the base of trees growing at the edge of this marginal zone are scattered groups of *Phacelia maculata*, *Salvia lyrata*, *Tradescantia subaspera*, and many other wildflowers. Most of these are too large or too rampant for a rock garden; however, the 8-10"-high *Phacelia maculata* with its attractive, lobed foliage and bluish lavender blooms make it an appropriate choice for a rock garden.

Each *Aster avitus* (photo, p. 50), first reported by E.J. Alexander (1939) as growing on this outcrop and considered by some to be a southeastern outcrop endemic, dots the terrain, otherwise flowerless at this season. Growing singly or in clumps, the flower heads appear at the ends of 12–18" high stems with contrasting dark green, linear foliage. Although most of these asters have white ray flowers, there is surprising variation in color from white to pale pinkish-lavender, sometimes both colors present in the same cluster of plants. Not only is there a striking color contrast between the dark green foliage and the sparkling white-and-gold flower heads, but in some areas this contrast is intensified, both in terms of color and texture, against the silver-gray mounds of lichen.

There are also several species of ferns, including *Polystichum acrostichoides* and *Asplenium platyneuron*, or ebony spleenwort. The latter is an appropriate candidate for planting

between or along the edges of rocks as its evergreen, arching fronds grow some 10-14" high, tolerating fairly sunny to lightly shaded conditions in a humus-rich soil. Resurrection fern, growing from a few inches to about 8" high, although not as tolerant of sunny locations as ebony spleenwort, grows well on the shadier sides of rocks. During dry spells, its fronds curl up and appear to be lifeless; however, it revives as soon as it receives moisture. Several of the mosses around Boggs' Rock also thrive in areas I would previously have considered inappropriately sunny. Of these, *Polytrichum* with its 4-5" high, fir-like form and ability to withstand drought by closing its needles, can create enticing mats encircling or spilling down along rock crevices and thereby adding yet another dimension to rock gardening in the Southeast.

The forested areas around Boggs' Rock have not only familiarized me with the many native woodland plants that are appropriate for the various shades of my shady woodland garden in the Piedmont, but they have also illustrated quite vividly the many ways of combining and grouping

plant communities. The complex layering of tall, deciduous trees, understory shrubs and smaller trees, vines clamoring up and cascading from tree limbs, the heterogeneous mixture of lichens, mosses, ferns, and wild flowers, all combine to create a multi-layered and textured environment of great diversity, conducive to wildlife and well worth emulating in our private landscapes. For an incipient rock gardener in the Piedmont, Boggs' Rock and its marginal areas have opened up unexpected possibilities.

Classical rock gardeners, whose plant repertoire is comprised of demanding and fastidious gems from alpine and subalpine regions, may well cast a disapproving eye at these strong and sturdy little plants which inhabit some of our rocky outcrops. For those of us who garden in the Piedmont, rock gardening must take another, less trodden path. These little stalwarts that inhabit demanding regional habitats impel us to explore fresh approaches and new plant communities to enrich our attempts at simulating the wild and wondrous terrain of cliffs, crags, and crevices.

Acknowledgment: I would like to thank Dr. John E. Fairey, for introducing me to Boggs' Rock. I am indebted to him and to a Master's thesis by his student, John N. Knox, for the correct identification of the plants mentioned in this article.

Rekha Morris lives and gardens in Pendleton, South Carolina. She reports how she became interested in horticulture:

"Although I never had any interest in living or working in England, fate not only impelled me there but also determined my buying a small row house in Sevenoaks, Kent, one of a complex of four built by a 19th-century nursery owner for his wife and three sons, which he named Hortus Place. There was no resisting the spirit of the place: I left the States as a professional art historian and returned a passionate gardener."

ENDEMIC PLANTS OF THE OLYMPIC MOUNTAINS

by Carla Lankow

Many people visiting the Puget Sound area for the first time are surprised to see the snow-capped Olympic Mountains to the west as well as the Cascades Mountains to the east. Most think of Seattle as being on the Coast and expect to see an ocean to the west. The Olympic Mountains are nearly surrounded by water, with the Pacific Ocean on the west, the Strait of Juan de Fuca on the north, and Puget Sound to the east. To the south, the mountains drop away sharply to the Chehalis River Valley. About 15,000 years ago they were nearly an island in a sea of ice. Near the end of the last ice age, the continental ice sheet moved south and split around these mountains. The western arm of ice pushed west and formed the Strait of Juan de Fuca, and the eastern finger gouged out Puget Sound between the Olympics and the Cascades. This left the highest rocky crags as an island in a sea of surrounding ice and snow.

These geological occurrences contributed to the evolutionary development of the plants of the Olympic Mountains. Endemic plants and animals are often associated with islands

or isolated areas. They continue to evolve while isolated from all other species to which they are related. While surrounded by ice, some plants managed to survive in the high crags of the Olympic Mountains. As a result, of the nine plants endemic to the Olympics, eight are from the high alpine areas.

I hesitate to state numbers of endemics in the Olympics, because, as new discoveries are made and taxonomists revise the status of some plants, the list is constantly changing. Several plants formerly on the list of Olympic Mountain endemics have now been found in small patches in high and isolated places on Vancouver Island. These include such species as *Pedicularis bracteosa* var. *atrosanguinea*, the blood-red form of a common, usually pale yellow *Pedicularis* found in the western mountains. Also included is the Olympic aster, *Aster paucicapitatus*, with snow-white ray flowers and bright gold discs. When found covering a slope mixed with bright blue delphiniums and scarlet paintbrush, this aster makes a very patriotic show! Magenta paintbrush, *Castilleja parviflora* var. *olympica*, is another plant found

in small patches on Vancouver Island as well as in the Olympics. Other varieties of *Castilleja parviflora* are found in the Cascade Mountains from the Three Sisters area in Oregon north into British Columbia, but the bright magenta variety is only found in the Olympics and on Vancouver Island. Most of these plants that are found on Vancouver Island are in small colonies and should be considered as rare as the true Olympic Mountain endemics.

Of the eight alpine species found only in the Olympics, the Olympic Mt. *Synthyris*, *Synthyris pinnatifida* var. *lanuginosa*, is the least familiar to most of us. It is the first alpine plant to bloom in the spring and has finished blooming before the roads and trails to the high country are free from snow. As early as March, its bright blue spike of flowers can be seen on slopes that are blown free of snow. The gray, filigree-cut leaves are familiar to most hikers, even if the flowers are not. Olympic rockmat, *Petrophytum hendersonii*, has small, tight clusters of white flowers on short, drooping stems. Its hairy clusters of leaves are always found clinging to rocks and outcroppings. The inflated, rusty brown pods of *Astragalus australis* var. *olympicus* are more showy against the deeply cut, hairy, gray-green leaves than the cream-to-off-white flowers. These fat pods give the plant its common name, Olympic rattleweed.

One of the most showy of the Olympic Mt. endemics is Piper's bellflower, *Campanula piperi* (p. 49). This little campanula manages to exist on the most exposed and wind-swept rocks and outcrops by sending its roots deep into cracks in the rock. The flowers are like strings of bright blue-lavender stars along each crack in the rock. *Campanula piperi*'s leaves are very different from those of most campanulas, being prickly hard, little, holly-like

leaves. Even more showy than the blue form, the white-flowered *Campanula piperi* sports pristine, white stars.

In the same wind-swept and sun-baked rocks where we find *Campanula piperi*, we also find another endemic, *Viola flettii*. I am always surprised to find it there; somehow violets should be growing in some shady glen, not clinging to a tiny crevice in high crags. But there it is, every time, with its large, lavender flowers. The leaves of *Viola flettii* are a soft, gray-green with distinctive, dark red veins, the reverse of the leaves being the same dark red.

Even though most of the Olympic Mountain endemics are fairly common in their range, that island of craggy peaks is less than 100 miles across. All these plants should be considered rare and in jeopardy from man and the elements. Walk lightly in the mountains, and enjoy these wonderful wildflowers.

Carla Lankow gardens with her husband George on five acres in western Washington. They have a large rock garden of "easy" alpiners and several large beds of species iris. Carla has been interested in all types of natural history since she was a child, having been raised by avid birders and rock hounds.



SIDETRIPS FROM SEATTLE

by Ilse Burch

I have only lived in Washington State for about 14 years, and I only have a few pages to describe Washington and the Pacific Northwest for the benefit of those coming to the year 2000 meeting. I will mostly describe my favorite things to do. I guess I bore easily, so I enjoy a lot of variety in my fun. I like everything to do with nature, but I am somewhat terrified of heights. I keep working on my phobia, but you won't find me recommending anything really extreme.

My discovery of many of these places came through serendipity and poring over maps. I may have missed some great places; I apologize if I don't mention a favorite of yours. Please tell me about the wonderful places I missed!

The year 2000 meeting will take place in Fife (a little town just north of Tacoma), and we will hike on Mt. Rainier. In addition to the hikes chosen for the meeting, there are many other areas that might interest a person who wishes to experience more of the area. This article is not intended as a substitute for research at your local library or the internet. If you do these things, you must have maps. I suggest

that everyone planning to go anywhere in Washington get a DeLorme Washington Atlas and Gazetteer as a start. I suggest the Oregon version for people wishing to visit Oregon, and there is even one for Alaska, and probably for Idaho, etc. These maps have details that you won't find on regular state maps. For example, they show rockhounding sites, logging roads, and local springs. Note that local road conditions change frequently, especially in the spring after high water. So be sure to do your homework.

The Pacific Northwest is a large area with many different ecosystems, and a different flora for each ecosystem. The Pacific Northwest includes British Columbia and Alaska, so the information here is but a fraction of that needed to adequately describe the whole area. For the purposes of the traveler to the meeting in Fife, I will work outwards from that location, with a focus on southern Washington and northern Oregon, where I have more experience.

ALONG INTERSTATE 90

The Cascade Mountains offer some wonderful hiking. Snoqualmie Pass on

I-90 is a great place to start. These trails are very well used and often crowded on weekends, but they are beautiful. I especially love Snow Lake, although any hike in the Alpine Lakes Wilderness is apt to be beautiful and will lead you up high into true alpine tundra. Pets are prohibited from the Alpine Lakes Wilderness. Please remember to get a special parking permit from a ranger's station to allow parking at trailheads. This permit must be used in Washington and Oregon, including in the Gifford Pinchot National Forest.

Farther east on I-90 are several cute little towns, and if you get off in Cle Elum (pronounced 'clay ellum'), you can easily drive to the scenic Teanaway River area (pronounced 'tee-annaway'). The dirt-and-gravel road up the north fork of the Teanaway goes all the way up to an area where fairly easy access to true alpine meadows is possible. From the small parking lot, just a relatively short hike gets you into the Alpine Lakes Wilderness area at a trailhead that is not nearly so well used. Here *Lewisia columbiana* grows on rocks in and around the fledgling Teanaway River, and I have found butterwort (*Pinguicula*) in the seeps. *Gentiana calycosa* is common in this area and lovely in the late summer. Beware of any abandoned mine shafts you find (usually filled with water), and enjoy the views of Iron Mountain and the Stuart Range.

If one travels even farther east on I-90, one drives through two mountain passes to the Columbia River and the Gingko Petrified Forest at Vantage. This area is a desert, complete with cacti, sagebrush, and various phloxes, to round out the desert ecology. If it is raining in Seattle, it is usually clear to cloudy here. This area once had an impressive forest of huge trees. The theory is that the trees fell in a lake and were waterlogged and covered

with mud before lava flowed over them, sealing the top. Thousands of years later, the trees are truly petrified into stone, still showing growth rings, etc. Surrounding this Gingko Petrified Forest is public land, where you can walk and pick up petrified wood chips almost wherever you go. It was legal to dig for small quantities of petrified wood last time I checked, but please do fill your holes. This is very steep and dry terrain, so be sure to wear good shoes, carry water—be prepared. The area abounds with wildlife, too, so keep your eyes open, and you might see something.

VOLCANO VIEWING

Another style would be a volcano-viewing trip. The Cascades are composed of a string of volcanoes. Besides Mt. Rainier, Mt. St. Helens is an interesting and convenient place to visit. Farther off the beaten track is Mt. Adams. As a monument to the tenacity of life and the raw power of the earth, volcanoes are hard to beat. Apparently, there is a Mt. Rainier Scenic Railroad in the town of Elbe. I have not personally taken the trip, but I'm sure it would offer scenery with comfort.

On the way down to see the John Day Fossil beds in eastern Oregon about three weeks ago, there were times when I could see two or three giant, white-topped volcanoes rising to the sky all the time. We drove the back roads through the Mt. Adams area (mostly in the Gifford Pinchot National Forest) to get to Oregon. These gravel roads were really pretty okay (I can't bring myself to use the word "good"), for a prudent person who is not in a hurry. If you are willing to relax and drive the potholes at a sensible speed, then you will do fine. If you must hurry, then you should probably rent a Humvee.

There are many signs of volcanic activity in the Gifford Pinchot National Forest in the southern part of the state, as well as some impressive trees and beautiful little lakes. The Indian Heaven Wilderness is a place I'd like to explore more in the future. It is a dry area with bear grass (*Zerophyllum tenax*), and all the associated plants and trees, but there are many small lakes, and the views of neighboring volcanoes are superb. The Indian Heaven Wilderness doesn't get nearly the use that many areas experience, so it offers more solitude. The Pacific Crest Trail runs through the Indian Heaven Wilderness, if you wish to see what that's like. One thing that makes life a bit easier is that the altitude gain on most of the hikes isn't nearly as great as that of the average mountain hike in the Cascades.

One of my favorite places is the large lava bed in the Gifford Pinchot National Forest, an amazing place. It is one of the most rugged, desolate places I have ever seen. The best way for me to describe it is to say that it is as if huge lumps and sheets of lava were tossed together on an area much too small for them. There are caves and valleys and cliffs, and these are covered with mosses, junipers, dryland ferns, and penstemons. In the valleys there are vine maples and a few stunted hemlocks. Even though the lava bed has little elevation gain, there are no flat places to walk here. It is all up one lava cliff and down the next, from caves, where it is very cool, to cliffs, where it is very hot. It is a very easy place to get lost, and there is no water to be found by people, so be careful. I think the pikas and other rodents have access to springs under the lava, but I could be wrong. In any case, there are lots of little animals about, and they serve up a neatly arranged, seasonal salad of dried bear-

grass, leaves, and colorful mushrooms in the caves.

Near the lava beds are "ice caves." They are to be found five or six miles to the east of the north end of the lava bed. The "ice caves" are lava tubes created when the outer areas of a lava flow cooled and hardened, allowing the center part to flow on out. These caves are very well insulated, allowing them to keep cold through the summer. They must have been really popular when the region was settled—cold beer all year!

SHORE

Washington has a nice seashore, and so does Oregon. Most Washington beaches are rather sandy and good for walking on but have few tide pools, except on the Olympic Peninsula, where there are lots of rocks and even stacks (tall rocks) in the ocean. Be sure to have a tide chart or table if you wish to take the beautiful hike from Ozette to Cape Alava. The high tide can make the beach impassable, and the headlands are steep, treacherous, and hard to cross. There is serious danger in these headlands. However, at low tide, it is an easy, flat, albeit a bit long hike. I really do recommend it, as there are a variety of ecosystems. The last time I was there I saw a golden eagle, lots of deer on the beach, and other wildlife, especially seabirds. The ocean is beautiful, the rocks on the beach are beautiful, and if you are vigilant, you may see the petroglyphs.

Oregon beaches are very interesting and have lots of tidepools. The last time I was down there I saw a pair of sea otters, a thrill for me, because I really like otters. A drive along the Oregon coast, with frequent stops for little walks, would be wonderful.

EASTERN OREGON

The eastern half of Oregon has a cli-

mate similar to eastern Washington, which is quite dry. This is because the Cascade Mountains catch and block the rainfall. The last time I was in eastern Oregon, I saw antelope, a porcupine, and few other creatures, including free-range cows and a rogue free-range llama. If you hit a cow with your car, you own it, so be careful. At night, in a couple of locations, we were serenaded by bugling elk and by one creature that may have been a youngster learning to bugle. WHATEVER-IT-WAS made the hair stand up on the back of my neck. There wasn't much to see from the standpoint of plants, since most plants seemed to be waiting for the snow to fall. But then it was September, and we were at high altitude.

The John Day Fossil beds are within a day's hard drive of Seattle, and since I was there so recently, I have to describe them. We camped with the cows, although there is a bed-and-breakfast in Dayville, which I am told has air conditioning. Be advised that this is a very warm place in summer. There are three separate geologic areas that span one of the longest continuous fossil records in existence—from 54 million to 6 million years ago. For the sake of clarity, I must advise that there are no dinosaur bones. However, critters did run big in those days: rhinoceros, deerlike creatures, early horses, tortoises, and some extremely nasty, large-toothed cats and dogs. The enormous beardog, which looked a lot like my Corgis in shape, but had a shorter nose and bigger teeth, could attack just about anything that lived—and climb trees, too. And if the predators didn't get you, the lava and lahars (hot ash flows) would, as the whole area was covered with hot ash on a regular basis. Life must have been quite dramatic. There are plenty of plant fossils and many animal fossils

to be seen in the visitors' center. Naturally, no fossils may be collected. Again, there are some Indian petroglyphs to be seen if you are clever enough to find them. This area is really worth the drive for great, colorful desert scenery and the amazing glimpse of the past one can get through the fossils.

I haven't done a lot of exploring in Oregon until this year, so I can't say much more about its attractions, although obviously Mt. Hood resides in a very scenic area of northern Oregon. And let's not forget the Columbia River Gorge. If you wish to drive quickly, take Interstate 84 on the Oregon side, and if you wish to meander, the smaller roads on the Washington side are best.

For those of us who like to sew (yes, this is a slight diversion from the main topic), I highly recommend the Pendelton Woolen Mill Outlet Store in Washougal, Washington. Great wool fabrics are only \$3–\$10 per yard. They also have ready-to-wear clothing and hats, both seconds and discontinued from their current line of clothes.

I hope this article piques your interest. If you have any questions, or wish to berate me or enlighten me on a topic, please do write.

Ilse Burch's love of plants is the result of a childhood spent running around a mature beech forest in Ohio. At age four, she planted her first seeds—marigolds. At seven, she discovered that crocuses do well planted in gravel walks.

Ilse came to rock gardening when she moved to Seattle 13 years ago. Special interests include wierd plants—species *Clematis*, arums, green flowers—and plants with fragrance or good foliage. Ilse lives and gardens in Issaquah, Washington, on the Pine Lake Plateau, approximately USDA zone 7.

MT. RAINIER

EXCERPTS FROM *SUNRISE TO PARADISE*

by Ruth Kirk

excerpted by Patricia Bender

SUMMER'S RUSH

Summer comes late to the high country and leaves early. Result? Plants above 5,000 feet do not place their entire faith in seeds. They may set seed, but no high-country species relies on starting over each year. There is not enough time between one year's melt and the next year's snow; plants survive as perennials rather than by testing fate as annuals. Most hold stem and leaf buds barely within the soil or just above its surface, protected by snow from freezing and perfectly positioned for renewed growth as soon as the world shrugs off its white mantle.

In an experiment, plants once were moved from lowlands near the Tyrolean Alps to upper slopes as a means of studying how they would adapt to a mountain environment. As expected, most died, but plants that lived developed shorter stems, greener leaves, brighter petals, and earlier bloom. Their lowered growth reduced exposure to wind and optimized use of warmth from the ground. Their deepened pigmentation accelerated absorption of the sun's rays. By speeding life processes, the plants increased their odds of leafing out, growing, and flowering within the time available.

Some of Rainier's subalpine plants put out only two or three leaves per year and lengthen their stems by the merest fraction of an inch. But they may have long roots. A moss campion two inches high may be rooted more than a foot deep. It needs such deep roots as an anchor against wind and sliding soil. Root depth would be a waste if water were the purpose; water tends to be available near the surface.

Avalanche lilies have perfected the art of coping. Each September, as other plants are shutting down for winter, these lilies start growing at the tips of their bulbs. They anticipate summer. When it actually approaches, they perform an extraordinary juggling of metabolism and literally melt their way up through thinning snow. Stored carbohydrates permit this burst of energy. They raise the temperature of the plant and also warm the air in the melthole enough to let photosynthesis begin.

The avalanche lilies are a signal. Summer has arrived in the high country. It comes with a glorious rush, a sort of biotic urgency that skids over spring and flings out all possible warm-weather splendors at once. Water that had dripped and trickled

suddenly cascades, and marsh-marigolds bloom—creamy and golden—submerged in its eddies. Waterfalls spill from cliff tops. Lakes thaw, briefly host icebergs, then take on the sparkling blue of summer. Mother bears venture out with their cubs. Marmots shriek odes to the worth of risking danger from eagles rather than miss a moment's sunshine.

Although deserts may seem the quintessential harsh environment, Rainier's high meadows are equally demanding. Hard-core adaptations gird their gentle look.

Nature writer John Muir in 1888 described Paradise as "the lower gardens of Eden...filled knee-deep with fresh, lovely flowers of every hue, the most luxuriant and most extravagantly beautiful of all the alpine gardens I ever beheld in all my mountain-top wanderings." Perhaps too many people have agreed with him. Only one century separates Muir's Eden from today's all-too-real problems owing to the excess of one species: people. More than a million visitors a year now come to Paradise. Twelve miles of maintained trails lead through flowers and to vantage points, but mixed with them are shortcut trails, abandoned horse trails, old roads, former campgrounds, and scars from the rope tows of a ski operation. Damage from the horse trails is the most severe. The riding concession closed in 1965, but a full quarter-century later some trails still cut glaring swaths five to ten feet wide with foot-deep ruts.

Through the years, piecemeal efforts attempted to correct such flaws, but not until the 1980s was a systematic plan worked out. National Park Service rangers, botanists, sociologists, interpreters, a landscape architect, a trail crew foreman, and volunteers set to work. Their first step was to analyze why trampling continued despite

efforts to discourage it. For example, barriers closing off an area to allow plants to recover were being ignored. So uniformed rangers strolled the trails. They asked questions. They listened. People said they recognized yellow polypropylene ropes as a barrier, but not split-rail fences. In cities, yellow ropes closed off critical areas; the park's rail fences seemed bucolic, even decorative. Signs that admonished "Protect the Meadows. Stay on Paved Trails," conveyed nowhere near the punch of "Off-Trail Hikers May Be Fined." One family seated in the flow-ers explained they were not walking off the trails, but picnicking. Photographers denied they were trampling; they were looking for a camera angle.

Inventive excuses called for inventive solutions. Interpretive panels explaining meadow ecology went up, and, as a training mission, army helicopter crews lifted handsome wooden benches and large rocks into position along trails to invite rest and contemplation. Botanists and volunteers turned their attention—and aching backs—to replanting scars at Paradise and Yakima Park, on opposite sides of the Mountain.

In 1990, friends of a Rainier aficionado celebrated her fiftieth birthday by laboring for a weekend in the meadows. They have returned every summer since. So have a host of other volunteers, about half of them as individuals, half from organizations such as Elderhostel, Boeing Management Association, the Native Plants Society, Garden Clubs of America, Canon USA (the copy machine company), "Good Neighbors" from Target stores, the crew of the U.S.S. Rainier (a supply vessel that comes to Bremerton every year), Boy Scouts, Girl Scouts, and environmental science classes from schools in the surrounding area.

University students in Tokyo have even paid their own way from Japan to volunteer at Rainier; Superintendent Briggie was the only national park superintendent in the United States to answer a Waseda professor's letter asking about such an opportunity for his students. Briggie knew that Renton resident Dixie Gatchell, the volunteer who manages the program, would find a task for them. Her computer file of Volunteers in Parks holds almost a thousand names, and a website (www.nps.gov/volunteer) posts openings for more. Opportunities range from carpentry and painting to engineering, giving roadside assistance to motorists, acting as campground hosts, and patrolling the backcountry.

Volunteer work in 1997 totaled more than 52,000 hours. In the subalpine meadows alone, fourteen volunteer groups that year contributed 1,800 hours to loosen compacted soil, construct erosion barriers, fill ruts, set out plants, and sow seeds and lay temporary protective covers of excelsior netting over them. At Yakima Park, they lifted 4,755 plant clumps from the mile-long road to a campground closed twenty-five years ago, covered them with burlap, and left them in a tree while National Guardsmen recontoured the land, using heavy equipment flown in by Guard helicopter crews. Then they replanted all that they had salvaged.

Meanwhile, the park horticulturist tended meadow cuttings and germinated seeds in the "re-veg greenhouse" at park headquarters in Ashford—which operates something like a hatchery, but for plants instead of fish or chickens. Seeds and young plants start in the warm greenhouse, but soon are moved outdoors. It would not do for them to get used to the good life only to be released back

into their natural, high, harsh environment. Greenhouse success sent 40,000 two- to three-inch transplants back to subalpine meadows in addition to the 4,755 salvaged at the former campground. Fifth-grade students from the Ashford school help with the ongoing work.

Part of the restoration program's success depends on heeding the genes that have evolved to meet meadow realities—and this may represent an exceedingly long time. For example, botanist Ola Edwards has made the astonishing discovery that Rainier's heather communities are truly ancient. Individual plants may live fifty years and may take two centuries to become established as a community. Once successful, the community endures. Edwards collected buried stems from beneath pink and cream and white heather mats and sent them off to be carbon dated. Back came the report: more than 7,000 years old. Corroboration of the date came from beneath some of the heather patches: a layer of volcanic ash from Oregon's Mount Mazama, which blew its top and formed Crater Lake 7,000 years ago. The ash lay as a thin white line, well *above* the base of the debris of heather stems and seed capsules underlying today's living plants. The total accumulation is over three feet deep: today's heather meadow is growing on top of its ancestors from 10,000 years ago. Bees are pollinating heather blossoms located in the same places where Rainier ancestor-bees were pollinating ancestor-heather while the Bering Land Bridge still connected Siberia to Alaska. Few plant communities on Earth can claim such antiquity.

CONTINUITY AND CHANGE:

Rainier's ancient heather communities have somehow escaped the seesaw

of climate. Protected by snow in winter, and inherently drought-resistant in summer, their claim to the land has lasted for millennia. The Mountain's garden-like meadows as a whole, however, ride the seesaw. Trees started an invasion in the 1930s and they noticeably stepped up their advance beginning in the 1980s. If warming continues, the trees' pace probably will quicken still more. Today's visitors stroll across a broad meadow mosaic broken by slopes newly shaggy with fir saplings. Tomorrow's visitors may find mostly trees, with flower patches here and there. Treeline rose during the warmer period that began at the end of the Ice Age, 9,000 years ago. It dropped, beginning about 5,000 years ago, as climate cooled. Now it is again rising.

Lowland forests seem more timeless than this. They close in upon themselves, do not tempt eye or mind with a distant horizon. To sit beneath giant Douglas-firs or silver firs, or to walk among red cedars, is to find the reassurance of something bigger and older than ourselves. Trunks are straight, with first branches 100 feet above the ground and total heights as great as a twenty-story building. Diameters are four to five feet. Lives date from a time before Columbus headed west -or even twice that long ago.

We sense stability, but we are looking at change. Rainier's forest cloaks 200 square miles of ridges and valleys, a remnant of what once seemed endless but now—outside the park—is cut over and paved over and populated. Inside the park, the forest continuity is a mix supported by differing soils, on differing slopes and valley bottoms, exposed in differing degrees to sunlight and snowfall. In places such as the Cougar Creek Campground above Longmire, lahars [mudflows originating on the slopes of a volcano—ed.]

have set the clock back to zero, leaving such poor soil that Douglas-firs a thousand years old may have trunks little more than two feet in diameter. In other places floods have toppled giants, or advancing glaciers have overridden them. Windstorms have left patches of broken stumps and jack-strawed logs. Avalanches have streaked slopes, breaking and ripping trees grown tall in the years since the previous avalanche, and sliding over shrubby vine maple and Sitka alder that are hunkered within the lower snowpack, supple enough to bend without snapping.

And there is fire—catastrophic fire. Water may drip, trickle, gurgle, rush, roar and swirl gray veils of mist. Its sogginess does not preclude fire. Indian people regularly set fires to manage Rainier's high country. "That's so the berries would come back," says Puyallup tribal member Karen Reed-Squally, a basketmaker and consultant at the Washington State History Museum. If you don't burn those sites, the trees come in. Burning was real important. Each family had its own spot, and they took care of it."

Lightning starts other fires. "The land appears bleak and friendless," writes William Moir in *Forests of Mount Rainier*. "A fire has transformed the tall trees into a dismal graveyard of charred and dying skeletons...In reality, the earth has just had a massage." Raindrops, previously caught by the trees' canopy and held till they evaporate, instead soak the soil. Ashes provide the "sweet balm" of fertilizing minerals. Sunlight warms the soil and evokes "dormant responses [held in check by] long centuries of cool shade. Now, with the suppressive effects of the tree layer removed, a new plant life is ready to begin." The forest is recycling.

The biggest fire yet known came in the year 1230. It devastated more than ten percent of the forest within today's park boundaries but was only one conflagration of many. Counting growth rings in today's forests back to when the trees started growing indicates the dates of the fires and gives a sense of their frequency: 1303, 1403, 1503, 1628, 1688, 1702, 1803, 1825, 1856, 1858, 1872, 1886, 1897, 1930, 1934. These are the years that correlate with prolonged summer and fall droughts. The odds of wildfire at any particular spot average about once every 400 years.

If fire overtakes a slope mantled by silver fir, the heat will be intense enough to send flames racing through the forest canopy as well as along the ground. Only scattered survivors will stand; the fire's main legacy will be new openings, where bracken fern may sprout, its spores borne by wind. Once established, the fern is likely to thrive more than a century while a new forest grows up through it. Snowbrush also follows fire. Its hard-coated seeds may lie dormant for decades or even centuries until, cracked by heat, they absorb moisture and germinate. Vine maple, too, follows a survival technique. It sprouts into spindly shrubs wherever its branches touch soil or are buried.

In the western hemlock forests of valley-bottoms, a different postfire sequence takes place. Douglas-fir and perhaps noble fir and western white pine are most likely to lead the reconquest. They thrive in sunny openings and, after a century, will form a lofty green parasol shading the forest floor. Their own progeny cannot grow in such dim light, but western hemlock will sprout successfully in the moist bark furrows or rotting wood of fallen Douglas-fir. The hemlock grow into seedlings, then saplings, then rivals of the existing forest, then its ultimate

successor. Some Douglas-fir may remain as a forest component for 600 years or more. Theoretically, the hemlock forest will endure until the climate changes—or the next disturbance restarts the whole process. Individual trees remain after their general forest type has surrendered. Douglas-fir 750 years old are not uncommon, and some last for 1,000 years and more. They grow slowly and live long. Individual hemlocks occasionally reach 400 to 500 years of age. The oldest known tree in the park is an Alaska yellow cedar in the Carbon River area. It is a monarch seven feet in diameter and 1,200 years old. It stands among other giant cedars, evidence of a millennium without catastrophic disturbance.

The paradox of the Mountain as a physical presence is that, though it seems constant, it is constantly changing. So too is the life upon it. In only one season's time, after part of the Paradise Ice Caves collapsed in 1928, moss and algae started to dot rock unexposed to light for centuries. After six months, a hundred square feet of raw rubble were hosting two kinds of moss, an alga, a lichen, horsetail, two grasses, and yellow monkey flower. When a tree falls in the forest, its store of nutrients and its claim to light flows back into the system. Prostrate, the tree becomes a nurse log for future forest giants. When a tree dies but still stands, it becomes a banquet table for bacteria, fungi, and beetles, and therefore for hungry woodpeckers, whose foraging results in cavities large enough to become apartments for bats, squirrels, voles, and owls. Death nurtures life. The community endures.

Reprinted with permission from *Sunrise to Paradise, The Story of Mount Rainier National Park*, University of Washington Press: Seattle, London. 1999.

PLANT PORTRAIT

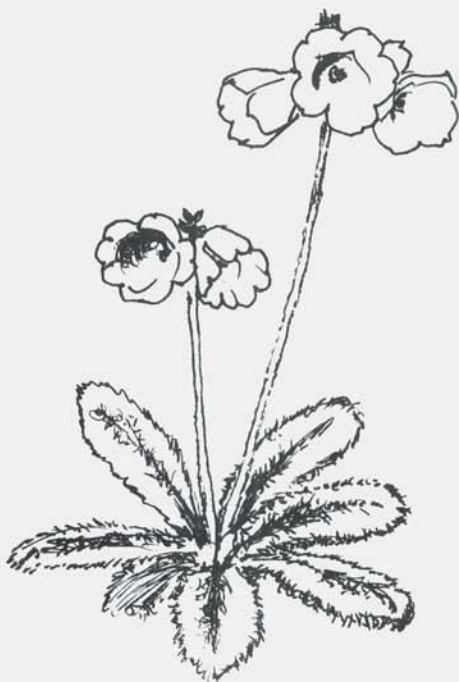
Primula reidii, diminutive delight

It was a great pleasure to be asked to write about *Primula reidii*, a plant that has to be my favorite primula species. I particularly like it because of its gorgeous scent; I think one plant could easily scent an entire alpine house. When in flower, I cannot imagine it being shown and failing to place.

Primula reidii comes in two forms. In the type variety, *Primula reidii*, the **flowers** are colored blue, purple, or green (?), with a white or ivory corolla. The other form, *Primula reidii* var. *williamsii*, is larger, and normally blue-flowered (but white and purple forms also occur, according to my source). The flower size is huge for the tiny plant. The mouth of the flower may be open more than 1". There are few flowers on the stalk (1–10" variety *reidii*, and 5–8" variety *williamsii*), and the flowers open one or two at a time. Both species and variety smell fabulous! I suppose that if I were polishing an old brass lamp and a genie came out and offered me a wish, I might ask to have a patch of these blooming out front all of the time. Then the neighbors would think that I was crazy—spending all my time face down in the front garden! Culture for the two varieties is identical, although I suspect the larger form to be a bit easier to grow. One source states that the leaves are 20 x 30 cm. long; another states that leaves are 3–20 cm. long. None I have grown, of either variety, have ever had a rosette over 4" in diameter.

In nature, *Primula reidii* is found growing near small trickles or streams of water, as well as on wet rock ledges and cliff crevices. It is a softly downy plant with a hairless and often somewhat mealy flowering stem. The resting buds tend to lie close to the surface in the winter, and unless looked after, they may heave and dry out in cold weather. Total height of the flowering plant is 4–6".

Primula reidii is actually pretty easy to grow, although it is short-lived and seldom seeds in the garden. It will rely on the gardener to keep it going, but if pollinated it produces scads of seed that germinate very well in a moist, peaty soil when surface sown. The seedlings are tiny and fragile and seem to take great harm from heat. They also appear to be fed on by the larvae of fungus gnats. The fungus gnat also likes a nice, moist, peaty soil, and since the gnats are tiny and hard to see and they like cultivation, everyone probably has a healthy population in the greenhouse, etc. It may be a good idea to try two different seedpots in different cool spots, to avoid "putting all of your eggs in one basket." I was able to flower *P. reidii* twice in the garden in a peat bed, facing north. The next time I get seed, I will probably use a sand plunge bed to keep the plant cool in its infancy. *Primula reidii* needs little light, and a north facing spot is perfect. Beware of planting it with more vigorous plants, as it is definitely not competitive and will rot if other plants smother it.



In mild climates, *P. reidii* var. *reidii* and *P. reidii* var. *williamsii* may also thrive in troughs. An alpine house might be effective provided that the lowest temperature is not too extreme. I suspect that a couple of inches of snow would also help protect the plants in winter.

Seed germinates easily and copiously in the spring. *Primula* seed requires light to germinate, so it must be sown on the surface. I use just a tiny bit of very fine grit or white sand as a mulch. Humidity is important in germination because the seedlings will have trouble shedding their seed coats if the seed coats shrink onto the cotyledons. These are naturally small plants, which means small seedlings. The tiny plantlets seem to like each other's company as long as they are not too crowded. They are tiny, and when the time comes to separate them it is not easy without use of a magnifying

device. However, the seedlings are quite durable when transplanted. If kept moist, maybe under mist, and out of the sun, they will regenerate any broken roots and grow on well. The seedlings will usually bloom the second year if they survive the winter.

Winter survival is always iffy. I have found that small groupings of seedlings tend to survive the winter better than single plants, possibly because they anchor each other down. Good drainage is essential, for the seedlings can easily be heaved out of the ground and desiccate. A cover might help, but if the winter sun made the temperature under the cover too steamy, that might also kill the plants. A grit mulch helps to hold the plants in place. I always expect to lose a third or more of my plants to winter causes, since I don't yet have an alpine house.

Even under the best of conditions, *Primula reidii* is hard to keep going for long. I asked Rick Lupp of Mt. Tahoma Nursery if he had any advice for this problem. He indicated that it was hard to adjust to the idea that *P. reidii* was short-lived, because it was such a nice plant, but that if one wishes to keep it, one has to keep starting it from seed. He agreed with me that it's worth growing for its scent alone.

It is easy to obtain seed for both varieties of *Primula reidii* from the seed exchanges. For those gardeners who know how to please these plants, apparently they usually do very well and set lots of seed. *Primula reidii* is available through commercial sources, primarily specialty alpine growers and alpine nurseries. I hope I have not discouraged anyone from growing this wonderful little plant. It is really worth the effort and is a joy in bloom.

—Ilse Burch

Musings from a Rock Garden

WATERING

It may seem strange that the subject of watering is seldom discussed in much detail in books on rock gardening, but there is a good reason for not being too specific. Drainage, soil pH, exposure, and other essential requirements for growing a plant are permanent prescriptions that can be generally stated and used with only minor modifications anywhere and anytime. When to water, however, is a temporary measure that depends partly on common sense, e.g., don't water when the soil is wet, and to a much larger extent on guess work. Most true alpinists, which start their yearly life cycle when the snow melts, need constant moisture in the spring, and if at that time a dry spell comes around in the rock garden, watering becomes an essential requirement. Lowland rock garden plants may not be as exacting, but I have never met a plant that would object to being kept in moist soil in the spring.

The real controversy begins in summer, when climbing temperatures and highly variable precipitation patterns can render a rock garden bone-dry within a few days. At this point, rock gardeners divide into several categories, on one extreme being those who 'never water' and on the other those who start watering whenever it doesn't rain for three days. Personally, I take the 'never water' category with a large grain of salt, but, as will be seen later, there may sometimes be a basis for such a stand. On the other extreme, I can well imagine circumstances when seemingly too frequent watering does make sense. Prevailing day and night temperatures, air humidity, soil structure, and closeness of big shrubs and trees influence soil water content and availability to such an extent that an adverse combination of these factors can indeed require a frequency of watering that might otherwise seem almost ridiculously excessive.

Obviously, much depends on the plants themselves. Simply stated, some need more water than others, and one of the best rules for planting is to group plants with similar requirements together. If this is done, some sections of a rock garden will have to be watered more (or more frequently) than others which, however, is a small price to pay for keeping the plants alive. Although variable requirements for watering clearly indicate preference for a hand-held hose as against a sprinkler, not everyone has enough time and patience to spend hours idly watching a stream of water issuing from a nozzle. Besides, nature itself pays absolutely no attention to our designs, and rain falls equally on the just and the unjust.

Watering as such, however, involves some basic controversies. One of my sad, but useful, summer chores is performing autopsies on victims of our beastly climate, i.e., excessive heat and humidity, day and night, aggravated by prolonged absence of actual precipitation. Drought and disease are prime suspects

when such deaths occur, but because these two factors frequently combine, and a drought-weakened plant is especially susceptible to fungal attack, the distinction between the two is seldom clear. The precious buns that suddenly discolor and rot at the central stem are almost surely victims of a fungal disease, and although a lack of water may have been the cause of the original weakening, the disease, aggravated by the presence of moisture, was the ultimate killer. It appears then, that the same water that prevents wilting and drying up of the root system also increases the fungal virility, and, to press the point to its logical extreme, that one may just as well not water at all.

However, there *are* a few measures one can take to make watering less damaging. Perhaps the most important one is to reduce its frequency by watering "deeply." Although doubling the amount of water one pours over a flower bed will not necessarily double its availability to the plants and will not cut the frequency of watering in half, it will contribute to both purposes to some extent. Placing the hose on an elevated spot and turning the water flow down to a trickle for several hours, or overnight, is a convenient way to water deeply. A larger rock garden may be divided into two or more segments, each to be watered separately. The amounts of water can then be adjusted to the moisture requirements of the plants. In general, sprinkling should be done only in the morning, so that plants have a chance to dry out before night arrives.

At this point, it should be obvious that the subject of watering a rock garden is replete with contradictions. The thorniest of them is what to do with the so-called xeric plants, i.e., those that in nature grow in dry or desert environment. The common wisdom is to water them only during their active or growing phase and then not at all. Purists may even put a glass pane over them as a protection from summer rain. If they can survive weeks or months without water in nature, so will they in a dry rock garden, right? Perhaps, in some rock gardens, but not in mine, and I suspect in many others located in areas with hot and humid climates. I have killed more xeric plants by not watering them during summer droughts than by watering others. I have no logical explanation for it—but then I have never used the glass-pane method either.

Clearly, categorical statements regarding summer watering are apt to be wrong, and only one's own experience really counts. All we can and should do is consider our own conditions and then guess our way out of the maze. In my own case, after experiencing two subsequent and dreadful summer droughts, I am resolved to water more and more deeply than I used to. Besides, watering, although it may not always work, is nevertheless much more effective than doing a rain dance in breaking a drought.

—Alexej Borkovec

BOOKS

Penstemons, by Robert Nold. 1999. Timber Press, Inc: Portland, OR. 307 pp. 43 color photos, 12 botanical paintings, 18 line drawings. Hardcover, 6x9". ISBN 0-88192-429-6. Price, \$29.95, plus shipping and handling. NARGS Bookstore, \$24.

Penstemons, written by Robert Nold, is a summary of the genus *Penstemon* with emphasis on dryland gardening in the Midwest. Nold's philosophy of minimum supplemental moisture for garden plants and the genus *Penstemon* fit well together. Although he discusses *Penstemon* in the Mediterranean garden, rock garden, the traditional garden, and in container gardening, the dryland garden is his main passion.

In his book, Nold combines a vast amount of personal experience, scientific literature and visuals to produce a book that contains the basics of penstemon gardening. The center section contains twelve exquisite color drawings and 43 outstanding photographs. Scattered throughout are 12 line drawings that illustrate many of the points Nold makes in his text. It is easy, entertaining reading.

Nold's style is similar to that found in *Jewels of the Plains* by Claude Barr, whom Nold quotes several times in his book. Nold frequently emphasizes that what works for one gardener in cultivating penstemons may not work for another because of climate, soil, moisture and location differences. He encourages gardeners to try a spectrum of several species.

Nold admits, like many penstemon enthusiasts, that there is disagreement on the classification of species within this genus. He uses the classification and divisions that are, for the most part, accepted by the American Penstemon Society (APS). His chapter on the description of individual species is the largest section of the book. The chapter "Related Genera" is useful to all those trying to sort out genera that are similar to *Penstemon*. It briefly discusses the genera *Chelone*, *Chionophila*, *Keckiella*, *Nothochelone* and *Pennellianthus*, all of which are similar enough to *Penstemon* that, at one time or another, they have been considered part of the genus *Penstemon*. The chapters "Hybrids," "Propagation," and "Pests and Diseases" will also aid the penstemon gardener in growing their plants.

The Appendices add useful information on related plant societies, watering schedule, gardener's calendar, selected penstemons by flower color, and further reading. The glossary and bibliography add additional valuable information for those who need a better understanding of penstemon terms and for those who want to delve into penstemon in more detail. This work complements other recent books on *Penstemon*. It contains general information with enough details to guide the gardener. It encourages the growing of penstemons, even if problems arise.

This is a "must" book for anyone interested in *Penstemon*, especially for those in the midwest USA. It is the most complete, one-stop source of information on

penstemon gardening in the USA that is currently available. Bob Nold and his wife, Cindy Nelson-Nold, have done a great job of bringing together the skills of writing and artistic drawing.

—Dale T. Lindgren

Penstemons, by Robert Nold. (see above)

It is very easy to love penstemons. The all too numerous species lead a gardener on and on searching for the perfect plant, trying to grow them all, at least trying to find out about them all. At first the American Penstemon Society seems to be the obvious short cut to the answers. APS has a great seed list, a lot of enthusiastic growers, members who live in penstemon country and write vivid descriptions of penstemon hikes. They bring back seed for the seed list and take part in "robins" to share their knowledge and gardening experience.

But APS has never been enough. This source for penstemon truth has always lacked a basic reference. The floras of the various regions of the US and Canada and the local wildflower guides for even more local regions and the publications of the APS all contain bits and pieces of information which are more exhausting than exhaustive. What was needed was a book written for gardeners that encompassed all penstemons, one that told you what was growable, what was difficult, and most of all what actually exists.

Now Robert Nold has produced just that. Although it is 15 years too late for me, I am still grateful. *Penstemons* summarizes so much information that may be accessible if you know where to go to look for it, but which most gardeners would never have the time or ability to discover. What a pleasure to see it all in print and gaze lovingly at the photographs of plants one has killed, discarded, longed for, or actually grown more or less successfully. There are some beautiful watercolor paintings here, too, done by Cindy Nelson-Nold, as well as her line drawings. I would like to mention as my favorites the drawing of a gorgeous *P. nitidus* and a photo by Panayoti Kelaidis of *P. acaulis* var. *acaulis*.

The word "monograph" brings to mind a dull, dry, confusing list of plant descriptions burdened by botanical jargon with language that could be Sanskrit for all it conveys to the average reader. A wildflower book makes you think of descriptions of hikes with the occasional mention of a flower, using its common name of course. So writing a book about penstemons requires very careful walking the razor edge between talking platitudes and talking above the reader's head. Bob Nold walks this treacherous path beautifully. His language is clear, and when he uses a necessary botanical term you can find it in a glossary, but the writing is also personal, sometimes acerbic, and often amusing. Nold casually offers common names and translations of botanical epithets when it seems helpful in visualizing the plant. Some of the descriptive language borders on the botanical, but with the help of the glossary it invites you to be more precise in your own mental descriptions.

Also, Nold has opinions about plants (some of them), and that is a refreshing change from authors who are non-committal. You are pretty sure Nold has actually tried to grow the plants. For instance: *Penstemon jamesii*.... "can be quite wonderful in a dry garden." This brings me to my main regret: that the author doesn't live in the Northeast where his experience might coincide a little more with my own. However, anybody living the arid West can treat the book as a

predictor of what penstemons are likely to succeed. But I shall not fault him for writing about his own experiences and not mine. The obvious gap in his life with penstemons is with *P. hirsutus*, which is grown in its standard form more often, I would dare guess, than its dwarf form. It is close to being a beautiful weed for me. Moreover, the dwarf form's offspring are almost invariably normal size. It is interesting that the "shrubby" penstemons seem to have the same problems and successes in Colorado as in Massachusetts. Also, that they are a perennial joy to rock gardeners when they behave themselves.

One plant I hardly dare mention is *P. haydenii*, which is described as impossible to get because endangered. It happens to be one of the longest-lived species I have grown (except for *P. hirsutus* and *P. digitalis*). I hasten to say that my plants were grown from seed collected well before the edict forbidding seed distribution was proclaimed. What a pity I can't even send you seed. I wouldn't describe it as a "fairly tall" plant, since its sturdy but pliable stems sprawl across the sand bed and turn upwards at the base of the inflorescence.

Nold is very good recommending germination of seed under "natural" conditions, but I think he could have emphasized that seed kept for years remains viable. The *P. haydenii* mentioned above grew from 8-year-old seed stored in a paper envelope.

But everybody's experience with penstemons is different. Gwen Kelaidis says her love affair with penstemons left her feeling jilted. I can relate to that. I longed to grow the tall, red-flowered plants from the Southwest. Some of them worked for one season; some didn't survive a winter; some keeled over and produced an inflexible, 2', horizontal stem with 6" of vertical inflorescence. It was still worth doing, but not more than once. Marion Jarvie says: "I never saw a penstemon I didn't like." I can relate to that, too. But now I prefer some over others, specifically the mats and low shrubby penstemons that do grow well enough in Massachusetts.

We penstemon lovers owe a debt to Robert Nold for doing what many experts have wanted to do but haven't; they may have been daunted by the magnitude of the work involved. The choice will not be between Nold's book and the David Way and Peter James book, because both will be useful for the dedicated penstemoniac.

—Geoffrey Charlesworth

The Garden Plants of China, by Peter Valder. 1999. Timber Press, Inc: Portland, OR. 400 pp., 420 color photos, 15 b/w illustrations, drawings. Hardcover, 8 5/8x11 3/8". ISBN 0-88192-470-9. Price, \$49.95, plus shipping and handling.

Most rock gardeners know that Ernest Wilson, George Forrest, Frank Kingdon Ward, Reginald Farrer and no end of French missionaries spent an inordinate amount of time in China and are commemorated by more primula, rhododendron and gentian honorifics than you can shake a stick at. Fewer of us realize that our art—or at least the oldest branch of it—originated in China over two millenia ago. Perhaps China and her gardens merit another look.

With over 25,000 species of plants (roughly one-tenth of all plants on earth) and a fifth of the world's population, there are pressing and disturbing issues of

land use and conservation that ought to concern a lot of us, especially rock gardeners. Considering the volume of books published in English each year concerned with the floras of North America and Europe, a major monograph treating the principal groups of Chinese ornamentals would certainly be welcome.

Anyone contemplating a trip to China, or indeed intrigued with many of the commoner garden ornamentals, will find this sumptuous coffee-table book a great fund of information. Of the 400 or so plants treated herein, most are the classic plants of Chinese art and literature (peony and bamboo, pine and chrysanthemum are treated at length). The magnificent reproductions of paintings and impeccable photography of temples and misty vistas capture not only the sense but something of the sensibility of China. The extensive bibliography is copiously referenced throughout the text; there is sound scholarship here.

There are fine treatments of the basic fruit trees as well (*Prunus* and the wealth of citrus, so many of which trace their pedigrees to China), although the grains and soybeans and most vegetables that feed over a billion people are mysteriously missing: these somehow aren't quite garden plants I suppose? Why not put flower or ornamental in a title when this is what is meant? There is a good synopsis of the extraordinary woody plants that form the backbone of the modern garden: rhododendrons and roses, viburnums and a few glimpses of wild plants (*Iris lactea* at Badachu near Beijing), but the treasure-trove of the high western Chinese mountains is practically ignored. One would think Roy Lancaster's *Travels in China* was written about a different country.

One last quibble: the Chinese characters that accompany each plant are welcome and exquisite, but what a pity that *pinyin* (the standard Romanization subsequent to the Chinese revolution) is always printed without the four tones of Mandarin. This makes transliterated Chinese about as useful as prntng nglish wtht vwls.

The ornamental cultivated flora of China (including some delightful exotics like yucca and corn poppy) is so vast and its history so rich and complicated that even this massive tome might best be compared to the lavish stone gate at the entrance of a Buddhist temple. The meticulous text and flawless photography more than rise to the promise.

—Panayoti Kelaidis

Treasured Perennials, by Graham Stuart Thomas. 1998. Sagapress, Inc: Sagaponack, NY. 169 pp. 183 color photos, 8 b/w illustrations, drawings. Hardcover, 7 3/4 x 10 3/8". ISBN 0-89831-076-8.

One greets a new book by Graham Stuart Thomas much as baroque audiences must have greeted Bach's latest cantata: a gift that becomes a part of an *oeuvre* which in Stuart's case will go down through the ages as a monument of Twentieth Century horticulture.

Of course, you will have grown many of these treasured perennials (or at least admired them in England or on the continent). Why is it every specimen shown in this book is bigger and better than any you've ever seen in real life? And where can one get *Selinum wallichianum* or *Saxifraga manchuriensis*? The delightful take on classic plants, interspersed with the occasional wild card,

makes one curious to know when his next installment will come out.

I suppose there must be gardeners who do not know of Graham Stuart Thomas, or who do not refer to his books as a matter of course. His extraordinary ubiquity on the horticultural scene over the last half-century might cause those with unorthodox tendencies to question or rebel against his authoritative-ness. Don't go there.

If you do not know G.S.T., *Treasured Perennials*, this as much as any of his books has the supple prose, the information-packed yet effortless tone that make his every book a delight. North American rock gardeners can take special delight that so many of us are represented among the credits (especially George Waters, who, I suppose, has feet firmly planted on both sides of the puddle). It's true that most of the plants are large (heaven forbid, merely perennials!), but alpines sneak in quite frequently. G.S.T. is the author, after all, of the definitive history of our art. It's impossible to imagine where our blazing garden scene would be today without him stoking the fire.

—Panayoti Kelaidis

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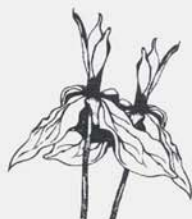
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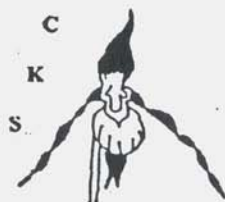
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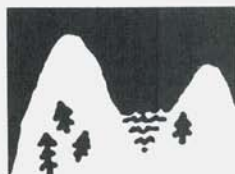
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