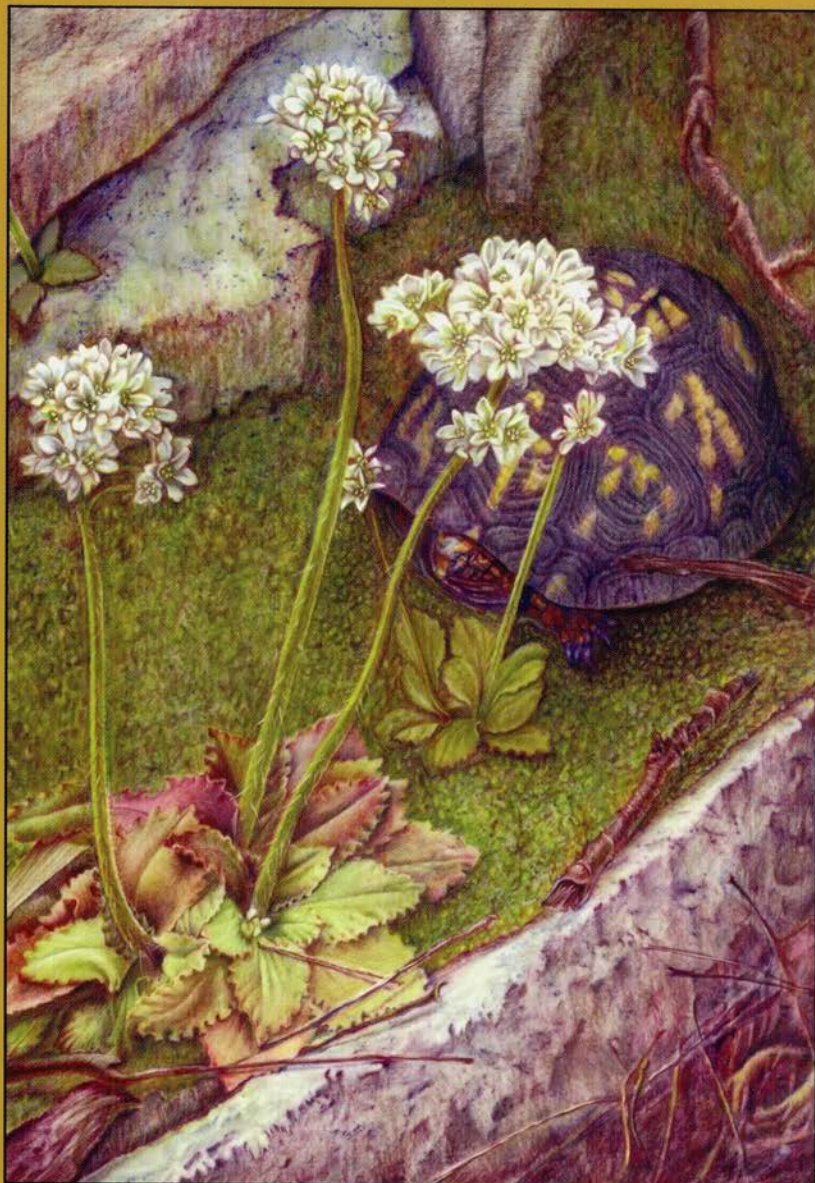


ROCK GARDEN *Quarterly*



Volume 64 Number 3

Summer 2006

Front cover: *Saxifraga virginensis*. Painting by Jean LeCluyse (see p. 220).

Back cover: *Helichrysum confertum* in Lesotho. Photographed by Dianne Huling on the 2005 NARGS South African tour (see p. 196).

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Printed by Allen Press, 800 E. 10th St., Lawrence, Kansas 66044

ROCK GARDEN

Quarterly

BULLETIN OF THE NORTH AMERICAN ROCK GARDEN SOCIETY

Volume 64 Number 3 Summer 2006

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From the Editor

What does the national organization of the North American Rock Garden Society accomplish for its members, and for the world of plant enthusiasts more broadly? This issue offers some important answers to that question.

One goal of NARGS is to acquaint gardeners around the world with the wealth of beautiful plants native to North America. Our first article, on the wildflowers of Bryce Canyon in the U.S. Southwest, originated in author Alan Petersen's inspiring photographs submitted to the 2005 *RGQ* Photo Contest. I asked Alan to write this article to accompany reproductions of these photos, and he responded with text that should help others see the plants—and perhaps his photos will help us see the plants as Alan, a professional artist, sees them.

Knowledge of North American plants is furthered on a more botanical level by Malcolm McGregor's "Searching for Saxifrages," the first part of which appears here. Malcolm, known to many as the editor of the Scottish Rock Garden Club's magazine, is also a leading member of the Saxifrage Society, and his profound enthusiasm for the genus is probably typical for that group. His expedition to document American species was funded in part by a grant from the NARGS Norman Singer Endowment Fund, an important program of the Society.

The Singer Endowment also supported two public rock garden projects described in this issue, one at Lakewold near Seattle, Washington, and another at Pacifica in southwestern Oregon. Our spring 2006 issue contained reports on two other public garden projects supported by NARGS, one in Montreal and one near Denver, Colorado. These gardens should inspire visitors from many different regions to turn toward rock gardening and eventually, we hope, toward NARGS membership.

Intellectual exchange is another important facet of NARGS membership. Brian Bixley's essay in this issue responds to one by Bob Nold in a previous issue. Our occasional "anthology" feature, "Conversations in the Garden," offers a forum to readers who want to comment on articles or offer informational notes shorter than actual feature articles. Please participate!

Next we have our ever-popular "Plant Portraits" section, for which we always need contributions. In this issue, Bobby Ward kindly wrote up artist Jean LeCluyse's cover subject; botanist and hybridizer Stephen McCabe, to whom I was introduced by photo contest favorite Jack Muzatko, described one species of a genus in which he specializes (and gave me a tour of the collection he curates in Santa Cruz); and Todd Boland supported his own winning photo contest entries with descriptions and notes on cultivating the plants in his Newfoundland private and public garden settings.

The book reviews lead us to another NARGS benefit, the Book Service, from which we can buy the best gardening books at reduced prices for members. And let's not neglect our advertising section, where we can find out where to buy many of the plants praised by authors. Advertising in the *Quarterly* is inexpensive; if you're a nursery owner, consider reaching an international readership this way.

And remember to enter the Photo Contest: entries accepted until September 1.

Bryce Canyon: Fairylnd of Flowers

Alan Petersen

Late in May and early June of 2005, during our break from teaching at Coconino Community College in Flagstaff, Arizona, my wife, Catherine, and I spent three weeks camping and hiking in southern Utah, an area we visit as often as possible. Our journey included Capitol Reef and Bryce Canyon National Parks and Grand Staircase-Escalante National Monument. These are locales of soaring sandstone cliffs, slickrock expanses, colorful sculptured rock formations, and a variety of fascinating plant communities. Here I'll relate a hike that we took in Bryce Canyon, and some of the lovely plants encountered along the way.

Bryce Canyon National Park is situated in southern Utah on the Colorado Plateau. The Plateau is a 130,000-square-mile region covering parts of Utah, Colorado, Arizona, and New Mexico. Its architectural landforms of colorful rock make it a visually dramatic region. Millions of years of uplift and erosion have carved the land into a series of plateaus as high as 11,000 feet (3385 m) at the Aquarius Plateau, and canyons such as the Grand Canyon, with its lowest elevation around 2000 feet (615 m). There are a number of high volcanic and laccolithic mountains that reach almost 13,000 feet (4000 m) at the San Francisco Peaks. The climate, too, is one of extremes: much of the Colorado Plateau is arid or semi-arid, with cold winters and hot summer days followed by cool nights. Average annual precipitation is about 20 inches (50 cm), but many areas receive less than 10 inches per year. The dramatic geography has created an extremely varied flora, from alpiners to xeric species that add to the richness and beauty of the region. There are many endemic species that speak to the unique niches found in the varied habitats. Like other landscapes of the Colorado Plateau, Bryce Canyon National Park is one of great beauty as well as one of great extremes of climate and topography. These two factors contribute to the unique flora of the park.

The climate at Bryce is like that of the larger Colorado Plateau. In late May and early June, daytime temperatures range from the mid-60s to the mid-70s F (c. 18–25° C), with nighttime temperatures dropping into the 30s (c. 3° C). Generally there is little precipitation at this time of year. Most of it comes in mid to late summer in the form of afternoon monsoonal thunderstorms, which can be

downpours, dropping as much as an inch or two of rain in an hour. Average annual rainfall in the lower elevations of the park is 10 inches (25 cm) per year, with up to 19 inches (47.5 cm) a year on top of the plateau. But because of the shaly nature of the soil, little of this rain is absorbed and much of it runs off. In a wet winter the top of the plateau receives about 100 inches (2.5 m) of snow .

Bryce Canyon National Park is not actually a canyon. The most dramatic part of the park is the series of amphitheaters eroded from the eastern edge of the Paunsaugunt Plateau, one of the many plateaus carved from the larger Colorado Plateau. Here, erosion of the colorful Claron Formation (deposited during the Cretaceous period and consisting of limestones, sandstones, and mudstones) has resulted in a maze of spires, fins, and pinnacles. The soils found in the slopes contain little if any humus and are very loose and shaly as a result of the soft, loose nature of the parent rock. The slopes and ridges we hiked are a very difficult environment for plant life.

The third morning of our stay at Bryce, we decided to hike along the Fairyland Trail. We began early near Sunrise Point, where the air was chilly but the sun already warm. The elevation at the rim is 8152 feet (2508 m), and we descended almost a thousand feet and covered 8 miles (12.8 km) in the course of our walk. One of the things that attracted us to the Fairyland Trail was its great diversity. The trail descends steep slopes in the Claron Formation and quickly moves out of the ponderosa pine forest of the rim and into the open space of the first amphitheater we would traverse. Here, trees as well as the few shrubs and flowers are typically stunted and widely spaced on rocky outcrops and gravelly slopes. Stunted, sculptural forms of bristlecone pine (*Pinus longaeva*) and pinyon pine (*Pinus edulis*) contrast with the smooth, soft-looking texture of the slopes. The bristlecones are small and spare, reaching only 4 to 5 feet (1.3–1.6 m) in height.

As we meandered down toward Campbell Canyon, we came across numerous columbines, always a surprise to find in this harsh environment. The rock columbine (*Aquilegia scopulorum*) lives here on the steep gravelly slopes (photo, p. 177). It is a very small columbine, 6–8 inches (15–20 cm) in height, with very small leaves. Its lavender flowers and delicate form offer a beautifully sharp contrast to its setting. *A. scopulorum* can be found in a number of other subalpine locations in central Utah. *Hymenoxys acaulis* is a member of the composite family (Asteraceae) that we found on the colorful slopes throughout our walk. These short, compact plants have bright yellow flowers that stand up proudly on short, slender stems. They appeared like miniature suns scattered across the slopes. Although it was still early in the season, many were already in seed.

Campbell Creek, a small stream at the bottom of Campbell Canyon, was a cool treat, in sharp contrast to the arid, rocky slopes above. On the skyline rising above us we spotted the dramatic natural bridge, Tower Bridge. The streamside was a nice place to relax and enjoy the shade and the shrubs and flowers of the different plant community we found there.

As we climbed up out of the streambed, the air was much warmer and the sun brilliant in the ultramarine blue sky typical of the Colorado Plateau. We followed a narrow ridge, and on the steep slope bordering the trail we came across

the smallest of several *Astragalus* species that grow in the area. *Astragalus kentrophyta*, with its compact mat form and very short, waxy leaves, is admirably suited to this harsh environment (photo, p. 177). It has small violet flowers that appear profusely following a very wet winter. The color combination of violet flowers, green leaves, and yellow-orange rock was very rich.

The showiest flower we observed in the labyrinth of Bryce was, not surprisingly, the Bryce Canyon paintbrush, *Castilleja revealii* (photo, p. 179). At no more than 6 inches (15 cm) tall, it is one of the smallest species in the genus, but what it may lack in stature it makes up for in color: *C. revealii* is an intense fuchsia pink. The flowers we saw in the early morning light positively radiated. This is an endemic species found only here at Bryce Canyon, and it alone is well worth the visit.

Another diminutive endemic we encountered, which is found only at Bryce and nearby Red Canyon, is *Penstemon bracteatus* (photo, p. 178). I often seek out small penstemons that grow in adverse environments, and this may be the ultimate in an arid climate. *P. bracteatus* is tiny, and lovely. It grows to only 5 inches (12.5 cm), but its rich blue-violet tubular flowers can pack the stem. Its upright form and spatulate leaves set it apart from other small mat-forming penstemons such as *P. caespitosus* or *P. davidsonii*.

As we slowly climbed back to the rim, we left the colored slopes behind and reentered the ponderosa pine forest. We arrived in a plant community much more similar to that of our home in Flagstaff. The forest was warm in the early afternoon, suffused with the fragrance of the dry needles carpeting the forest floor. Throughout the open parklike setting we viewed thickets of greenleaf manzanita (*Arctostaphylos patula*), black sage (*Artemisia nova*), and bitterbrush (*Purshia tridentata*). Scattered throughout the forest and in openings, a variety of flowers added splashes of color. Among the most common we saw were *Lithospermum incisum*, and *Lithospermum multiflorum*, *Linum lewisii*, and *Castilleja linariifolia*.

The next morning, June 7, was our last at Bryce, and we were surprised to wake up to more than an inch of snow on the ground. The snow was somewhat unseasonable, but because of the high elevation of many parts of the Colorado Plateau, snow can fall at almost any time of the year. We hastily packed up our tent and retreated to the rustic lodge for a hot breakfast. We vowed to return.

We enjoy camping, but others may choose from a number of lodging options available in the park and nearby. The most classic and luxurious of the options inside the park is Bryce Canyon Lodge; the main lodge is surrounded by small cabins built in the 1920s. The National Park Service campground is one of the finest in the National Park system. The best time to visit the Bryce area for viewing flowers is mid-May to mid-June; however, if you enjoy high plateaus with dramatic landforms and rich plant communities, this area is a wonderful place to visit any time of the year.

Alan Petersen paints and teaches art in Flagstaff, Arizona. His work, often inspired by Southwest landscapes, can be viewed at <http://www.apetersenpaintings.com>.

Searching for Saxifrages: A Journey through the American West

Part 1: Alaska

Malcolm McGregor

My travels in North America have taken me to around a dozen U.S. states and a Canadian province, looking for and photographing saxifrages—sometimes as a sideline, sometimes as the *raison d'être* of the trip—in the Rocky Mountains, the Cascades, the Olympics, the Appalachians, and Alaska. That still leaves some big gaps, but it certainly covers a whole lot of plants. Two of my trips have been on the back of lecture tours: the first from Calgary down through Washington state and Oregon to Yreka in northern California, and the other from North Carolina up to Washington, D.C., and New Jersey to New York. The latter trip, with the support of a generous award from the NARGS Norman Singer Endowment Fund, for which many thanks, was wholly focused on saxifrages. It involved a month-long trip to five distinct localities: Nome and Anchorage in Alaska, the Olympic Mountains of Washington, the Rocky Mountains around Yellowstone National Park, and the Rocky Mountains around Denver. Any such trip inevitably leaves a great many loose ends of trails not taken and roads not driven, but everything else was definitely secondary to finding and photographing saxifrages.

I had thought at an early stage that although there are great pleasures in solitary travel, the pleasures of joining up with many different people along the road would offer both botanical expertise and the constant stimulus that a whole month of botanizing on the run would need. I also might hope to trade back some of my enthusiasm to my companions and to give some ownership of what we found back to them and their chapters.

There was a lot of shaking down to be done to get the optimum timing for the trip in terms of the flowers I wanted to see, but it was possible to produce an itinerary that was pretty good everywhere: Montana, June 25–July 1; Alaska, July 2–12, of which July 5–9 were in Nome; Mt. Rainier, July 13; the Olympics, July 14–16; and Denver, July 17–21. Here I must thank Bill King (although I didn't get to Salt Lake City, his home), Jane McGary, Verna Pratt, and Panayoti Kelaidis, each of whom contributed to planning the itinerary with their advice on appropriate dates.

Although Alaska was not the first place I visited during the trip, it is where I want to start this account: in Alaska the focus is on the genus *Saxifraga* rather than the wider saxifrage family, which is increasingly important farther south. But before talking in more detail about the different saxifrages which grow in Alaska, and what we found, it might help to explain a little about their taxonomy.

The Taxonomy of Genus *Saxifraga*

The genus *Saxifraga* is a large one, with more than 400 species divided into fifteen sections, but genetic research led by Douglas Soltis has shown that there is a fundamental divide in the genus. Two of these sections would be much more sensibly considered as a separated genus, *Micranthes*, while the remaining thirteen would constitute a rather narrower but genetically more homogenous genus *Saxifraga*. This new genus *Saxifraga* would be represented in western North America by seven of the thirteen sections in the new genus:

- Section Ciliatae, including *Saxifraga flagellaris* and *S. chrysantha*;
- Section Porphyrium, including *Saxifraga oppositifolia*;
- Section Saxifraga, including *Saxifraga cespitosa*;
- Section Mesogyne, including *Saxifraga cernua* and others;
- Section Heterisia, including *Saxifraga mertensiana*;
- Section Xanthizoon, including *Saxifraga aizoides*;
- Section Trachyphyllum, including *Saxifraga bronchialis*.

In the new genus *Micranthes* would be just two sections from the current genus:

- Section *Micranthes*, which is discussed below;
- Section Merkianae, including *Saxifraga tolmiei*.

Even if this new genus is not fully embraced, it is important to consider the species in it further because they are central to the American saxifrage family.

The *Micranthes* Saxifrages

The *Micranthes* saxifrages are not everyone's idea of a garden saxifrage, but they include a range of species of nonchalant charm. Depending on the taxonomist you follow, there are a number of broad groups divided along lines that match their morphology. One such taxonomy, from Richard Gornall, suggests four groups: Stellares, Cuneifoliae, *Micranthes*, and Rotundifoliae. Worldwide there are around 90 species, of which about half are found in North America and most of the others from Siberia through Russia and China down to the Himalaya. Although some of these species are in dispute (hence the vagueness of the number), these broad groupings do seem to have some validity. The morphology of the species in each group is quite distinctive, and there are useful geographic boundaries represented.

Section Micranthes—Subsection Cuneifoliaetae. The species in this subsection have a rosette of wedge-shaped, toothed leaves that are often quite leathery. They have relatively few flowers compared with species in subsection Micranthes. In general, the ovaries are prominent, in some species dramatically so. Most of the 30 species in this subsection are found in the Himalaya, China, and Siberia, but a small handful of species have crossed over into Alaska: *Saxifraga nudicaulis*, *S. calycina*, and *S. unalascensis*.

Section Micranthes—Subsection Micranthes. This group is the least easy to characterize by the foliage, but it is noticeable that the inflorescence usually has many small flowers and is often very congested. The inflorescence may be capitate, having a terminal cluster of flowers, as in *Saxifraga rhomboidea* and *S. nivalis*, basically columnar as in *S. oregana* and the Yellowstone saxifrages, or somewhat more diffuse as in *S. occidentalis* and *S. rufidula*. Almost every one of the 33 or so species in this subsection is American.

Section Micranthes—Subsection Stellares. This group has eight or nine species in North America, arctic Asia, and Europe. The species vary widely in size, but one of the more constant characters is that the flowers tend to have a 3+2 arrangement of petals, with the three petals having two yellow spots and narrowing abruptly toward the base, while the other two petals lack the spots and do not narrow abruptly. Species in this group include *Saxifraga stellaris* (Europe and arctic America), *S. michauxii* (Appalachians), and *S. ferruginea* (western North America).

Section Micranthes—Subsection Rotundifoliaetae. In this group are 16 species that have circular leaf blades, often on rather long petioles. The species are split more or less equally between eastern Asia with species such as *Saxifraga manchuriensis* and *S. purpurascens*, and northwestern North America with species such as *S. nelsoniana*, *S. odontoloma*, and *S. spicata*.

It is clear from the genetic analysis that a further group (which contains the American *S. tolmiei* and the Asian *S. merkii*) should be included alongside the Micranthes saxifrages if they are reclassified as a separate genus.

There is little agreement among botanists about the boundaries of all the *Saxifraga* species, particularly among the Micranthes species. Some tend to favor a narrower species concept; some, specializing in the flora of a particular state or region, have little opportunity or perhaps little inclination to put their local plants in a broader context. In general, I have used the approach of those botanists specializing in saxifrages with a perspective which is wider than just North America. In particular, I have relied on the treatment of Webb and Gornall as my base, although on occasion I disagree with their interpretation. The great American specialist on saxifrages was the late Patrick Elvander, who produced the treatment of *Saxifraga* for volume 8 of the *Flora of North America* (Richard Gornall will author the account of *Boykinia* for that project, and Douglas Soltis accounts of *Sullivantia* and *Mitella*). At this time volume 8 is not yet available, either in whole or in parts or on the internet. This is unfortunate, since work continues by others, and Elvander's account will at best be very delayed and at worst will have been superseded in part at least.

On the Road in Alaska

We'd spent some time the previous day discussing whether to take a gun. Frank Pratt had been quite keen—"It might not stop a grizzly but it might put them off"—although it did seem that this was perhaps more to do with recapturing his past than any real need in the present, and his stories of life in Military Intelligence in the sixties and seventies took us on from gun control, to Iraq, to the deplorable need these days to have any license in Alaska. In the end the gun didn't go with us nor did any of Frank's beautifully balanced handmade knives, but a pack full of extra memory went with Frank for his and my digital cameras, and lots of spare film, Verna running Fuji while I stuck to Kodak.

If you've never been to Alaska, it might not strike you as one of the world hot spots for saxifrages, but very few places rival it for sheer variety of species. I'd written to Verna Pratt when first planning my ten-day visit to Alaska, and as well as sending me wonderful details about where I could find the plants I was looking for, she and Frank had also offered me a bed while I was in Anchorage and their company in Nome. We spent a couple of days around Anchorage in the Chugach Mountains and at Hatcher Pass, enjoying success with *Saxifraga lyallii* (p. 182), predominantly found in British Columbia and southern Alaska, and *S. nelsoniana* (p. 183), found from Washington up into Alaska and on across into Siberia. We also found a number of other members of the saxifrage family: *Lep-tarrhena pyrolifolia*, *Mitella pentandra*, and *Chrysosplenium tetrandrum*. But my final destination was the *ultima Thule* for any saxifrage enthusiast: the far west of Alaska, the Seward Peninsula, on the Bering Sea coast. As if this were truly the end of the world, any farther would have meant crossing into Russia, would have me on my way home to England. Certain places have this quality of being a destination rather than a transit point on the road: high places, remote places. I've never been to the Antarctic, but the far northwest of Alaska ranks for me along with Tibet and the mountains of the Continental Divide in equatorial Africa. This is what makes people climb the highest mountains or try to reach the poles: not because they're there, but because of this sense of final arrival. But this remoteness which makes western Alaska a true wilderness was not what I came for; it was the saxifrages which brought me.

Time in Nome is expensive, so the flight on July 5 was the first one of the day, arriving mid-morning. From my seat on the right-hand side of the plane I was able to see Denali (Mt. McKinley) in the distance, the one peak emerging through the clouds, while to the left side the Gulf of Alaska was clear and blue. By early afternoon we would be looking at saxifrages on Anvil Mountain, with Nome spread out below.

Hunting Saxifrages around Nome

The three roads out of Nome each run about 70 miles to small, remote communities: one around the west coast of the Seward Peninsula to Teller; the second,

to the east of Nome, follows the coast for some 20 miles past a long lagoon before heading inland and on to Council; and the third runs more or less due north for 40 miles until it reaches the Kigluaik Mountains, where it bears east and then cuts through north toward Kougarok. These three roads make Nome a base from which it is easier to cover a lot of ground than anywhere else in far western Alaska. Our five-day, four-night stay (about the limit in high-priced Nome) would allow us to explore along each of these roads, as well as looking at Anvil Mountain immediately north of the town, where we went immediately on arrival.

Nome was established in the gold rush of 1898, and there are still gold panners spending the summer in huts scattered for miles along the beach; in the surrounding area are abandoned workings and the rusting remains of a failed railway. On the tundra, long-tailed jaegers hawk across the hills, and loons, like the spirits of loneliness, call on the coastal lagoons. In high summer you can be up at midnight writing postcards home about the herd of wild musk-ox you watched that sunny afternoon, saying that it still is beautifully light, for so near the Arctic Circle the midsummer sun barely dips below the horizon. Make the best of it. Three days later we were being blasted by continuous drear, wintry gales, with the temperature in town down to 41° F, and a lot lower still in the thickly fog-bound hills. That day we took refuge in the Russian store, browsing among walrus ivory carvings, baleen brooches, and Arctic fox furs (all part of the native population's legal harvest), videos and tapes of native song and story, Russian fur hats and ex-Soviet army hats which dated to World War II, new Orthodox ikons, and old Russian porcelain. The proprietor, Victor, finding that I was in Nome to photograph saxifrages and particularly *Saxifraga nudicaulis* (p. 184), led me out to a tiny patch of garden flanking the wooden steps up to the front door. There Victor and his wife, Nadejda, grow a collection of food plants. Among these was the saxifrage which, Victor explained, was one of the traditional native foods, the leaves being eaten fresh or kept for the winter in jars of seal oil.

For Nadejda, *Saxifraga nudicaulis* was *sitngeghbaq* in the Naukan Yupik Eskimo language; the root of the word, *site-*, means the leaf is shaped like an ear. Victor also came up with the name *azigaq* from Central Siberian Yupik. In 1990, Naukan Yupik had only 75 to 100 speakers, almost all in Chukotka, the region of Siberia where they were resettled from coastal Naukan for Soviet military reasons, and Central Siberian Yupik was spoken by 808 speakers in Alaska and 300 in Chukotka. Of all communities split by the Cold War, the native people of this region have a claim to be most affected: extended families separated for 50 years by the US/USSR border, and entire villages in the USSR relocated inland where their language and culture declined in urban settings, a process of acculturation paralleled, although not forcibly, in Alaska.

Eric Hultén in his *Flora of Alaska* notes that *Saxifraga nelsoniana* subsp. *nelsoniana* was used by native people as a food plant, and Verna believes it was used by the Aleuts, but we only found small numbers of this species in the Nome area. That *S. nudicaulis* has names in both Naukan and Central Siberian Yupik as well being used as food might seem unlikely to the outsider, as surely it too is rare. In

fact we found it in three different places; in two, it grew in large quantities surrounded by running water, rather like an arctic version of an English watercress bed.

It was interesting to discover that *Saxifraga tricuspidata* also has uses among the people of the Arctic, with the Inuit names *kaillarnaqutit*, *tiinnguat*, and *a'asaat*, the first these referring to its prickly leaves, the second to its use as a tea, and the last perhaps an onomatopoeic exclamation at being pricked. The prickly leaves are said to have been used as bedding for husky puppies to toughen the pads on their feet.

Anvil Mountain. The track up Anvil Mountain was a wonderful place to start our search for the saxifrages of western Alaska. From the top you can look back down to Nome and park among the three massive parabolic reflectors, now abandoned; they used to be the front line of the early warning system which watched the Soviet Union, a mere 140 miles away. The mountain is just over 1000 feet (330 m) high, a significant elevation here just short of the Arctic Circle, where good alpine plants come down to sea level. On the rocks above the reflectors and the slopes beyond is an array of flowers to astonish the first-time visitor. Nowhere has a much better display than these slopes at peak flowering in early July: *Rhododendron*, *Dryas*, *Anemone*, *Geum*, *Oxytropis*, *Papaver*, *Dodecatheon*, *Loiseleuria*, *Diapensia*, *Gentiana*, *Cassiope*, various composites, *Pedicularis*, *Phlox*—some in widely recognisable forms, and some narrowly endemic species. The saxifrages, however, rank highest in number of species, with eight species of *Saxifraga* as well as two other members of the family, *Chrysosplenium tetrandrum* and *Boykinia richardsonii*. The latter is known as “bear plant” because bears often dig up the roots to eat. It is a very striking plant. The leaves are glossy, and the flower stem, some 15 inches (40 cm) tall has large white to pale pink flowers, stained cerise at the center, clustered toward the top of the stem. This beautiful plant would rival other members of the family, such as *Telesonix jamesii* and *Bergenia purpurascens*, in anyone’s affection, but unfortunately it is not in cultivation and, like so many plants of the far north, it seems to be intractable.

The *Saxifraga* species we found on Anvil Mountain were *Saxifraga hirculus*, *S. flagellaris* subsp. *setigera*, and *S. eschscholtzii* (all from section *Ciliatae*); *Saxifraga rivularis* and *S. cernua* (section *Mesogyne*); *Saxifraga oppositifolia* (section *Porphyron*); and two *Micranthes* species, *Saxifraga nelsoniana* subsp. *nelsoniana* and *S. hieracifolia*.

The **Ciliatae saxifrages** are the most numerous in the world species list with between 200 and 250 species, the vast majority of which are found in the mountains of China and the Himalaya. Botanists have subdivided them in various ways which are of little interest here, except to say that the handful of Alaskan species range across these different groups. *Saxifraga hirculus* (p. 182) is widespread in subarctic and alpine areas of the Northern Hemisphere. It usually forms a small tuft with a few stems of yellow flowers. The petals are often speckled with orange near the base. Those on Anvil Mountain are of the typical variety with fairly narrow petals, but in some other locations we found var. *propinqua*, recognizable by the much more rounded petals. Generally *S. hirculus* is found in

damp or wet ground, and on the Teller Road we found a streamside bog with very large cushions. In drier areas it tended to give way to *S. flagellaris* (p. 183), which also occurs in more than one form, the most obvious differences between them being the overall height and overlap of the leaves on the flower stem, and the shape of the sepals and way in which the cup of sepals is formed. On Anvil Mountain we found *S. flagellaris* subsp. *setigera*, but elsewhere some specimens seemed to accord better with var. *platysepala*, sometimes listed as a species.

It is the third Ciliatae species which is the most fascinating: *Saxifraga eschscholtzii* (p. 181), referred to by Verna as the “barnacle saxifrage.” At first glance it looks more like a tight-cushion-forming Kabschia species than a Ciliatae one. The cushions are made up of tiny globular rosettes, more than 40 of which would be covered by a U.S. penny. The incurved leaves have a fringe of long membranous hairs which, along with the dead, bleached-white outer leaves from last year, form a mass of insulation for the flower buds. The minute flowers are yellow, orange, or pink, and appear perhaps six weeks earlier than most of the other flowers, so I missed them; many of the female plants I saw were covered with the red seed capsules. *Saxifraga eschscholtzii* is very unusual among saxifrages in being dioecious, with individual plants being either male or female. This would be an absolutely delightful plant for the specialist, were it possible to cultivate it, but as far as I know it has not been managed so far. Closely allied to *S. eschscholtzii* is *S. aleutica*, which is confined to mountaintops in the Aleutian Islands.

We were unable to find the other Ciliatae saxifrage which grows here: *Saxifraga serpyllifolia*. Out of flower it has small, insignificant rosettes of leaves. *Saxifraga chrysantha*, which I was planning to see in Denver, has rather more showy flowers and is often treated as a subspecies of *S. serpyllifolia*.

The **Mesogyne saxifrages**, which have palmate or ivy-shaped leaves, are almost unknown in cultivation—they are either insignificant or difficult, or both—but the group has a very wide geographic range. The most widespread species are *Saxifraga cernua* and *S. rivularis*, which occur in Scotland, much of arctic Europe, are not uncommon in Alaska, and are found down the Rocky Mountains discontinuously as far as Colorado. There are a number of other species, although exactly how many is a matter of contention. Gornall lists six species for Alaska: *Saxifraga cernua*, *S. rivularis*, *S. flexuosa* (including *S. debilis*), *S. hyperborea*, *S. bracteata*, and *S. radiata*. Various other authors combine some of these. Suffice it to say that the species I had most hoped to find was *S. bracteata*. It has an involucre of bracts behind the flowers and mostly grows on high sea cliffs; although the Seward Peninsula has many such sites, they are all far from the road and we had no time to reach them. The closest we got were distinct views from the top of Anvil Mountain of two places where it has been recorded: some remote cliffs east of Nome, 10 miles of rough hiking from the nearest access point, and, 10 miles out from the sea cliffs, King Island, one mile long with 500-foot cliffs which we could see on the horizon, behind a couple of dozen wild muskoxen. *Saxifraga bracteata* is more common in the Aleutian chain and in Siberia. According to the USDA website, *S. bracteata* should be subsumed in *S. sibirica*. This seems to be a somewhat heterodox view: specimens I’ve examined seem

quite distinct, and apart from the total absence of the involucre in *S. sibirica*, the flowers of *S. sibirica*, which I've photographed in the Himalaya, are not clustered in the same way as those of *S. bracteata*.

Yet although we were unable to get to *S. bracteata*, we did find *S. cernua* (p. 181) in some numbers, in one case in a clump with more than a dozen flowering stems, not at all typical, and we also found *S. rivularis* (p. 184) under overhanging rocks. *Saxifraga cernua* can grow 4 inches (10 cm) tall; it has one white terminal flower and many small dark red bulbils up the stem. Always nice to see, it is not an easy species to photograph, growing often in shade and in exposed windy places. It usually has a single flower stem, sometimes a couple, but one clump had more than a dozen, with smaller flowers like those of *S. flexuosa*, but with the bulbils characteristic of *S. cernua*. Even photographing *S. cernua* is not nearly as difficult as photographing *S. rivularis*, a tiny species, often no more than 1 inch (2.5 cm) tall, rather like a small chickweed, living under rocks in deep shade. Even if a camera can get into the cracks, the head of the photographer cannot follow to the viewfinder. Both *S. cernua* and *S. rivularis* were present on Anvil Mountain and again at the high point on the Council road. The other species in this group that I had hoped to find is *S. exilis*, the species closest to *S. sibirica*, but none of the plants we found matched this.

Saxifraga oppositifolia is a proper saxifrage in anyone's eyes. It has rich purple flowers, forms a nice little mat, and can be grown in the rock garden. It is the only species in Alaska from **section Porphyron**, is widespread in Europe, in North America, and even down to the Himalaya, and partly because of its wide geographic spread can be quite varied in the wild. The subspecies found in most of North America is *S. oppositifolia* subsp. *oppositifolia* (the typical subspecies), but in Alaska there are two distinct subspecies: subsp. *glandulisepala* and subsp. *smalliana*, found only in the far west of the state. The latter has very condensed foliage, on a par with that of *S. eschscholtzii*, and typically has dark purple flowers, while the flowers of subsp. *glandulisepala* are looser and paler. On Anvil Mountain we found subsp. *smalliana*, as we did on the road to Woolley between Penny River and Cripple River. On the limestone hills in the Kigluaik Mountains that we got to on the Kougarak Road some plants seemed to fit into subsp. *glandulisepala*, as did some of those on Anvil Mountain.

The Trachyphyllum species. Nowhere is the difference in approach to the concept of the botanical species more apparent than in the treatment of these species by Western and Russian botanists. Narrowly defining species, Russian botanists tend to give specific status to geographically isolated populations which some Western botanists might not even accord varietal status. In the case of the Trachyphyllum species, which are most prolific on either side of the Bering Strait, this leads to very different results. Conservative botanists would have just three species in North America: *Saxifraga bronchialis*, *S. taylorii*, and *S. tricuspidata*. Russian botanists approaching the same plants would have *S. bronchialis*, *S. cherleriodes*, *S. funstonii*, *S. austromontana* and *S. vespertina*, plus *S. taylorii* and *S. tricuspidata*, as do the more "splitting" of their American counterparts. In eastern Russia where some of these same plants occur they are supplemented by a further list which

includes *S. spinulosa*, *S. derbekii*, *S. omolojensis*, *S. multiflora*, and others. Some of these clearly seem to justify their status as species; for instance, *S. derbekii* seems quite distinct both from pictures on the Web and from plants in cultivation in the U.K. and Alaska from seed collected in Russia.

In Alaska there are a number of taxa which can be distinguished without arguing over their precise status as species, subspecies, or varieties. Typically, *Trachyphyllum* saxifrages have stiff, evenly spaced hairs on the leaf margins, at right angles to the direction of the leaf. These bristly hairs may be very short but are usually longer. The leaves themselves may be long and sharply pointed or shorter and broadened at the tip, and may have teeth at the apex. The flowers are typically white with red and yellow spots.

Of the species found in Alaska, *Saxifraga tricuspidata* is easily identified; its white flowers are typical, but its mature leaves, larger than in most other species, have three obvious teeth at the tip. This is not found in far western Alaska, but we saw it growing on a boulder on the shore of Turnagain Arm, a Pacific inlet south of Anchorage. It is found from Alaska, northern Canada and Greenland as far south as the Great Lakes and is one of the more readily grown species in this section.

Three other *Trachyphyllum* taxa are found in Alaska: *Saxifraga cherlerioides*, *S. funstonii*, and *S. codyana*, each of which is treated by many authors as a subspecies of *S. bronchialis*. *Saxifraga cherlerioides* has a more spatulate leaf than the other two, and the flowers are typically white with red and yellow spots. It ranges from Russia into the Aleutian Islands and just into mainland Alaska. *Saxifraga funstonii* (p. 183) also crosses the Bering Strait and is the taxon found in western Alaska. It is easily distinguished from most of the others by its very pale yellow petals, which only have yellow spots; the petals are also distinctively narrowed at their base. *Saxifraga codyana* is found much farther north and east in inland Alaska and into the Yukon. It is closest to *Saxifraga funstonii* but has narrower leaves with glandular rather than stiffly hairy margins.

On the Seward Peninsula, the species we found was *Saxifraga funstonii*, which tended to be most numerous inland on fairly bare, rocky ground, with particularly large mats on dry limestone. For me this is the most attractive of the species (or subspecies) in section *Trachyphyllum* in North America, with prolific pale yellow flowers on cushions up to a foot or more across. Once the flowers are pollinated, the carpels turn deep red and add a nice contrast.

Outside Alaska there are another three taxa in this group. Throughout most of western North America the most common taxon is *Saxifraga bronchialis* subsp. *austromontana* with pointed leaves and typical white flowers with red and yellow spots. Much rarer is *S. taylorii*, which is confined to the Queen Charlotte Islands off British Columbia and has pure white, unspotted flowers which open far more than in other species. The foliage of the third, *S. vespertina*, is not unlike that of *S. taylorii*, broader and shorter than in the other taxa, but in *S. vespertina*, most common in the Cascades and Columbia River Gorge, the flowers are typical: white with red and yellow spots like those of *S. bronchialis* subsp. *austromontana*. As in all the *Trachyphyllum* species with red and yellow spots, the red spots are those farthest from the base of the petal.

The *Micranthes Saxifrages* of Alaska

As outlined earlier, there are four groups of *Micranthes saxifrages* represented by species found on the Seward Peninsula: subsections *Stellares* (*Saxifraga foliolosa* and *S. redowskii*), *Rotundifoliae* (*S. nelsoniana* and *S. spicata*), *Micranthes* (*S. hieracifolia*), and *Cuneifoliae* (*S. calycina*, *S. unalaschcensis*, and *S. nudicaulis*).

Saxifraga nelsoniana is distributed from arctic Europe through Asia to North America. In North America it is often referred to as *S. punctata*, but this name has fallen out of favor because it was originally applied to plants now probably placed in the *S. calycina* complex. Across this range are a number of subspecies, including six in North America. The typical subspecies, found from Siberia into Alaska, is subsp. *nelsoniana*, which has a congested inflorescence and pubescent (softly hairy) leaves—this is the subspecies we found around Nome. In the Aleutian Islands this is replaced by the much smaller and fleshy-leaved subsp. *insularis*; and in turn around the Gulf of Alaska by subsp. *pacifica*, the one in the Anchorage area. Inland this is replaced by subsp. *porsildiana* with very small leaves, found up to high arctic Canada and down to the northern Rocky Mountains. Traveling farther south from the Gulf of Alaska, subsp. *carlottae* (in Hultén listed as subsp. *charlottae*, but *carlottae* is correct) is found in and around the Queen Charlotte Islands; and finally, subsp. *cascadensis* with rather larger thinner leaves with more teeth, and with a looser inflorescence, occurs down the coastal ranges and into the Cascades of British Columbia and Washington (it's one of the saxifrages I was to find in the Olympic Mountains). Although seed of *S. nelsoniana* is occasionally available in exchanges (often listed as *S. punctata*) and I have often tried, I have yet to succeed in germinating it. Perhaps seed from the more southerly populations would offer greater promise.

It is notable that the distribution maps in Hultén indicate that *Saxifraga spicata*, a closely related *Micranthes* species restricted to central and southwestern Alaska, has its centers of concentration in areas where none of the subspecies of *S. nelsoniana* are found, with very little overlap between the two species, despite the very wide spread of the latter in much of Alaska. *Saxifraga spicata* is a larger plant than *S. nelsoniana*; its round leaves have longer petioles and more teeth. Indeed, in pressed specimens the blade outline looks like a circular saw blade. The leaves are up to 3 inches (7.5 cm) in diameter and covered with hairs. The flower stem can reach 20 inches (50 cm), substantially taller than *S. nelsoniana*, and carries numerous small white flowers. It flowers after Alaska's summer bloom peak in the first two weeks of July.

Nevertheless, *Saxifraga spicata* was one of my goals, and Verna had recorded it about 50 miles east of Nome at the highest point before the road starts to drop down for the remaining miles to Council. Our day along this road—which passes the lagoon and miles of scattered beachtop cabins and shacks where gold panners still spend the summer and hang salmon to dry in the wind—was misty and damp. About halfway to Council, where abandoned railroad engines rust among pools on which red-necked phalaropes were spinning like clockwork toys, the road breaks away from the coast. Another 20 miles or so farther on, at the road-

side where we had stopped to look at some exceptionally well-flowered cushions of *Silene acaulis*, we found *Saxifraga spicata* toward the bottom of the high bank above us, among rocks rich in mica: a plant with four or five rosettes of leaves, some 40 in all, with nine flower stems of the previous year, bent horizontal by the weight of winter snow. The individual leaves were up to 3 inches long with 32 to 36 teeth, and the furry surface trapped sand and mica grains. At the highest point of the road, probably 1500 feet (500 m) above sea level and another 10 miles on, is a small parking area, but in the mist there was no view to admire, and exploration of the surrounding ground required some care to remember how to get back to our car. In better visibility we would have marched farther, but we could not have been much more successful. In the rocky ground above us the predominant large plant was *Rhododendron camtschaticum*, the flowers echoing the color of *Epilobium latifolium*, which had been common on the roadside lower down. In the shelter of some rocks we found another specimen of *S. spicata*, slightly less advanced up on this higher, more exposed site, but again a substantial plant with four tufts of rounded, soft, thick, hairy leaves, each rosette already having up to half a dozen young leaves, and with two of last year's flower stems with 26 old seed capsules on one stem, which was a little over 18 inches (45 cm) long. Among these same rocks in the shelter of overhangs were a few *Primula tschuktschorum*, and deep under the overhang, *Saxifraga rivularis*.

On the slopes below this summit area the terrain falls away across varied, rough ground in which there was a good scattering of *Saxifraga nelsoniana* subsp. *nelsoniana*, just coming into flower in the most exposed sites but well advanced on more sheltered, slightly lower slopes, and a few *S. hieracifolia*, which we saw at most sites where we stopped. This is a widespread *Micranthes* species in northern latitudes of North America, Asia, and Europe. We found two distinct forms of it: one with very short branches of the inflorescence, and the other with much longer ones. I have not been able to establish whether these equate to recognized varieties or forms, but in both cases the rich red, starry flowers are distinctive.

The joy, however, was an area of sphagnum bog on the slope which was a haze of *Saxifraga nudicaulis* (p. 184). The newly opened flowers are pure white, with a prominent white ovary, but this ovary turns rose-pink after pollination. Back in Anchorage we'd seen a large bed of *S. byallii* (p. 182), another of the *Cuneifoliatae* species, quite distinct from the round-leaved *S. nelsoniana* which grew nearby. Though interesting, *S. byallii* hardly makes the heart leap as *S. nudicaulis* does. The stiff little drawing in Engler and Irmscher's 1916 monograph *Das Pflanzenreich* makes it look an unlikely candidate for such praise, but the neat, dark green foliage, and the white and pink flowers on dark red stems are a delicious combination. On the lighter green mounds of sphagnum the plant formed its characteristic stolons, dark red like the flower stems, rooting at the nodes to form a loose mat. In the coastal shingle at Woolley, among damp pools, we had also found *S. nudicaulis*, and like the few plants we had found on the Kougarok Road, these spread much less, but here in the sphagnum the mass of plants clearly showed the typical spreading habit. When we had found the plants at Woolley



Aquilegia scopulorum (p. 164) in Bryce Canyon National Park. (photos, Alan Petersen)

Astragalus kentrophyta (p. 165), Bryce Canyon.





Penstemon bracteatus (p. 165), Bryce Canyon National Park. Alan Petersen won honorable mention, class 1 in the 2005 photo contest for this image.



Castilleja revealii (p. 165), Bryce Canyon National Park. (A. Petersen)

Castilleja miniata on Mount Goliath, Colorado, photographed by Yoko Arakawa received second prize in class 1, 2005 photo contest.





Saxifraga calycina (left) and *S. unalaschensis* (p. 193) in Alaska; below, a plant intermediate between these two species. (photos, Malcolm McGregor)





Saxifraga eschscholtzii (p. 172), a remarkable Alaskan species, with ripening seed capsules. (M. McGregor)

Left, *Saxifraga eschscholtzii* at an earlier stage; right, *Saxifraga cernua* (p. 173).





Two semiaquatic saxifrages in Alaska. Above, *Saxifraga hirculus* (p. 171); below, *Saxifraga lyallii* (pp. 169, 176). (M. McGregor)





Saxifraga funstonii on rocky ground in Alaska's Seward Peninsula (p. 174). (M. McGregor)

Left, *Saxifraga flagellaris* (p. 172); right, *Saxifraga nelsoniana* subsp. *pacifica* near Anchorage (p. 169).

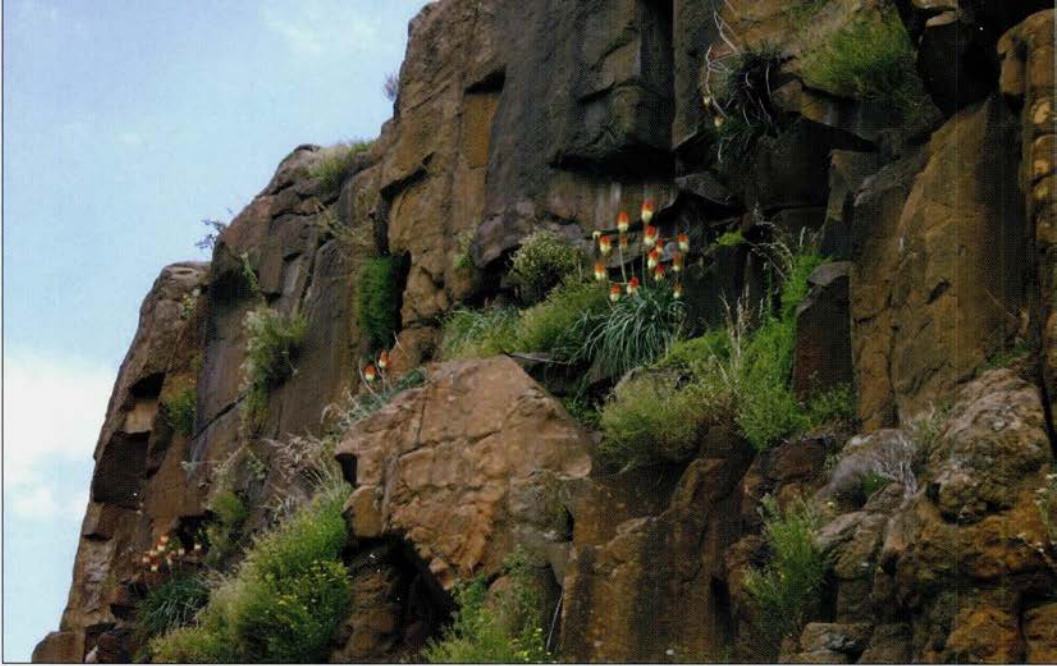




Saxifraga nudicaulis (pp. 170, 176). (M. McGregor)

The minute *Saxifraga rivularis* (p. 173).





Grand displays of *Kniphofia* in South Africa: above, *K. albomontana* (p. 202); below, *K. caulescens* (p. 198). (Panayoti Kelaidis)





Eucomis autumnalis, one of a genus of hardy, summer-flowering South African bulbs. (P. Kelaidis)

Left, *Crassula vaginata* (p. 201); right, *Euphorbia clavarioides* (p. 198) in foreground, *Delosperma nubigenum* (p. 203) in background.





Inulathera thodei (p. 202) dominates a slope below a typical South African rock formation. (P. Kelaidis)

Left, *Wahlenbergia congesta* (p. 200); right, *Protea roupelliae* (p. 201).





Helichrysum milfordiae in Lesotho (p. 199). (Dianne Huling)

A tiny South African ledge on the Oxbow mesa (p. 203) hosts *Aloe aristata*, two ferns (*Cheilanthes* sp., and probably *Mohria*), *Oxalis obliquifolia*, an orchid, a succulent composite (probably *Othonna*), and an amaryllid, probably *Cyrtanthus*. (photo, P. Kelaidis)





Incarvillea mairei growing in St. John's, Newfoundland (p. 224); Todd Boland's photo received third prize, class 3, in the 2005 photo contest.

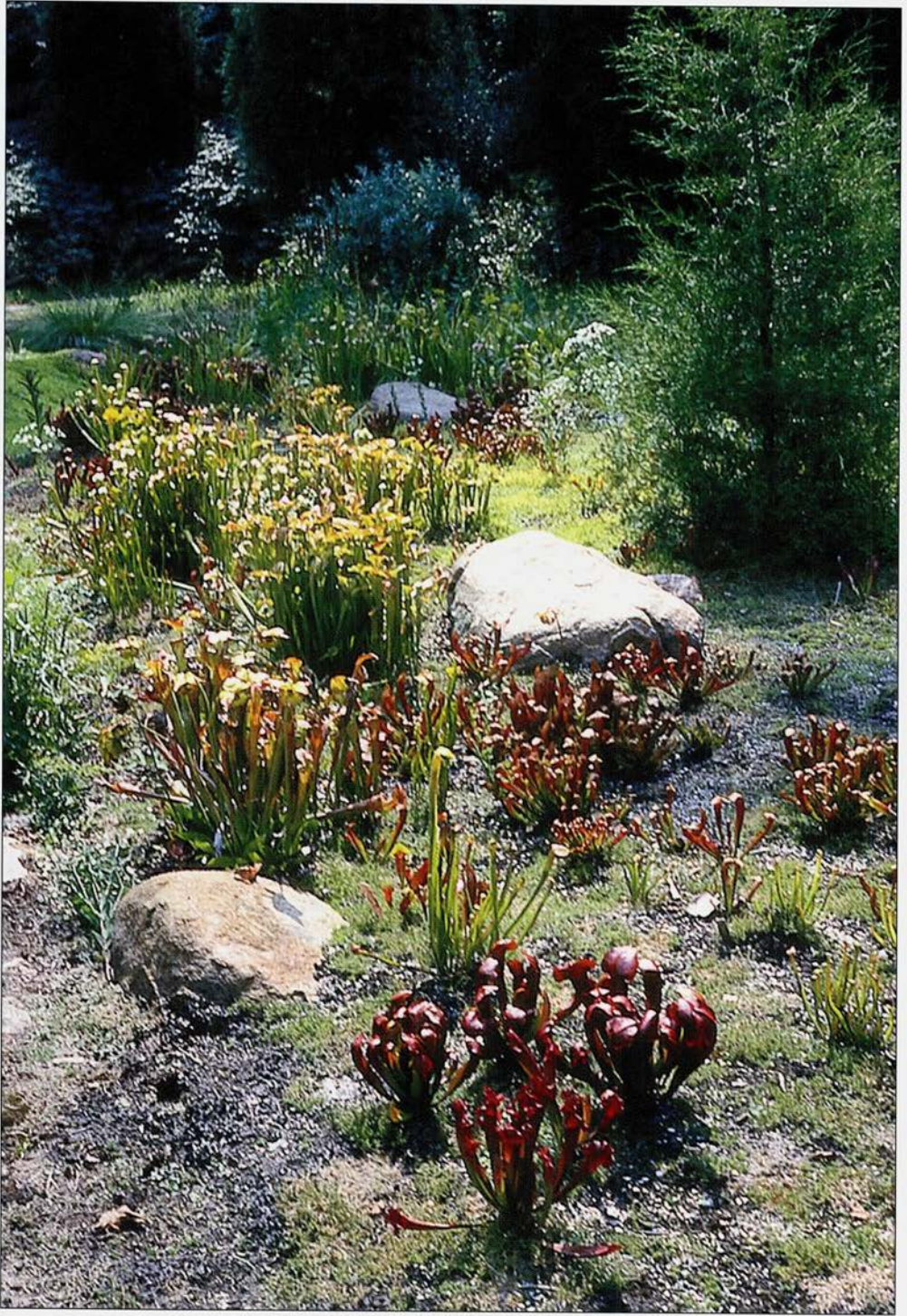
Lewisia kelloggii photographed in California by Jack Muzatko, fourth prize, 2005 photo contest.





Two color forms of *Salix glauca* (p. 223), photographed in L'Anse-aux-Meadows, Newfoundland, by Todd Boland.



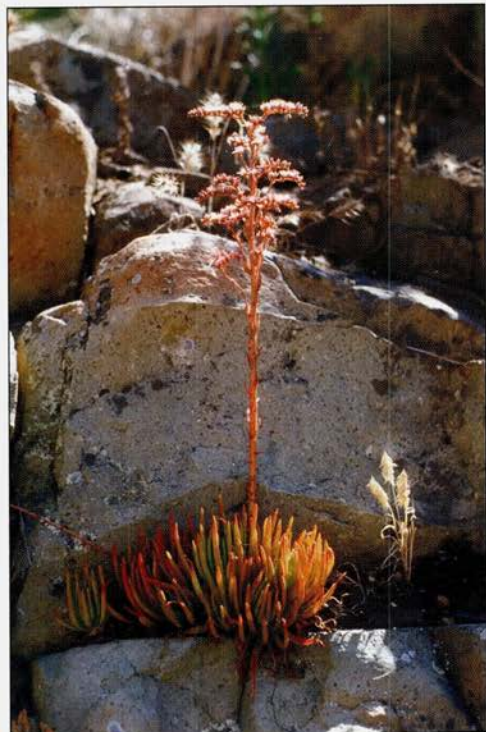


Sarracenia species in the bog garden at Chanticleer Estate, Pennsylvania; Dianne Huling received honorable mention, class 4, in the 2005 photo contest for this image.



Dudleya viscida (p. 221) with other *Dudleya* species at the Arboretum, University of California, Santa Cruz.

Dudleya viscida in flower; stem height varies with the plant's exposure.



they had been so numerous and so pretty that it was hard to believe that they would be put in the shade by the plants along the Council Road.

At Woolley, however, we also found a specimen of another intriguing *Micranthes* species, *Saxifraga redowskii*, which belongs in the same group as the much more widespread North American *S. ferruginea*, the common European *S. stellaris* (which gets into northeastern Canada), and *S. foliolosa*, which is like a rather spindly version of *S. stellaris*. Characteristic of *S. foliolosa* is that all the flowers except a single terminal one are replaced by rounded buds which fall off and propagate the plant as bulbils. *Saxifraga redowskii*, also called *S. foliolosa* subsp. *multiflora*, is a rather taller plant with a number of long side branches, each bearing a single terminal flower. Whatever its specific status, this is clearly related to *S. foliolosa*, but it is recorded from only a very few extremely scattered locations in eastern Russia, Alaska and the Yukon.

Two other *Micranthes saxifrages* remain to consider here. Closely related to *Saxifraga nudicaulis*, these two species are also *Cuneifoliae* species, and the coasts on either side of the Bering Strait in the Seward Peninsula and far eastern Russia are the only area where the two species coexist. Unfortunately, although they are distinguishable in the field, there are substantial problems associated with their naming. This might seem esoteric, but the complex of names used by Hultén, by Gornall, and by others does little to aid the uninitiated. Gornall, whose work on saxifrages is more recent than that of Hultén, calls the two species *S. calycina* (Hultén has this as *S. davurica* var. *grandipetala*) and *S. unalascensis* (which may be found as *S. davurica* subsp. *unalascensis* or *S. calycina* subsp. *unalascensis* and in the USDA database, wholly incorrectly, as *Leptarrhena pyrolifolia*!). Both have leaves with a cuneate base, but *Saxifraga calycina* (p. 180) is distinguishable by having longer, narrower leaves; flower stems (or at least fruiting stems) with narrowly ascending branches rather than broader spreading ones; and narrow, pointed seed capsules rather than much broader ones. Hultén notes that where the species coexist, intermediates between the two occur. (Zhmylev [1989] adds to our picture of these species by his recognition that *S. davurica* var. *grandipetala* as referred to by Hultén is quite separate from *S. davurica* in Asia, and that the plants so named in North America should be known as *S. razshvini*. Although there is a section in Latin describing *S. razshvini*, the discussion of the relationships is in Russian, but it seems that Zhmylev has *S. calycina* and *S. razshvini* to cover what Gornall has treated as all belonging to *S. calycina*, with the more limited *S. calycina* being distributed either side of the Bering Strait from about 160° E to 150° W and *Saxifraga razshvini* being east of that from about 150° W through into northern Canada at about 127° W in the Backbone Range. *Saxifraga unalascensis* remains a separate, third, species in such an analysis.)

We found a small number of plants on the limestone hills by the Kougarok Road which undoubtedly fit into *Saxifraga unalascensis* (p. 180) with broad leaves, broad capsules, and branches of the inflorescence very broadly branched. At the other extreme, and much more common both here and also at a site on the Teller Road, were plants with much narrower leaves, much narrower capsules, and much less broadly spread branching, which would fit the description

of *S. calycina*. It became clear that the broader-leaved plants invariably had broader spreading branches, although a couple of plants had broader spreading branches and more rounded capsules and yet had intermediate leaves (p. 180). Only one plant was found in flower, the others all having finished, and this was an intermediate with broader branching and fairly broad, although not the broadest, leaves. The petals, of which there were more than the typical five on many flowers, are very pale purplish pink, with deep purple-red carpels and a pale stigmatic tip. The stamens are the same length as the petals and, like those in many of the *Micranthes* species, they add to the overall impact of the flower because they are somewhat broadened. In this case the filaments are also stained pale purple, adding to the attractive effect of the petals.

Farewell to Alaska

As we flew back to Anchorage, I counted up the *Micranthes* species of western Alaska which I'd come to see and could see nowhere else except Siberia: *Saxifraga nudicaulis*, *S. calycina*, *S. unalaschcensis*, and *S. spicata*. And then there were the other species: *S. eschscholtzii* and *S. funstonii*. Finding *S. redowskii* was an amazing bonus. Only the Mesogyne species such as *S. bracteata* and the Ciliatae species *S. serpyllifolia*, and, in the Anchorage area, the *Micranthes* *S. reflexa* had been elusive.

Back in Anchorage, I still had a few more days: we'd visit Seward to go out to see humpback whales, and stop off by Turnagain Arm to see *S. tricuspidata* and *Heuchera glabra* and I would do a presentation on saxifrages to the NARGS Alaska Chapter. All that got done, but sitting in the airport in Anchorage waiting for a midnight flight to Seattle, I couldn't help but think back to Nome. Of the saxifrages and the muskox and the loons. But enough of them: it's a four-hour flight to Seattle, and with another two hours for time-zone changes it would be around 6 a.m. when I touched down, to be met at 7 by Judith Jones for a day on Mt. Rainier.

Bibliography

For those who want to go further, here are two standard floras, a couple of key treatments of the genus *Saxifraga*, and some articles dealing with specific groups of plants, individual plants, and specialized topics. Many other sources were also referred to but are not included here. The USDA website is valuable as a resource but not infallible, nevertheless it provides great help in working your way through the multitude of synonyms.

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- Malcolm McGregor's publications for the Saxifrage Society can be obtained via the society's website. His articles on saxifrages appear regularly in *The Saxifrage Magazine* (Journal of the Saxifrage Society), and two major articles appeared in *The Rock Garden* (Journal of the Scottish Rock Garden Club), issues 114 & 115 (January & June 2005).

Note:

In the second part of this account of Malcolm's research trip he will discuss the saxifrages of the Olympics, Cascades and Middle Rocky Mountains.

Malcolm McGregor lives in East Yorkshire and is editor of the Scottish Rock Garden Club's journal. He has published a number of books on saxifrages, including the International Register and *Saxifrages from Scratch*. He spends about a month traveling each year in search of wild saxifrages, and he is an enthusiastic lecturer at home and in North America, where he has given presentations to 14 NARGS chapters. Malcolm is currently working on a major book on saxifrages for Timber Press.

South African Adventure: The 2005 NARGS Tour

Panayoti Kelaidis

What a difference a few years make! In January 1994, the South African botanist Koos Roux and I were the only people staying at Sani Pass Hotel. I was self-conscious, sitting in the echoing dining room with half a dozen waiters hovering around our table. In February 2005, however, the same dining room was packed with hundreds of tourists, with a string of giant buses lined up in the parking lot like cattle. The resort's spacious gardens were thronged with northern Europeans gawking at the scenery, the proteas, and the birds. Fortunately, though, the visitors seemed to keep to the grounds of the elegant resort. There were not nearly as many people when we ventured up the onto the "Berg," despite the mountain range's current status as a World Heritage Site and the destination of more and more midwinter tours from Europe.

I'd written a half-dozen articles in this journal on South African subjects after my first trips to that amazing country. The Fynbos, a plant community of shrubs and understory herbs, is justifiably famous among botanists as the world's smallest Floral Kingdom. Fynbos is characteristic of the winter-rainfall Western Cape, but the Drakensberg is far to the east, and it is one of the country's summer-rainfall regions, whence come most of the showy garden perennials from South Africa that we grow in perennial borders—*Eucomis*, *Galtonia*, *Kniphofia*, *Dierama*, *Phygelius*, and many more.

Rock gardeners have treasured a handful of Drakensberg specialties: *Helichrysum milfordiae*, *Rhodohypoxis baurii*, *Cyrtanthus breviflorus*, and a few others, all likely introduced to horticulture in the 1930s by Helen Milford. This number has expanded enormously in the past decade or two as South African seed companies and collectors have brought a wealth of miniature bulbs, cushion plants, and succulents into cultivation from this vast, enchanting flora.

I have timed each visit to South Africa at a slightly different season and made an effort to revisit certain places. I've found many new plants each time; conversely, I don't find plants I saw at another season. My first visit was in January. I returned a few years later in March and on another occasion I visited in October. So why not visit in February, when orchids and *Kniphofia* should be in peak form?

I had been asked by many members of NARGS if I would lead a trip to South Africa, and February 2005 turned out to be the year. The Administrative Committee and the Board of NARGS approved the concept and allowed us to use the NARGS name in the announcements in the *Quarterly* and chapter newsletters. To my delight, the trip filled; I regretted that a few people were left on the waiting list.

Cape Town

I like to fly into South Africa a few days ahead, particularly if I am a tour leader, to have time to acclimatize. This trip, as usual, I arrived in Cape Town, one of my favorite cities. Capetonians are always telling me about their fierce winds, terrible summer heat spells, and chilly winters. There had been a rather severe drought in the Western Cape over several years prior to my visit, and I was braced for the worst. Naturally, I arrived after a thorough (and uncharacteristic) mid-summer rainy spell left the city resplendent and the skies crystalline; the fresh ocean breezes felt heavenly to my body just wrenched from midwinter in the Northern Hemisphere.

I was hosted by the trip's co-leader, Dr. J. P. Roux (who insisted we all call him Koos), Director of the Compton Herbarium at Kirstenbosch. Koos had been my companion when I first visited the Drakensberg, and we were to retrace our first trip's steps in a counter-clockwise direction. I was astonished to see how his home garden, a sunny, colorful perennial planting when I first visited more than a decade earlier, had become a woodland under giant tree ferns, shading a fine collection of bromeliads.

I spent the better part of a day at the Compton researching some problematic South African plants we grow at the Denver Botanic Gardens, and an even more rewarding half-day at the Bolus Herbarium nearby at the University of Cape Town, where the finest collection of Mesembryanthemaceae specimens is housed. Providentially, the type specimens of dozens of species of the genus *Delosperma* had just been returned from Europe, and I was able to photograph these for my future study back at home.

The National Botanic Garden at Kirstenbosch was transformed utterly: a huge new visitor center and entrance complex greeted me. The fabulous Succulent Conservatory I'd last seen freshly planted was now filled with gnarly mature specimens, and the grounds were as dazzling as ever with vast drifts of all manner of perennials, bulbs, and shrubs bedded out in lavish schemes. Kirstenbosch is reason enough to visit South Africa, a gem among public gardens.

Soon Koos and I flew off to Bloemfontein to join the rest of the tour participants. There were 20 of us altogether, from all across North America. Most had never been to South Africa before, and all were excited to get to the high mountains. Bloemfontein is situated on a very flat plain 100 km (60 miles) from the Drakensberg. We departed early the first morning to drive directly to our first and loftiest base, the ski area at Tiffendell.

The vast, grassy plains of the Eastern Cape remind me of the North American Great Plains, or perhaps parts of the Intermountain Plateau country in the West. It's only when you get out of the car and take a closer look at the strange plants and villages filled with proud South Africans that you realize that you're truly not in Kansas any more. As we whizzed through Aliwal North, I was frustrated to see the vast stands of *Aloe broomii* alongside the road, many of them with a few fresh flowers left—and no time for pictures! We climbed the long, winding road straight up the berg to Tiffendell.

Tiffendell and Naude's Nek

We finally saw the quaint, European-flavored chalets perched high on the hillside near Ben MacDhui. The accommodations were quite pleasant, and the food and service were excellent. Tiffendell must be among the highest permanent settlements in the Southern Hemisphere at 2720 meters (8923 feet), and the steep north-facing slope on which it is built is lush with floral displays—a great spot for a few days' botanizing.

Tiffendell is situated on the very lip of the southernmost escarpment of the highest Drakensberg, overlooking the high plateau centered on Rhodes—probably the coldest area in South Africa outside Lesotho. This area is rather like the Colorado mountain parks that are colder than the surrounding mountains owing to cold air drainage in the winter months. Any plants from this area are likely to be the hardiest of their class.

The first floral spectacle to greet us at the ski area was a vast boggy meadow filled with thousands of *Kniphofia caulescens* in full bloom (photo, p. 185). An article posted in the guest rooms implied that the resort's next phase of construction will expand in the direction of this meadow, which would be regrettable. *Kniphofia* swales like this are common in Lesotho, but this must be the showiest display in the East Cape. On several excursions during the next few days from the lodge to the immediate vicinity, we easily tallied perhaps 100 wildflowers in full bloom, including a significant quantity of bulbous plants ranging from *Albuca* to *Wurmbea*. The immediate vicinity of Tiffendell has possibly the most spectacular massing of *Helichrysum ecklonis* I've seen anywhere—the gorgeous, giant pink everlasting that makes thick mats looking absurdly like lamb's ears. A cliff nearby is thickly encrusted with giant mounds of *Euphorbia clavarioides* var. *truncata*, the wonderful cushion euphorbia of the Drakensberg (p. 186).

The last full day here consisted of a “short” traverse from Tiffendell to Naude's Nek—something our jeep drivers had obviously never done before and are not likely to repeat. It turned into a 20-mile odyssey over bumpy roads that thoroughly jarred everyone's kidneys. There were some spectacular sites along the way, though, and many novel plants (including my first encounter with *Helichrysum caespitium*). Naude's Nek lived up to our highest expectations: dozens of showy plants we had not seen up to now—especially orchids—were in full bloom at the summit. There is an especially wonderful assemblage of many species of

alpine heaths (*Erica* spp.) on the moist slope facing east, and many unusual ferns and chasmophytes on a steep cliff we walked beneath. This pass represents the southernmost of the three high roads that traverse the east-facing escarpment of the highest Drakensberg, and it is a must-see for any alpine enthusiast.

Sani Pass

From Tiffendell the expedition took the better part of a day descending back onto the “Little Berg” (the foothills of the Drakensberg), driving through lush green country filled with massive pine plantations and fabulous remnant meadows with fine assemblages of wildflowers. The picturesque small towns that dot these foothills—MacLear, Ugi, and Underberg—are thronged with locals, mostly of the Xhosa tribe in the south, although Zulus come to predominate farther north. The women often wear wonderfully colorful outfits. A lunch stop at a spectacular waterfall at Howick allowed time to buy souvenirs at the numerous tourist shops there. Gazing down at the thundering waterfall in the distance was so captivating that it took a few minutes to make out that a crowd of women were patiently washing clothes at the river’s edge near the top of the falls.

Our destination was the Sani Pass Hotel, a wonderful resort with well-established, colorful gardens, picturesque views, golf courses, and other entertainment options for tourists with time for these leisure pursuits. No such luxury for us: the hills were beckoning! Immediately around the hotel lay extensive, relatively pristine meadows filled with bloom, so we spent the better part of one day strolling through them, finding tree ferns (*Cyathea dregei*) and a wealth of bulbs in bloom.

The next full day was spent in bumpy jeeps again, this time ascending the famous Sani Pass as soon as Lesotho customs let us through. The 8-mile road from Lesotho customs to the summit of Sani Pass must be the richest stretch of cool temperate climate vegetation on the planet, equaled perhaps only in a few parts of the Chinese Himalaya or northern Mexico. I have had the privilege of walking this road at several different seasons, and each time I have found hundreds of attractive ornamentals brimming the roadsides. This time we stopped briefly several times to stretch our legs and examine unusual orchids like the black *Corycium*. Our destination was actually well beyond the Summit Pass chalet, on a high pass another 6 miles along, at the very summit of the Black Mountains of Lesotho. We had packed lunches for a stop here, and a cluster of colorfully garbed Basotho herdsmen anticipated our arrival. A short stroll from our lunch spot, huge cushions of *Helichrysum pagophilum* were fluffy with shedding seedpods. Some cushions were several feet across, emerging from the basaltic crevices in all directions. *Helichrysum milfordiae* (p. 188) was much smaller, but in full bloom—its silken mats spreading along crevices.

On the way back to the Chalet we stopped several times to admire *Androcymbium*, abundant in wet swales on the summit plateau. The ghostly white bracts look like tissue paper from a distance, but up close it is a striking plant that would be a great addition to gardens.

One of the high points, both literally and figuratively, was the rocky meadows immediately around the Chalet at Sani Top. This was unquestionably the most colorful alpine display we saw on this trip, equal to anything I have seen at other seasons or on mountains anywhere. *Wahlenbergia congesta* was the most conspicuous component, with deep blue flowers in every shade from lilac to cobalt blue, and even some albinos (p. 187). Many had darker spots, and any would be an adornment in the rock garden. This abundant campanula lookalike was interspersed with lingering *Rhodohypoxis* and a number of *Helichrysum* species in full bloom, mostly yellows, but the showiest everlasting at this season was *Helichrysum album*, a rather misnamed plant. This species' flowers are white on the upper surface of the bracts, but the undersurface is brilliant red, pink, or mahogany. I have never seen *H. album* as abundant as on Sani Top. Everyone on the trip was kneeling in adoration (or perhaps just taking pictures). We explored a bit farther on the summit plateau and searched among the glorious cliffs below the Chalet, where *Euryops acraeus* lingered, but the border post below would close too soon. I looked longingly at the cliffs as we descended, so rich in bulbs, cushion plants, and perennials. I know I have only seen a fraction of what they offer on my visits here. It would be worth spending a week at the Chalet and hiking long distances to see what this treasure trove of saxatile delights might hide.

En route to the hotel, we had to stop a few more times: a vast field full of brilliant orange *Kniphofia laxiflora* in full bloom and a meadow studded with *Protea dracomontana* begged for photographs. What could the next few days possibly have in store for us?

Royal Natal National Park

Our final stops as a group were spent in the northern quadrant of the Kwa-Zulu Natal Drakensberg, an area of extraordinary lushness and beauty. The Royal Natal National Park is scenically an area of jutting, basaltic cliffs (the "Barrier of Swords") swirling with mists, and deep canyons ornamented with waterfalls and flowers. Once again we were staying at Cathedral Peak Hotel, an elegant resort complex with beautiful gardens and lovely views. Our hikes the following days were taken directly from the hotel; in a few hours we could be perched quite high on the little berg, with panoramic views of the lowlands and an astonishing list of plants seen along the way. The Little Berg is considerably milder than the summit plateau, but many of the understory plants promise hardiness, especially in relatively mild temperate climates. Orchids again were abundant, as were many suspiciously tender-looking woodlanders like *Begonia sutherlandii* and a tiny *Peperomia*. The many tender landscape plants around the hotel, including giant *Cereus* cacti, huge *Protea* bushes, and even bird-of-paradise (*Strelitzia reginae*), indicated that frost was a fleeting phenomenon there, although they assured us that it did snow. I suspect we are talking about Zone 8 winters most years at the resort level.

Five or more species of *Protea* occur, sometimes abundantly, on the Little Berg throughout Kwa-Zulu Natal Province. I was surprised to see an ancient-looking grove of *P. roupelliae* (p. 187) in full bloom on the dry bluff above the Basotho Village on this much cooler and drier part of the interior Drakensberg. As we climbed toward a high ridge with Bushmen rock paintings, I spotted a cushion plant dotting a rock outcrop. It proved to be a miniature *Crassula* that, judging by its gnarled trunk, must have been decades old.

We spent the last few days driving over Oliviershoek Pass to the drier and colder Orange Free State side of the North Drakensberg, visiting the Sentinel area on one day and the Basotho Village park the next. Alas, our day on Sentinel was extremely foggy and rain finally set in, but we did get to walk along the road from Witziehoek and see dozens of novel species we hitherto had missed. I was especially struck by the dark, speckled black blossoms on miniature *Gladiolus ecklonis*, which was common in the turf, and the usual assortment of heaths, orchids, and gigantic mounds of *Helichrysum sutherlandii* tucked into the cliffs. As always, Koos Roux was able to put accurate names on most of the flowering plants, and ferns (his specialty) were abundant at almost every stop. In the sparse turf along the path, *Crassula vaginata* (p. 186) showed bright corymbs of bloom. This beautiful wildflower unfortunately appears to be monocarpic. Elsewhere I saw deep orange and near-red forms, sometimes a foot or more tall, but here it was uniformly compact with deep yellow flowers.

On our last day, we parted regretfully with most of the participants, who returned to Durban to fly back to the United States. Six of us proceeded for a four-day extension at Oxbow Lodge, in northernmost Lesotho. The countryside around the northern escarpment of the Drakensberg is pastoral, with lovely villages like Clarens and rolling farm country that has kept much of its nineteenth-century charm. Although obviously grazed and often cultivated, much of it seemed relatively undisturbed, especially in rocky areas, where we could glimpse wildflowers winking among the grasses. Lesotho presents a stark contrast.

Oxbow Lodge

As soon as one crosses the border into Lesotho, the tenor of the landscape changes. There are no fences (all property is communal), and grass seems suddenly to shrink to a misty green film over the reddish soil. Deep gorges called dongas, caused by erosion—most of it recent—are common around the villages, and animals wander everywhere: mostly sheep and goats, with some cattle, horses, and donkeys. Crowds of people mill around in even the smallest villages. The scene was colorful, but aside from plots of corn and vegetables around the homesteads, the vegetation seemed to be thoroughly browsed.

As we ascended Moteng Pass over the Maloti mountains, we stopped for a break. A short stroll produced a few new plants, but everything had been sampled by the herds of sheep and goats that traversed the pass en route to higher pasturage. Young boys from all over the lush western verge of Lesotho, where the

population is concentrated, are sent up to the high mountains in the spring to tend their flocks of sheep and goats during the mountain summer. They bring them down again in the autumn, but it was obvious that any place near a road would be thoroughly occupied by Basotho herd boys.

Despite my initial concerns, the summit of Two Gun Pass, the highest pass in southern Africa at over 3200 meters altitude (around 10,000 feet), was tremendously rewarding. Small alpine plants carpeted the ground, although many showed signs of browsing. I was particularly gratified to find hundreds of *Delosperma basuticum*, which I hitherto knew only from one small, diminishing patch north of the Chalet on Sani Top. Soon we were thronged by Basotho herdsmen, who begged cash or food and were obviously eager for some distraction from their mountaintop solitude.

We spent several days at Oxbow Lodge, a pleasant cluster of rooms, restaurant, bar and shop. This is the “other” ski area of southern Africa, but I couldn’t tell where the skiing took place: perhaps people were driven to the top of the pass and worked their way back down to the lodge. The thrifty Arizona cypress at Oxbow (filled with weaverbird nests) indicated to me that this—probably one of the coldest spots in Africa—likely does not get winter temperatures much lower than 0° F (–18° C) in most winters. I doubt that snow accumulates here as it does in the Northern Hemisphere’s ski areas. I first explored the hills in this area in 1998, and they proved to be a highlight of my South African travels. One afternoon, while relaxing at the lodge, I noticed a plate with the Acropolis and a few other Hellenic knick-knacks and deduced that the owner was of Greek extraction, like myself. We both dusted off our slightly rusty ancestral language: he had been living in South Africa and Lesotho for almost half a century.

While our group stayed there, a cluster of Basotho girls were selling green peaches outside the gates of the compound; I never saw anyone purchasing any. I espied a number of Basotho herdsmen’s shelters in the area, so we were hardly distant from civilization. Each of our hikes produced a wealth of interesting, showy plants, although the area had been thoroughly browsed. I suspect there is still enough browse in this section of Lesotho—and the highway through these parts is still relatively new—and it’s just far enough away from winter villages that there is still a bit of a show. The plants that looked best and were most abundant may have been poisonous or otherwise unpalatable to sheep and goats.

A half-mile west of Oxbow, where the highway crosses the river to climb up toward the pass, we were struck by a graceful table mountain about a quarter-mile across, on the south side of the road. As we approached the hill, we saw a glorious throng of *Kniphofia albomontana* (photo, p. 185) closely allied to *K. caulescens*, only with larger inflorescences, and adapted to rockier, drier habitats. Growing among them was a great variety of attractive wildflowers, including *Cotyledon orbiculata*, striking *Eucomis schiffii* and *E. humilis*, and no end of showy composites, especially vast clumps of *Inulanthera thodei* (p. 187), which reminded me of rabbit brush (*Chrysothamnus nauseosus*) in the western American landscape. The top of the plateau had four Basotho herdsmen’s huts, and an angry pack of Basotho mastiffs threatened us at one point. I was concerned for my

companions, but when we all picked up rocks for defense the wildly barking dogs backed off immediately; apparently we were not the first to threaten them with stones.

The north and west faces of this basaltic mesa were one of the richest and most beautiful natural rock gardens I have seen anywhere (p. 188). The thousands of *Kniphofia* blooming everywhere headlined the spectacle, but dozens of other showy ornamentals grew among the rocks, on the rock face, and in the scree slopes below: many *Crassula* species, a half-dozen orchids, bulbous plants of all sorts, and several parasitic Scrophulariaceae, as well as *Sutera*, *Nemesia*, and more. Dense cushions of *Xerophyta viscosa*, which looks absurdly like a miniature, bright purple-pink daylily, grew out of the rock walls, and *Aloe aristata* made mounds of fine-spined rosettes, reminiscent of *Sempervivum*. The highlight for me, however, was finding for the first time *Delosperma cooperi* and *D. nubigenum* (p. 186) growing at the same locality. I had seen both of these many times on previous trips, but the yellow ice plant was generally restricted to very high elevations, and *D. cooperi* was most common in the Little Berg or the plains below. Here the purple ice plant grew in thick festoons on the north side of the mountain, where it was still speckled with large purple flowers in February (the equivalent of north temperate August). The yellow ice plant clung to cooler exposures, more to the east. It was likewise lush and green, and had long finished blooming, though covered with seed capsules.

We now grow dozens of species of “mesembs” (genera in the family Mesembryanthaceae) in Denver, some as showy and serviceable as these two. These were the first two species to establish themselves in cultivation in the Northern Hemisphere, and their origins and distribution have been a source of great interest to me over the years. I was astonished to find them both flourishing here, at a ski resort at over 2600 meters.

We returned to this spot several times for photography. We found even greater variety of flowers in a steep canyon just south of our lodge, many of them species I had never seen before. But the spectacle of the first two hardy ice plants I had ever grown, growing together at one locality with such vigor, will always remain with me.

I am deeply grateful to NARGS for the support afforded me and others through the grant programs. I have learned so much from my travels to South Africa, and I was deeply gratified to share some of my experience with fellow NARGS members. The prospect of more tours being planned will offer even greater possibilities for members to seek out our fabulous rock garden flora in its native haunts. I hope this program will expand and afford many others the opportunity.

Panayoti Kelaidis is Director of Outreach at the Denver Botanic Gardens, where he developed the famous Rock Alpine Garden and has been a leader in introducing new plants from around the world to American gardeners. He is a frequent contributor to this journal and a popular lecturer worldwide.

At the Lake's Edge: The Alpine Rock Garden at Lakewold Gardens

Katie Burki

On a lakeshore between Washington's Puget Sound and Mount Rainier in the area historically known as the Lakes District of Tacoma and now called Lakewood, Lakewold Gardens boasts near-perfect growing conditions. Its temperate climate nurtures what has been called a "gardener's paradise." The Cascade Mountains capture moisture borne inland by warm Pacific winds. There, the moisture is held frozen in snowfields until warm summer days, when it melts and begins a return journey to the sea. Along the way, the water nourishes the diverse plant life of the Puget Sound region. With care and skill, many of the world's choicest plants can be grown here.

Lakewold Gardens lies at the forest's edge, set against Gravelly Lake, a relic of the glaciers that covered the region during the last ice age. As the glaciers retreated, they left outwashes of deposits consisting of sand, gravel, and rocks. A great amount of sorting is evident in the outwash deposits, and much of the gravel is rounded, a result of water transport. Most of the native topsoil—comprised mostly of forest detritus—is only a few inches deep. The soil is quite loose in consistency, and drainage is mostly by infiltration; the soil readily soaks up precipitation. On the banks of the lake, appropriately named "Gravelly," grows the endemic Oregon white oak, or as people north of Oregon call it, the Garry Oak, the stately *Quercus garryana*.

Lakewold's Alpine Rock Garden is nestled under a great Garry oak, just west of Gravelly Lake. The lower hillside overlooks the lake and provides good drainage, air circulation, and full morning sun—conditions perfect for growing gentians, saxifrages, irises, vacciniums, dwarf rhododendrons, and the tiny, ground-hugging cushions of alpine treasures.

In the 1940s, Eulalie (Mrs. Corydon) Wagner, the founding visionary behind Lakewold, began developing the gardens by removing more than 200 Douglas fir trees from the property, opening up the space. In the late 1950s, the Wagners hired Thomas Church, one of America's best-known landscape architects, to help design the gardens. With his help Eulalie created a series of garden rooms, including the Alpine Rock Garden, to draw people through the garden.

Over the years Eulalie Wagner became an accomplished plant collector. She adored the tiny cushion plants and quickly filled the space at the lake's edge. Because many of the plants were new to the trade and their growth habits were not well understood, over the years some of them "cannibalized" the smaller treasures once planted there. Through a series of ongoing renovations, Lakewold—now a not-for-profit public garden—is slowly restoring the Alpine Rock Garden, along with other garden areas, to reflect the original beauty of Lakewold and to respect the rich geological and natural history of the area.

With the aid of a grant from the North American Rock Garden Society's Norman Singer Endowment Fund, specifically designated for hardscaping materials, Lakewold has been able to purchase rock for much-needed renovations to the upper rock garden area. Because the area was overrun by *Acanthus mollis*, native *Gaultheria shallon*, and *Actinidia*, it seemed disconnected from the lower rock garden. As well, smack dab in the center of the upper garden stood the stump of a tree damaged by lightning, from the center of which grew *Rosa glauca*.

It seemed appropriate to treat the upper rock garden as an alpine meadow planting that holds more moisture than the lower rock garden. We deliberately chose not to cover the ground with gravel (as in the lower rock garden) or to create a chaotic collection of treasures and must-haves. Instead, we designed the upper garden to showcase drifts of plants similar to the alpine meadows of Mount Rainier, where the trees are dwarf in stature and the ground is covered by a large variety of species.

The focus has been on plants of the Ericaceae (heath) family, combined with other alpine plants and a small collection of dwarf conifers. Sempervivums and saxifrages line the stairs. The 200-square-foot area contains four varieties of *Vaccinium*, including *V. × intermedium*, *V. retusum*, *V. delavayi*, and *V. macrocarpon* 'Hamilton'. These subtly different species will spread into a wonderful evergreen carpet, creating a beautiful backdrop to plants more ephemeral in nature. Particularly noteworthy is *Vaccinium delavayi*, with its tight, rounded foliage and wonderful crimson spring tips. Another species with interesting spring growth is *Vaccinium retusum*, whose new foliage emerges in a glaucous tone with pink tips. Also included in the ericaceous collection are *×Phylliopsis*, *Cassiope*, and *Phyllodoce*.

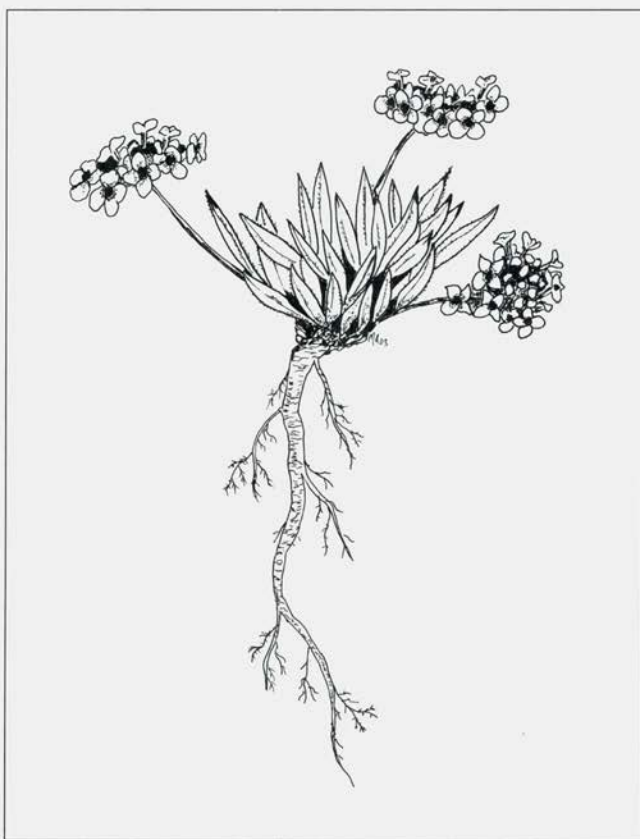
One of Eulalie Wagner's best-loved alpinines was *Gentiana acaulis*. To accompany the few surviving specimens of her original planting, we added 20 more, creating a mass of gentian blue to delight the late April visitor to the garden. May visitors will enjoy drifts of *Iris* species cascading down the slope. Most of the irises here are native to the eastern United States, including *I. prismatica* and *I. setosa*. As well, the collection includes a native of Japan, *I. gracilipes*, and a small collection of Pacific Coast iris hybrids. We will continue planting the upper rock garden as the area evolves. Just this spring we added a mass planting of *Azorella filamentosa* and *Myosotis decora*.

Along with the grant from NARGS, we have enjoyed collaborating with distinguished nurseries that are also supporters of the Society, including two in our own area: Mt. Tahoma Nursery and Coenosium Gardens, who provided plants for the renovated area. In the continuous development of Lakewold Gar-

dens, we are very appreciative of the support of groups such as NARGS. It gives us great pleasure to develop projects that preserve plant ecologies and delight and educate garden visitors.

Visiting Lakewold: Lakewold Gardens is a 10-acre public estate garden in Lakewood, Washington. Hours of opening and touring information are available at www.lakewold.org or by calling (253) 584-4106.

Katie Burki graduated from Evergreen State College with a major in environmental studies, focusing on organic agriculture and community development, and also has technical training in landscape design. She has worked in various capacities at Lakewold Gardens since 1999 and is currently the garden manager. She serves on the board of the Hardy Fern Foundation and on the steering committee for the Garden Conservancy Forum, a project of the Garden Conservancy.



Phoenicaulis cheiranthoides, drawing by Mark Akimoff

Pacifica: A Garden in the Siskiyou

Craig Dent

Pacifica, a recently established botanic garden in Williams, Oregon, in the Applegate Valley between Medford and Grants Pass, features a rock garden as one of its three entry portal gardens. Gracing a south- and southwest-facing slope, the Garden is visible to all passersby.

Four years of planning and fundraising came together in May 2005. With cash contributions, grants—including a generous contribution of \$2,875 from the Norman Singer Endowment Fund of NARGS—donations of plants, and plenty of volunteer help from interested rock gardeners, Pacifica undertook a three-year project to construct and plant one of the largest rock gardens in North America. At more than two acres, Pacifica's rock garden will focus on alpine and subalpine plants from the Klamath-Siskiyou bioregion, supplemented with a generous collection of plants from around the globe.

Pacifica is pleased to have the world-renowned rock garden designer and alpine plantsman Josef Halda engaged in this massive design, layout, and construction effort. Beginning in winter 2004–2005, the site was cleared and a universally accessible main trail through the Garden was roughed in. Josef arrived at the end of April, visiting three local rock quarries to select native extrusive igneous rock. During 2005, more than 160 tons of rock were arranged on the slope. Equal amounts of rock will be placed on the site during both 2006 and 2007. A waterfall that drops nearly 50 feet, with 13 pools, was excavated and readied for “paving” during 2006. As a major feature that will attract people to the *Garden*, the waterfall will flow at 150–200 gallons per minute and will be visible from more than a quarter-mile away.

Klamath-Siskiyou native alpine and subalpine plant specimens were gathered from private lands and nurseries in the area and planted. Three hundred specimens of both Klamath-Siskiyou and nonnative plants were donated by Siskiyou Rare Plant Nursery (Medford), Kathy Allen, Phyllis Gustafson (Central Point), Forest-farm (Williams), Cathy Lombardi (Cave Junction), and other members of the Siskiyou Chapter of NARGS.

Craig Dent is Executive Director of Pacifica: A Garden in the Siskiyou.

The New Import Permit for Small Lots of Seed

Joyce Fingerut

The regulations for importing all plants and animals into the United States are written by the Animal and Plant Health Inspection Service (APHIS; <http://www.aphis.usda.gov/>) of the U.S. Department of Agriculture (USDA). APHIS is an active arm of the USDA's mandate to "protect America's agriculture" and provide safe and affordable food, and it deals mostly with pest and disease management.

The import regulations for fruits, vegetables, and plants are found mostly in those rules designated as 7 CFR Part 319. Within 319, the portion dealing specifically with plants and plant parts (including seeds) is section 37, giving these regulations the nickname of Q37 ("Q" for "quarantine"). Q56 (section 56) deals with imported fruits and vegetables, and is far more restrictive.

In the 1980s and 1990s, rising concerns about the state of our natural environment culminated in the Plant Protection Act, published in 2000 (for this and other documents mentioned here, see "Internet Resources" at the end of this article). This act gave APHIS's Plant Protection and Quarantine (PPQ) the authority to control importation of plants and animals where necessary to protect U.S. agriculture, horticulture, and the natural environment. These are considered to be "phytosanitary" issues (affecting the health of plants), and all such regulations must be based upon sound science and international agreements (specifically, trade agreements).

The International Plant Protection Convention (IPPC) is a multilateral treaty acknowledged as the source for international standards for phytosanitary measures affecting trade. With this treaty, 156 signatory countries agreed to carry out inspections and treatments to ensure that "quarantine pests" are not disseminated along with plants and plant products exported from their respective countries. Phytosanitary certificates, recognized as an internationally accepted form of pest risk mitigation, state that the consignment has been inspected or treated according to the importing country's requirements. This certificate is sent with each consignment of plants or plant parts. The conditions for import/export are bilaterally negotiated, and vary with the commodity as well as the importing country.

By 2000, then, we had a procedure for documenting the phytosanitary condition of plants and plant parts, and a regulatory agency to enforce that procedure. Establishing such a procedure to allow plants and seeds to enter the U.S. was viewed by APHIS as a means of facilitating trade—but, because of costs, time, and efforts, the phyto requirement was seen by seed hobbyists and small businesses as an interruption of the formerly free and open exchange of seeds.

Initially, the need for phytos for imported seeds was not enforced, and shipments of seeds passed into the U.S. uninspected and unchallenged. Then, a report from the National Plant Board, in trying an attempt to better safeguard the health of U.S. agriculture, horticulture and the natural environment, recommended the consistent enforcement of the phytosanitary requirement. The members of the Board were apparently unaware of the existence of horticultural societies' organized seed exchanges, and were primarily bent on discouraging the informal and unmonitored swapping of seeds by private individuals.

This is where we came in.

In the summer of 2001, notice was published in the Federal Register of the intent to begin enforcing the phyto requirement for imported seeds. As this would have severely disrupted our Seed Exchange by cutting off almost all overseas and Canadian donors to the Exchange, we petitioned APHIS to reverse the requirement for phytosanitary certificates. Enforcement was delayed until January, 2002 (based upon Canada's request), which allowed us one last full and unimpeded Seed Exchange. But with enforcement, came a noticeable diminution of seed donations, despite NARGS's best efforts to ease the import process for overseas and Canadian donors.

U.S. members of foreign horticultural societies also experienced long delays in receiving exchange seeds from those groups. While some seed sent through the mails continued to slip in under the radar, many shipments were confiscated at the ports for lack of documentation.

The letters and petitions to APHIS continued. An umbrella group was formed by societies with seed exchanges, and the 45 member organizations of this International Horticultural Seed Exchange Advocacy (IHSEA) supported the effort to change the rule. APHIS's contact person in this matter, Dr. Arnold Tschanz, believed that horticultural seed was of low phytosanitary risk (especially that from organized seed exchanges and knowledgeable seed vendors), and he became committed to finding an alternative method for importing such seed. Negotiations and discussions with (and within) APHIS resulted in a proposal to allow the importation of small packets of seed with a permit, instead of a phyto. Then, the long progression from a proposal to a published regulation began. . . . I'll spare you the details.

April saw the publication of the final rule: Small Lots of Seed (Docket: APHIS-2006-0053), which allows the importation of seed shipments of limited size under a permit instead of a phytosanitary certificate. The rule, as I write, is to become effective on May 15, 2006. The new procedure will require the one-time acquisition of an import permit by any U.S. resident wishing to bring in seeds from any other country outside the US. This permit will be free, good for three

years and multiple importations, and renewable. The application will be available online at: <http://www.aphis.usda.gov/ppq/permits/plantproducts/nursery.html> (click on "Small Lots of Seed Program") or from: Carolyn Fitzgerald, USDA-APHIS-PPQ Permit Unit, 4700 River Road, Riverdale, MD 20737-1236 Phone: 1-877-770-5990, Fax: 301-734-5786, E-mail: Permits@aphis.usda.gov

Information on the APHIS web page will walk you through the procedure of filling out the form, and advise you on exactly what to print on each line of the application. You will mail in your application, and receive a permit and several green-and-yellow mailing labels (more about those, below).

With the new permit, small lots of seed can be imported for our uses under the following conditions:

1. The seed is currently enterable. A list of prohibited or restricted seeds can be found on the NARGS website at: <http://www.nargs.org/RestrictedSeed/>
2. The following packaging and shipping requirements are met:
 - a. A typed or legibly printed list of all taxa (preferably alphabetically arranged for quicker processing) accompanies each shipment, along with the name/address of the shipper.
 - b. Each packet is clearly labeled with the name of the taxon, preferably to the species level. The enclosed list (see above) may provide a code for each lot, which may be used on the seed packets in place of the names of seed and shipper.
 - c. Each packet contains a maximum of 50 seeds of one taxon, or a maximum weight of 10 grams (whichever is greater).
 - d. Seeds are free from pesticides.
 - e. Seeds are free from soil, chaff and debris, fruit or pods, and (of course) "living organisms such as parasitic plants, pathogens, insects, snails, mites."
 - f. Each packet is securely sealed to prevent spillage. APHIS recommends resealable envelopes, to allow the inspectors to close the packets properly after inspection; clear envelopes allow them to view contents without opening.
 - g. Each shipment contains a maximum of 50 packets.

When ordering seeds from abroad, or requesting seeds from an offshore seed exchange, you (as importer) will send with your order a photocopy of the permit, one of the green-and-yellow mailing labels, and a good-sized mailing label, clearly printed with your own name and address. The green-and-yellow label is preprinted (by APHIS) with the address of the U.S. Inspection Station through which the shipment will enter. There are a few such stations on each coast; each has a botanist on staff.

When sending your order to the U.S., the overseas exporter will supply the above-mentioned list of taxa and make certain that the packets meet all the criteria, which will be clearly printed on the permit. The exporter will paste the green-and-yellow mailing label on the outside of the shipment and enclose the list, the permit, and your address label with the seeds.

Because all items entering the U.S. automatically pass through Customs and Border Protection on their way to the inspection station, APHIS strongly recommends that a copy of the permit accompany every shipment, until all port workers become familiar with this new rule.

At the APHIS inspection station, the contents will be checked for phytosanitary cleanliness (what we previously paid overseas inspectors to do) and adherence to the requirements of the permit. It is expected that, after several rounds of inspections show entering seed to be generally clean and appropriate, only random checks will be needed in the future.

Following inspection, the individual packages and shipping container are resealed (very carefully, I have found), the importer's address label is pasted on the outside, and the shipment is returned to the mail system for forwarding to the importer. There are no additional shipping charges; the postage stamps applied by the exporter are sufficient to see the package through the entire system to the importer's door. However, commercial carriers may require an additional charge to get the package from the inspection station to the importer.

I urge all who order from overseas seed houses (Archibald, Halda, Silverhill, and so on) or who use the seed exchanges of international societies (AGS, SRGC, or the Aloe, Cactus and Succulent Society of Zimbabwe) to obtain a permit. This new regulation is a response to our needs and our requests, and the most workable compromise between the cross-purpose demands of trade and phytosanitary safety. It is also now the legal requirement for importation of seeds, and there will be no more slipping under the radar.

I will be happy to field questions and seek answers and can be contacted at alpinegarden@comcast.net or 537 Taugwonk Road, Stonington, CT 06378-1805.

Internet Resources

Plant Protection Act of 2000: http://www.aphis.usda.gov/lpa/pubs/fsheet_faqs_notice/fs_phproact.html

APHIS Plant Protection and Quarantine: <http://www.aphis.usda.gov/ppq/>

International Plant Protection Convention: <https://www.ippc.int/IPP/En/default.jsp>

National Plant Board report: <http://www.aphis.usda.gov/ppq/safeguarding/>

Small Lots of Seed, final rule: <http://www.regulations.gov/fdmspublic/component/main> and search for All Documents; Agency: Animal and Plant Health Inspection Service; Document Type: Rules

Joyce Fingerut is a past president of NARGS and has pursued the establishment of this new regulation with great energy and determination, for which we must all send her our heartiest thanks. She is also the chairperson and registrar for the coming Interim International Conference in Snowbird, Utah, having been a driving force in the planning of the meeting.

Counter-Combinatoriality

Brian Bixley

The essence of Robert Nold's jeu d'esprit ("Combinatoriality," *Rock Garden Quarterly* 64.1, pp. 48-51) seems to be that gardening cannot qualify as fine art because:

1. "it is the plants and not the artist's hand that actually create the picture" we see in the garden;
2. whatever is created "is so dependent on chance";
3. "the principles of 'artistic' gardening" change slowly.

Though he is justifiably critical of William Robinson's definition of art as "power to see and give form to beautiful things," he offers a definition only by inference: that for something to be "art" it must be created, that it must be original, and that the finished work (whatever that is) must correspond to the creator's intentions. This is clearly not very satisfactory.¹

A discussion of what constitutes "art" is complicated by the observation that almost everyone now thinks of herself as an artist. I am surrounded by accountants, stock traders, brewery salesmen, and university professors of economics who, on the purchase of a paintbox, and after the Chilean Cabernet Sauvignon has gone around a few times, announce themselves to be "artists." When we lived in France, our local butcher told us that "It is the butchers who are the artists of France, *et moi, je suis le Michelange des bouchers*" ('I am the Michelangelo of butchers'); he may have had his various tongues firmly in his cheek. Every chef, every signwriter, every reggae singer is an artist. Roger Federer is an artist on the tennis court, a surgeon is an artist in the operating theatre. All of this is harmless, even admirable. We may think of ourselves as painters or writers, composers or sculptors, even as artists, but we must not deceive ourselves into thinking that we are thereby producing art.

Creation is a solitary act (I know there are "team efforts," but even there it seems likely that at one moment one member of the team created this bit, another member that bit). Creation is a necessary condition for art, but not a sufficient. Art is a social concept, depending on a social evaluative process. The "artist's hand" plus the materials used create the picture, but they don't create art. Only a

social judgment, a collective judgment made by the appropriate “client community” as to the status of the created work, can do that, and it can, and does, do it for gardens as it does for music and painting.² Whatever artistic value a creation has, as distinct from the act of creation, is decided socially; even the artist’s commentary on what she thought she was doing in that act may not be privileged. There is not space here to argue this in detail.³ Instead, let me reflect briefly, in the light of these comments, on Nold’s three propositions summarized above.

He writes, “Even if we dismiss out of hand, as we ought to, the idea that gardening can be one of the fine arts, since it is the plants *and not the artist’s hand that actually creates the “picture”* (emphasis added), as though the fact that we see “plants in a garden” rather than the “artist’s hand” distinguishes (and diminishes) gardening as compared to the other fine arts. But we don’t “hear” a composer, we don’t even “hear” his score, we don’t “see” a painter, we don’t “read” a writer; we apprehend the materials they employ, their notes, their paints, their words, exactly as we apprehend a garden through the materials employed. We say, “I was listening to Mozart last night,” or “I have been reading Larkin recently,” but we don’t mean that literally. We mean we were listening to the *Requiem* or reading “Aubade.” So it is for the gardener and the garden. We are able to use plants (and other devices) in our garden to create pictures, sounds, fragrances, tactile effects, even flavors, in *precisely* the same way that a composer uses notes (and other devices) to create a symphony, a poet uses words (and other devices) to create a poem, or a painter uses paint (and other devices) to create a painting. It is the ability of the gardener to create the possibility of reaching many senses simultaneously and in ways that are constantly changing that gives rise to the possibility of gardening as the most complex of the arts.

Nold writes that “gardeners, or at least garden writers,⁴ seem to confuse the emotions attendant on perceiving an object with the actual creation of the object.” But they do nothing of the kind. They simply know that the act of creation is a necessary condition for art, but not art itself—that art is produced as a social act of judgment arising from, among other responses, “the emotions attendant on perceiving an object.” Art is concerned not only with the performance of a work but also with its reception. All art involves creation. Not all creation is art. My own efforts at writing poetry serve as evidence for that conclusion, though a major critical review could change all that. Thus John Donne had to wait for three centuries, and for T. S. Eliot, to be changed from a divine who wrote sermons to the metaphysical poet who was a great “artist.”

Second, Nold holds that “in order for gardening to qualify as fine art . . . every leaf and every branch and their positions in space . . . would have to be the willed creation of the gardener.” How strange to think that there are no or few “aleatory” (resulting from uncertainty) elements in the fine arts other than gardening, not to recognize (to take a musical example) that each performance of the Mozart Requiem is different, takes place in a concert-hall with variable acoustics, is played on different instruments and by different players at each performance, with a conductor who demands different tempi and different pianissimo and fortissimo shadings, and that is listened to and appraised by a

different audience, some sleepy, some attentive, some knowledgeable about music, some who had a large lunch and some who had not. We have very little idea whether what we are hearing is the “willed creation” of the composer. To assume that it bears some relationship to the intent of the composer seems reasonable enough,⁵ but that is similarly true for the relationship between the gardener and the garden.

Music is, in fact, a bad example for Nold’s argument in another way. Not only are the composer’s intentions mediated through the performers, in the way that a gardener’s intentions are mediated, *inter alia*, through her plants, but the performers may also see themselves as artists, bringing something original to the performance. The more they succeed in this, the less will the work represent the composer’s vision (except accidentally). Plants may be protean in their performance, but we have no reason to think that they set out to impose their own vision upon the garden.

Paintings fade, sculpture erodes, words lose their earlier allusive qualities, even architecture crumbles, so that what we, the “consumers” of art, experience in looking at a painting or a building is similar to what we experience in a garden. When we see and listen to *Acis and Galatea* or *Much Ado About Nothing*, how much of what we see and hear corresponds to the “willed creation” of Handel or Shakespeare? It may well be that art works are great precisely because of their imprecise nature, the multiple readings to which they lend themselves.

Of course, plants die, or grow in ways that we had not forecast (heights, textures, colors), so there is an inescapable element of chance in what actually happens. But that is quite a different proposition from saying that whatever is achieved is random. I am not sure whether Nold has been in our garden, but I have been in his, and it would be clear, I think, to most reasonable observers, that the substantive differences between the two gardens have little to do with chance.

Third, Nold asserts that because the “principles” of gardening have changed slowly as compared to other arts, gardening is deficient in “original invention.” Recall that “invention” (creation) is not art, that the objectives of painters and sculptors are not themselves art, that “originality” may be good for the brain cells but it is not art. It is too early to proclaim which of “the contested triumphs of modernism” (in the words of the critic Charles Rosen) will form part of the canon, whether it be in music or the visual arts or literature or gardening, in a hundred or two hundred years, though it would probably be unwise to bet much on the *Verklärte Nacht* (ah, that “inverted ninth”), of which it has been said that it “sounded as if the score of *Tristan* had been smudged while the ink was still wet.”

Gardening changes slowly. As I wrote in “Plants for a Time”:

Gardening, like its sister arts, has its fashions. The time scale is typically grander, however, fifty years or a hundred, while painting fads can come and go in a decade (think of the number of schools and movements you can name between 1860 and 1920). There is an obvious reason for this difference. Gardens—those, at least, that count as significant—take not a month or a week or a day to create, but a generation. You cannot paint a

moustache (as Marcel Duchamp did on a reproduction of the Mona Lisa) on a garden, and capsize the theorizing and practice of the previous several dozen years.⁶

The technical conditions of creation are very different. It takes longer to create a beech grove than it does to rattle off a sonnet or a sonata—three hundred years, it has been said, to make a lawn.

I have for many years argued that gardening is not only a fine art, but that it is the most complex of those arts and, by extension, the greatest. Almost twenty years ago, long before I had worked out with any care just how a garden came to be fine art, I wrote in a review that

gardening is the most profound and complex of the arts, operating not just inessentially or marginally through time, but deliberately and consciously. What makes a garden great is the tension between the dimensions, between what is structurally permanent and what is temporarily, immediately, imposed upon that structure. . . . We must not exaggerate the degree of permanence in the structure. . . . What distinguishes gardening from the other arts is the degree of intent. Sculpture chips, canvases crack, wood rots, buildings deteriorate through usage, music may be played badly. But only rarely—perhaps in the case of ‘performance art’—is the change planned for and hoped for.⁷

It is the element of change, not all of it controllable, which I see as one of the strands in the claim for gardening as the most complex of the arts. But there is more, much more, to be said.

Notes

1. The *locus classicus* is Immanuel Kant, *Critique of Judgment*, but may I recommend two more approachable texts: Mara Miller, *The Garden as an Art*, and Stephanie Ross, *What Gardens Mean*. I have been influenced by, and have perhaps borrowed from, both books, but I read them too recently to remember them clearly.
2. There are clearly tricky questions as to *which* works are singled out for social approval, and *why* they are. Some of these issues are touched upon in relation to gardens in “The Vernacular Garden” in my *Essays on Gardening in a Cold Climate*.
3. I have argued this at greater length in a piece called “Gardening: Most Complex of the Arts?” which I would be pleased to email to anyone interested. Notice this is not a *normative* proposition about how art *should be* identified, but an *operational* proposition about how it is identified *empirically*.
4. He mentions only William Robinson and Gertrude Jekyll, a somewhat limited sample. Any garden history book would have provided something more substantial to chew on.
5. Electronic music presumably minimizes the gap, without eliminating it.
6. Reprinted in *Essays on Gardening in a Cold Climate*.
7. In “Gardens, eh?” reprinted in *Essays on Gardening in a Cold Climate*.

Brian Bixley gardens in the country near Shelburne, Ontario.

Conversations in the Garden

Compiled by the Editor

Once again we gather some thoughts and facts from our correspondents. Please participate in this feature. We welcome responses to articles and photos we've published, brief informative notes of various kinds (though time-value items such as event announcements are not accepted owing to the long lead time involved in producing each issue). The editor's various addresses appear on the last page of each issue.



Boyce Tankersley's article on plant collections in the spring 2006 issue opened exciting prospects for North American growers who specialize in particular genera. There have been attempts in the past to imitate the U.K.'s National Collection program in the United States, but as far as I know, none yet has progressed beyond the "vaporware" stage. As the "holder" of a large number of bulbous species, particularly *Fritillaria*, I'm always concerned about preserving what I've collected, mostly by growing plants from seed, and I make a point of sharing rare species I have with other serious growers who I know will conserve them and pass them on. I also donated funds to a local botanic garden for a bulb-growing area, but administrative problems so far have prevented its being constructed. At one time plantspeople in Oregon, where I live, hoped that the ambitious Oregon Garden in Silverton would host botanical collections, but it went in another direction and is now floundering financially. And too often, we know from sad observation, a botanic garden's notable collection doesn't survive long after the departure of a staff member who took particular interest in that group of plants.

NARGS is rich in members who specialize. Some of them appear regularly in these pages, sharing their passion and expertise. We'd like to feature more of you! When can we hear about, for instance, hardy Gesneriads, or miniature *Epimedium* species and hybrids?



One crucial piece of information that helps gardeners grow unfamiliar plants is what the temperature and moisture regimes are where the plant is native. Lee

Poulsen of Pasadena, California, provided a good rundown on researching worldwide climates during a discussion on the Internet forum of the Pacific Bulb Society. Following is an edited version of Lee's message, reprinted with his permission:

My first choice website is the World Climate website: <<http://www.worldclimate.com/>>. The person who made this site apparently had access to a large amount of digitized weather data from all over the world. Since then he has been planning to update it with a lot of newer, better, and additional weather and climate data, but he is apparently a very busy guy and has been unable to do this for several years now. It's still the most comprehensive site available for free. As he warns, you have to enter the city name in what you think is the transliteration for place names in non-Latin alphabet countries, and in non-English countries you need to enter the place name as it is written in that country (e.g., "Roma" instead of "Rome"). Once you get a successful hit, you will be given all the possible locations he has data for that fall in the same 1° by 1° latitude/longitude quadrant as the city you entered. Then he has a neat little navigation device that allows you to move to the adjacent quadrant in any of the eight compass directions from the quadrant you're in. In this way, you can "step" through all possible data available in a larger geographic area.

I just get out my big *National Geographic Atlas* (the [London] *Times World Atlas* is also a good one) and follow along to see where the locations lie on the map. Sometimes, even a big atlas doesn't have the locations for some of the station sites. In those cases, another useful website is Global Gazetteer: <<http://www.fallingrain.com/world/>>, which allows you to track down the location, on a nice topographic map, of virtually any city or town in any country in the world.

My second favorite weather website is especially useful for major cities in third world countries, for which the World Climate site often has much less data: the World Weather Information Service, sponsored by the WMO, <<http://www.worldweather.org/>>. It is especially good for finding the long-term average monthly maximum and minimum temperatures of major towns in third world countries. The max and min temperatures are often missing in the World Climate database. (The latter seems to be most interested in a single daily average temperature, which isn't very useful.)

Third, on the individual country pages in the World Weather Information Service site, there is a link to that country's national weather service website. Each country does things its own way, and usually in its own language (although quite a number provide an "English" option as well—Spanish-speaking countries, like all of Latin America, seem less apt to do this). Thus these sites may be difficult to use even if they provide a lot of good data. Some sites won't give you any data for free. Others give a limited amount. Some give a lot if you can figure out how to look for it. For a linked listing of almost all the world's countries' weather service websites on one page, this Egyptian site has it: <<http://nwp.gov.eg/arabic/members.htm>>.



A book on climate that will be of special interest to growers of western American plants (and to attendees at the coming international conference) is *Weather Extremes of the West* by Tye Parzybok (Mountain Press, \$24). One type of extreme discussed is the rain shadow created by the great spine of the Cascade and Sierra Nevada ranges and also by smaller mountains. For example, on Santiam Pass on Oregon Highway 20, annual precipitation at the summit is 90 inches/225 cm (falling mostly as snow), but just 20 miles to the east, in Sisters, it is 14 inches/35 cm. In the Columbia Gorge, a mecca for plant lovers because of the rapidly changing flora as one drives east from Portland, rainfall drops from nearly 80 inches/200 cm at Bonneville Dam to 20 inches at The Dalles, Oregon—a decrease of 2.4 inches per mile. Another famous plant site is isolated Steens Mountain in southeastern Oregon; its summit receives 52 inches/125 cm of precipitation annually, and only 5 miles (8 km) to the east is the Alvord Desert, with 7 inches/17.5 cm. You don't just need a road atlas to find out about your plant's habitat; you need a topographic map, and the skill to read it.



In a recent issue we published Joachim Langfeld's article on growing hepaticas from seed. Curious, I asked him whether the popular (and expensive) double hepaticas were fertile, and if not, how new doubles were raised. The answer then materialized in the September 2005 issue of *The Alpine Gardener*, the journal of the Alpine Garden Society, in an article by Gunther Kleinhans. He writes that the blossoms are "partly or completely sterile," suggesting that some seeds can be obtained from certain hepaticas with more than the normal complement of colored segments. Kleinhans says that full doubles, called Senju-Zaki in Japan, are bred by taking the "rare fertile anther on a Sandan-Zaki," a type in which stamens and pistils are converted into normally infertile petaloids, and pollinating a Nidan-Zaki (a type with petaloid stamens but a normal gynoecium or female reproductive organ) with it. The article is a detailed look at the rarefied world of Japanese plant specialties, with beautiful photos. (To join AGS, see the advertising section of this issue.)



Jim McClements, author of "Plants from the Chinese Grab Bag" in the fall 2005 issue, has new information on the identity of the mysterious *Tricyrtis* species he photographed and discussed:

I received a letter with an article and photos from Volker Debus, curator of the Regensburg Botanic Garden, positively identifying *Tricyrtis* sp. B as *T. puberula*. It seems quite convincing. He also thinks that species A could well be a hybrid between *T. puberula* and *T. macropoda*, and would likely be sterile. That fits with the fact that sp. A has not produced seeds in the 4 years I've grown it.



Virginia Maffitt of Sherwood, Oregon, grows a multitude of penstemons and other plants, and got tired of white plastic labels looking like “tombstones for mice” in her troughs and rock garden. She devised the following permanent labels:

This method produces dark-green plastic tags in any length you want. After several years of use, the names remain as clear as the day I wrote them. Pick up some mini-micro window blinds at your local Goodwill thrift store, and a can of Krylon Fusion spray paint in Hunter Green. Spread some blinds out on newspapers and spray on two light coats of paint. Wait about 15 minutes (longer on a cool day), flip over the blinds, and spray the reverse. You’re done! You can leave the tags at full width for flower beds or cut them lengthwise for narrow labels for a trough. When cutting them into lengths, leave about as much to go below ground as above and cut one end on the diagonal. Since these are flexible, they will wiggle out of the ground unless buried several inches deep. Insert a narrow tool first and slide the tag alongside to get it in deep.

Inscribe the tags using a mechanical pencil with no lead exposed—the steel edge is a sharp engraving point for small letters and numbers. (I write the seeding or planting date across the narrow top edge, with as much other information as I can pack onto the label—genus, species, variety or cultivar, origin by county and state, and seed source.) I’ve even numbered the troughs with wide labels, which helps in keeping planting records as I do for the Berry Botanic Garden—good habits carry over.



Gentiana cachemirica, drawing by Baldassare Mineo

PLANT PORTRAITS

Saxifraga virginensis

BOBBY J. WARD, Raleigh, North Carolina

I have grown *Saxifraga virginensis* for the past three years, having first encountered it while rescuing plants in the western Piedmont of North Carolina at a dam site planned for inundation. The saxifrage grew in a moist seep adjacent to a creek; above it, on rocky, drier slopes, were *Trillium cuneatum*, *Hepatica americana*, *Anemonella thalictroides*, *Claytonia virginica*, and *Antennaria plantaginifolia*.

Saxifraga virginensis (this issue's cover), sometimes called the early saxifrage, is native to the eastern half of the United States (there's a variety or subspecies in Oklahoma) and to Canada from New Brunswick westward to Manitoba. It is a member of the Boraphila section of the genus. It is a perennial whose hairy and sticky flower stalk (pedicel) may attain a height of 12 inches (30 cm). The flowers, about one-eighth inch (3 mm) across, have white petals and are arranged in a loose cymose cluster. They are said to be fragrant, but I have never verified this. The oval leaves are basal and arranged in a rosette that hugs the ground. Each leaf is slightly toothed and grows to about 2 inches (5 cm) long.

In North Carolina there are six species of *Saxifraga*, four of which are endemic to the Southern Appalachians. Current molecular data and taxonomic research suggest that all six species are likely to be subsumed into *Micranthes*, a genus more closely allied to *Heuchera*, *Tiarella* and *Mitella* than to *Saxifraga* (Weakley 2005; see Malcolm McGregor's article in this issue for a discussion).

In my garden in central North Carolina, the early saxifrage blooms for about three weeks beginning in late March. I grow some individuals in a low, somewhat moist area near a creek in the deciduous shade of *Emmenopterys henryi*, along with a companion planting of the white-flowered *Dodecatheon meadia*, the North Carolina native shooting star, which blooms at the same time as the saxifrage (I am still waiting for the *Emmenopterys* to produce flowers).

I also successfully grow *S. virginensis* in a hypertufa trough containing a collection of native spring ephemerals. The trough has better drainage and drier

soil, and it sits in a sunnier aspect than the area where I grow other *S. virginensis*. These two growing conditions seem to confirm the adaptability of the plant.

Reginald Farrer, the author of *The English Rock-Garden*, wrote that saxifrages are the backbone of the garden. He preferred the English name “saxifrage,” which is “singularly apt, easy, expressive, and beautiful.” Farrer abhorred those faddists who would call it “rockfoil” as the name is “a dismal and tedious affectation which all reasonable people unanimously ignore.” He never gardened in the U.S. Southeast, where warm summer nights with high humidity and late summer rainfall would turn his beloved *Kabschia* saxifrages, “the jewels of the family,” into mush. But Farrer knew of *S. virginensis*, noting that it “is a by no means interesting [plant]. . . . It is usually ignored, though a place might more readily be made for it in a cool out-of-the-way corner.”

It is true that the early saxifrage doesn't stir the same passions as the cushion and mat-forming alpine saxifrages I have admired on exhibition at various rock garden meetings in North America and Europe. It can also be overlooked and dismissed and “lost” in the garden. Still, the early saxifrage has its own special charm, and it's a reminder that a plant need not be garish, gaudy, and spiked with steroids to be appreciated.

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Dudleya viscida

STEPHEN McCABE, Santa Cruz, California

Driving up a winding, two-lane highway in the dark trying to spot a rare species by the headlights seemed like a tough way for me to find a plant I'd never seen before. I was new to studying the live-forevers, also known as dudleyas, but another researcher had told me I couldn't miss them. I had my doubts. But suddenly, there in my headlights, I saw shiny leaves on dark-colored cliffs. Without Tom Mulroy's excellent directions, I never would have found them. After finding a turnout with considerable difficulty, I got out my flashlight and saw one of the most unusual species of *Dudleya*.

In the light of a warm day you can see (and smell) that *Dudleya viscida* (photos, p. 192) has attractive lime-green, shiny foliage, with a unique aroma that reminds some people of pines. It is one of the easier dudleyas to grow, perhaps because it kills some of its enemies. The viscid leaves are sticky enough usually to deter sucking pests like mealy bugs and aphids. However, one must be careful when repotting and weeding not to get dirt on the leaves; otherwise they will retain some dirt until replaced by new leaves. The species seems more resistant to fungal problems than most other members of the genus.

In nature the plants are fairly rare, being found primarily in four localities. Just upstream of one population, a development is going in where the entire landscape, including the creek bed, has been recontoured to make way for several hundred new houses.

In habitat, some of the plants are in the blazing southern California sun. In our central California Arboretum, two miles from the coast, they do well in full sun to part shade. Inland gardeners in warm climates should probably give the plants light shade. Coming from a Mediterranean climate, they do best with additional water and fertilizer starting in the fall. I use a liquid fertilizer diluted to 6-6-6 from two to six times a year. This is one of the *Dudleya* species that will look better if given some summer water, rather than being allowed to go bone-dry through the summer.

It is an excellent, easy plant for a well-drained rock garden in a mild-climate region. A single rosette can be 3-9 inches (7.5-22 cm) across and about as tall, though shaded plants may be larger. Older, branched plants can eventually become over a foot (30 cm) in diameter. If it is grown with more water-loving plants, a collar of gravel near the crown may prevent fungal problems. *Dudleya* can be started remarkably easily from seed and fairly easily from cuttings. Surface-sow the seeds, without covering them with any soil or sand, and you should have hundreds from a single plant. In spite of this ease, they are not weedy in our area.

Though there are some with paler flowers, the choice forms have rose-pink flowers. With open floral clusters a few inches across, the plants prove very popular at our gift shop. A 6-inch (15-cm) diameter plant may have several stalks at once, providing a hemisphere of blossoms for two to three months. They are some of my favorite plants for planting in a relatively dry rock garden, and though it is exciting to find them at night, I appreciate them more now when the solar rather than lunar light shines on them.

Stephen McCabe is Coordinator of Research and Education at the Arboretum, University of California at Santa Cruz.

Salix glauca

TODD BOLAND, St. John's, Newfoundland

Northern Newfoundland is very fortunate in having a very rich flora of arctic-alpine plants. Among our local beauties are our 14 species of dwarf willow. Any or all of these can make wonderful additions to the rock garden. Those that have been grown at the Memorial University Botanical Garden in St. John's, Newfoundland have all proven to be easy in cultivation there and have maintained their dwarf habit even when growing under conditions more favorable than in the wild.

However, as is the case with most alpiners, viewing them in the garden can't compare to seeing them growing in their natural habitats. Unfortunately, arctic

willows grow in northern Newfoundland, where the snow often remains until early June. Normally, I would only venture into their territory in July and August, when the cool summer temperatures of their native haunts are most tolerable. However, their flowers are nothing but a distant memory at that time of year. Late May to early June is the peak season of bloom for our arctic willows, and temperatures in such areas then are only 5–10° C, often accompanied by fog and wind.

During early June 2004, I was hired as an onboard naturalist for an expedition cruise ship circumnavigating Newfoundland. Each day we would make landfall at various locations. One area visited was L'Anse-aux-Meadows, at the northern tip of the Great Northern Peninsula. This National Historic Site is the only authenticated habitation site for Norsemen in the New World, dating back to around 1000 AD. During our stopover, I took a group of intrepid explorers on a nature walk around the grounds of the park. Late-lying snowbeds were still present, and most of the herbaceous wildflowers were just starting to appear. However, to my delight, the arctic willows were flowering at the peak of perfection. The most abundant species was *Salix glauca* (formerly known as *Salix cordifolia*).

The *S. glauca* growing at our local botanical garden has the typical yellow-pollened male catkins seen on most willows. However, in the wild, I was amazed at the number of plants of *S. glauca* with peach or pink pollen (photos, p. 190). Of our native arctic willows, this species is the most variable in habit. Most have trailing stems that, while only a few centimeters high, can measure 1 to 2 meters in length, forming mats that flow over and around the contours of the ground. Rarely in Newfoundland you may find individuals that grow more upright, forming twiggy shrubs 1 to 2 meters tall. Strangely, on a trip to Greenland later that same summer, I found abundant *S. glauca* growing there as well, but most were the upright form. As in most willows, it is the male plants that produce the most attractive catkins. Those of *S. glauca* measure 1–3 cm in length and, as mentioned, may have yellow, peach, or pink pollen. There are at least six botanically distinct forms, which differ primarily in leaf shape and degree of hairiness. The leaves vary between 1 and 9 cm long and may be oval, ovate, orbicular, or oblong. The typical form has young leaves that are densely silky and upon maturity are somewhat hairy and grey-green above but whitish below. However, some forms are entirely hairless, while others remain densely white-hairy.

Proper selection is the key to getting a good plant. They are easily propagated from cuttings, which seem to root at just about any time of year. In the wild, they grow in full sun and full exposure, primarily in peaty-gravelly soils overlying limestone substrates. Though difficult to find in cultivation, it is a worthwhile woody addition to any rock garden setting.

Source

Alpes Mont Echo (see the advertising section of this issue).

Todd Boland is curator of the Memorial University Botanical Garden.

Incarvillea mairei

TODD BOLAND, St. John's, Newfoundland

The vast majority of alpine plants we grow in our rock garden settings have relatively small, dainty flowers that are best appreciated close up. One alpine subject that goes against the rule is *Incarvillea mairei*, with its rather large, bold floral display (photo, p. 189). It is essentially a scaled-down version of its popular cousin *I. delavayi*, yet the flowers are the same size. I have grown *I. delavayi*, but its survival in St. John's, Newfoundland is iffy at best. It may survive for several years, then suddenly expire after a cold, snowless winter. After ten years, *I. mairei* has proven to be a trooper, surviving minus 20° C with 80 km per hour winds and no snow, as well as a winter when it was snow-covered for nearly six consecutive months.

There are 16 species of *Incarvillea*, 13 of which occur in China. *Incarvillea mairei* grows in the wild as an alpine on grassy mountain slopes or as a forest-floor species in subalpine open forests. It is distributed at 2400–4500 meters elevation in the Himalaya of western China, and in northern Bhutan and Nepal. The plants are stemless, with leaves that expand to nearly 30 cm (1 foot) in length. The leaves are rather shiny, deep green with a wrinkled texture. This species flowers before the leaves have fully expanded. The first flowers are often held just above the rosette of leaves, but as the flowering season progresses, the flower stems elongate. By the time they set seed, the stalks may be 40 cm (16 inches) long. Each stalk produces two to four magenta-pink flowers which measure 7–10 cm (3–4 inches) in diameter. Plants produce thickened, tuberous roots. In the wild, they bloom from May to August.

My plant originated from NARGS seeds offered in fall 1995. I sowed them in May 1996 and was rewarded with my first flowers in June 1998. It is growing in my main rockery, which used to be a vegetable garden, so the soil is quite rich and deep. To this I added extra grit to increase drainage, and I lime the area once every three years. Since planted there in fall 1996, my plant has never looked back and reliably provides me with a glorious display in mid to late June.

Incarvillea mairei can be variable in size, mine being at the larger end of the scale. Our local Memorial University Botanical Garden has the rare, very dwarf selection 'Frank Ludlow'. It is about one-third the size of my plants (entire leaf spread under 20 cm/8 inches), with several stems of solitary flowers. It is a very choice cultivar but appears to be reluctant to produce seeds. Mine, in contrast, produces copious seed.

Overall, this is among my favorite plants, and I highly recommend adding it to your alpine collection. However, I do have two points of caution. First, if it is one of the larger forms like mine, it can become quite leafy later in the season, so do not plant it near timid neighbors. Second, it is rather late to appear in the spring, so mark the area so that you do not inadvertently think you have a space in the rockery that needs filling (did I mention I used to have two plants?).

BOOKS

Daphnes: A Practical Guide for Gardeners, by Robin White. Portland: Timber Press, 2006. ISBN 0-88192-752-X. 224 pp., 160 color photos, 2 line drawings. \$34.95 U.S., \$49.95 Canadian; available at a discount from NARGS Book Service.

Reviewed by DARRELL TROUT, Forest Hills and Shelter Island, New York

As a young nurseryman in England, Robin White fell in love with the genus *Daphne*—first with *D.* ‘Aureomarginata’, then *D. collina*, *D. retusa*, and *D. cneorum*. That love of the plants, held not by a taxonomist but by a gardener and nurseryman-on-a-mission, weaves through the book. He writes, “This book . . . is for the benefit of those who grow daphnes, to encourage those people who would like to grow daphnes.” In the 224 pages of *Daphnes: A Practical Guide for Gardeners*, White shares his passion and knowledge with us in a very readable way.

All of us who attempt to grow this diverse genus, and who may also have fallen in love with a species or cultivar early in our gardening travels, have been searching for information and need this thorough treatment. Most of the book (over 60%) is devoted to an encyclopedic list of daphnes. White describes a multitude of species, clones, and cultivars, including habitat and collection history, which helps us understand the growing conditions each needs. It also helps us sort out which of the species, cultivars, or hybrids will grow best in our gardens.

Even though he concentrates on plants generally available in the U.K. and North America, many North American growers will still find new-to-them plants to add to their wish lists. The increase in knowledge from this book and the resulting increase in demand will encourage more specialist growers to acquire and then propagate these plants. A number of the plants will remain vicarious pleasures for the armchair gardener, though, since many of us lack the means or the necessary microclimates needed for the plants to flourish. But at least it’s good to understand why some plants are just not going to survive in your garden, in spite of all your good intentions and special care.

Throughout the plant description section, specific guidance is given for propagation of each species and cultivar. There is also a separate chapter on propa-

gation. All of this is invaluable to the crazed hobbyist or commercial grower attempting to perpetuate and distribute interesting and valuable plants. Those of us who have had to fly by the seat of our pants or simply rely on the few hints Michael Dirr gave us in his tomes on woody plants understand the value of White's guidance. This is the most complete guide to daphne propagation available.

There is information on the rewards and challenges of growing from seed, cuttings, grafting, and layering. All of these sections are clearly and concisely written in ways both amateurs and professionals will find useful. The section on grafting is particularly well written and illustrated with photographs and line drawings. It not only shows you how to do it but also makes you believe you can.

Typical of most Timber Press books there is a good number of photographs. I would have preferred them to be a bit larger, perhaps a reaction to my chronologically challenged eyesight. With all gardening books, there is a battle involving the total number of photos, size, and number of pages, and the price—producing a quality book with enough photos, large enough to achieve the objectives at an affordable price. Timber Press and Robin White have compromised wisely.

The "Pests and Diseases" chapter gives solid guidance about most of the problems you are likely to face, particularly the fungal and viral challenges, with reasonable suggestions for control, starting with wise counsel for good hygiene along with adequate drainage.

Daphnes: A Practical Guide for Gardeners demonstrates White's 30 years of experience and knowledge. We are lucky finally to have this book, which is a must for every daphne grower. It is now *the* daphne reference book.

Note: This review is reprinted with permission from the *Daphne Society Newsletter*, spring 2006.

Darrell Trout is the author of three gardening books, a New York certified nurseryman, and the co-founding vice president of the Daphne Society.

Tulips: Species and Hybrids for the Gardener, by Richard Wilford.

Portland: Timber Press, 2006. 212 pp., color photos throughout. ISBN 978-9-88192-763-4. Hardcover, \$34.95.

Bulbs in Containers, by Rod Leeds. Portland: Timber Press, 2005. 224 pp., color and b/w photos throughout. ISBN 0-88192-735-X. Hardcover, \$29.95.

Timber Press Pocket Guide to Bulbs, by John E. Bryan. Portland: Timber Press, 2005. 227 pages, color photos throughout. ISBN 0-88192-725-2. Softcover, \$19.95.

Reviewed by JANE MCGARY, Estacada, Oregon

Timber Press has recently issued a salvo of bulb books, three of which are reviewed here. Those under consideration include (in the order listed above) one

indispensable addition to the bulb fancier's library, one marginal but enjoyable work, and one that serious growers will find redundant.

Taking the best first, Richard Wilford's *Tulips* fills a longstanding gap in the gardening literature. It is not a new monograph of the genus, last fully treated by Daniel Hall in 1940 and less comprehensively by Zinaida Botschantzeva in 1962, but thanks to Wilford's intelligent summaries of taxonomic history, it will stand gardeners in good stead until a new full treatment appears. Wilford is the recently appointed curator of Kew Gardens' bulb collection, where I had the pleasure of meeting him in spring 2005 and listening in as he discussed Kew's tulips with Brian Mathew and Tony Hall.

Wilford's enthusiasm is for wild species, not horticultural hybrids, a stance that will immediately endear him to rock gardeners, as will passages like the following: "Pictures and books can be helpful and informative, but nothing matches finding a plant growing in its natural habitat. There you experience the conditions firsthand, the strength of the wind in your hair, the intensity of the sun on your back, and the texture of the soil between your fingers. You can see whole plant communities, not just isolated plants in pots" (p. 13). His book includes a general discussion of tulip biogeography and particular characterizations of habitats within the species descriptions.

After chapters devoted to geography, morphology, cultivation, and taxonomy, all clearly written with the gardening audience in mind, the largest section of the book (about 100 pages) is devoted to descriptions of most (though not all) *Tulipa* species, including valiant attention to untangling the nomenclature, which in many cases has been terribly confused in regard to cultivated stocks. Both wild forms and cultivars are mentioned, and suggestions for use in the garden given. Wilford has chosen to include some "species" which he admits are dubious in the botanical sense but which appear frequently in the gardening literature and bulb catalogues, particularly the "neo-tulips" naturalized in various parts of western Europe, and gardeners will find this very helpful.

After a short chapter on the East Asian genus *Amana*, Wilford turns to garden hybrids, with a predictable preference for the selections and hybrids sold as "botanical tulips," and disdain for such mutant forms as parrot, double, and fringed tulips. I agree here, but urge an exception on behalf of flower arrangers; a grand Dutch-still-life arrangement will benefit from a few parrot tulips. The book concludes with a brief glossary, a good bibliography, and index. The photos are good, but unfortunately a number of species are not illustrated.

Rod Leeds gardens in Suffolk, England, and has previously written *The Plant-finder's Guide to Early Bulbs*. He has chaired the RHS Joint Rock Garden Plant Committee and is active in the Alpine Garden Society, but *Bulbs in Containers* departs from the rock garden to discuss cultivating and displaying bulbous plants in the alpine house, on the patio and deck, and temporarily in borders and other garden settings. Most serious bulb fanciers grow many plants in pots, if only to keep them separate and documented, but this book goes beyond the bulb frame to offer ideas about integrating container-grown plants aesthetically.

The book has three sections. "A Photographic Year in Containers" presents individual species illustrated by the professional garden photographer Marie O'Hara and discussed by Leeds, organized by season of bloom. Many of the photos are exquisite, and the placement of the plants in their pots (mostly unglazed terra-cotta, the best kind for bulbs) is inspiring. I'll certainly turn to this book for ideas about moving my flowering bulbs briefly to the garden—if the rain ever lets up long enough here. I was particularly entranced by the idea of growing *Codonopsis* in large pots fitted with wire supports, since this genus is intolerant of the very wet winters where I live.

"Bulb Genera Suitable for Containers" is an alphabetic list with general discussion and recommendations of species and cultivars in each genus, along with cultivation tips. The final section, "Practicalities," includes a good discussion of propagation techniques and a summary of cultivation and display principles. There are ideas for unusual containers, various soil mixes, and positioning plants temporarily in the garden. Troughs are mentioned in passing, but rock gardeners can imagine taking off creatively in that direction with tiny bulbs. Leeds discusses the plunge beds and cold frames which are almost indispensable adjuncts to a containerized bulb collection. The book concludes with an already outdated list of suppliers, a short but useful bibliography, and an index.

John Bryan's *Pocket Guide to Bulbs* is a compact (6 by 8.5 inches) manual condensed from his *Bulbs* (revised edition, 2002). It covers "bulbs" in the broad sense, including tubers and rhizomes. The apparent target audience is general gardeners buying bulbs for the border and for containers, so most species and varieties mentioned are available through mass-market Dutch bulb catalogs and garden centers. Beyond that principle of selection, however, the species mentioned sometimes seem to have been chosen by opening *Bulbs* and pointing at random. One expects to see, for instance, *Sternbergia lutea*; but there is no mention of the widely grown, if doubtfully distinct, *S. sicula*, and there is an entry for *S. colchiciflora*, a species very difficult to obtain and grow, with minute, fleeting flowers.

Each genus or single-species section begins with cultivation tips, often useful. USDA hardiness zones are given for many but not all entries and exhibit the usual problems encountered when authors (driven by publishers) try to slap them on bulbous plants. Why is *Dichelostemma ida-maia* optimistically rated Z7, and the much hardier *D. congestum* Z8?

The condensed format results in some important details being omitted. Someone using this book to decide whether to purchase a high-priced bulb of *Cardiocrinum giganteum* would not find out that the bulb is monocarpic. Furthermore, in the process of lifting entries from the 2002 book, some peculiar things have happened. I was bewildered to read in the entry for *Schizostylis coccinea* that it "should be placed where night-blooming habit and fragrance can be appreciated"—neither being characteristic of *Schizostylis*. The mystery was solved when I turned to its entry in *Bulbs* and found it subsumed under *Hesperantha* (apparently one of the revisions of the African Iridaceae by Peter Goldblatt, who looked over the 2002 book in draft); many species of *Hesperantha*, in the old nar-

row sense, are fragrant late-day bloomers. Slips like this suggest that no one who actually grows the plants checked the copy.

The generously supplied photographs are more even in quality than those in *Bulbs* and will be valuable for the novice reader. The soft cover is laminated to be waterproof, so this book may find a home on the counter of the garden center as a handy, sturdy quick reference. For the bookshelf of the dedicated bulb grower, however, there are many other bulb manuals that are superior in text content (if not so well illustrated), and for identification photos, the old reliable Random House/Pan paperback by Phillips and Rix is much more useful.

Jane McGary, editor of this journal, grows more than 1200 species of bulbs in western Oregon.



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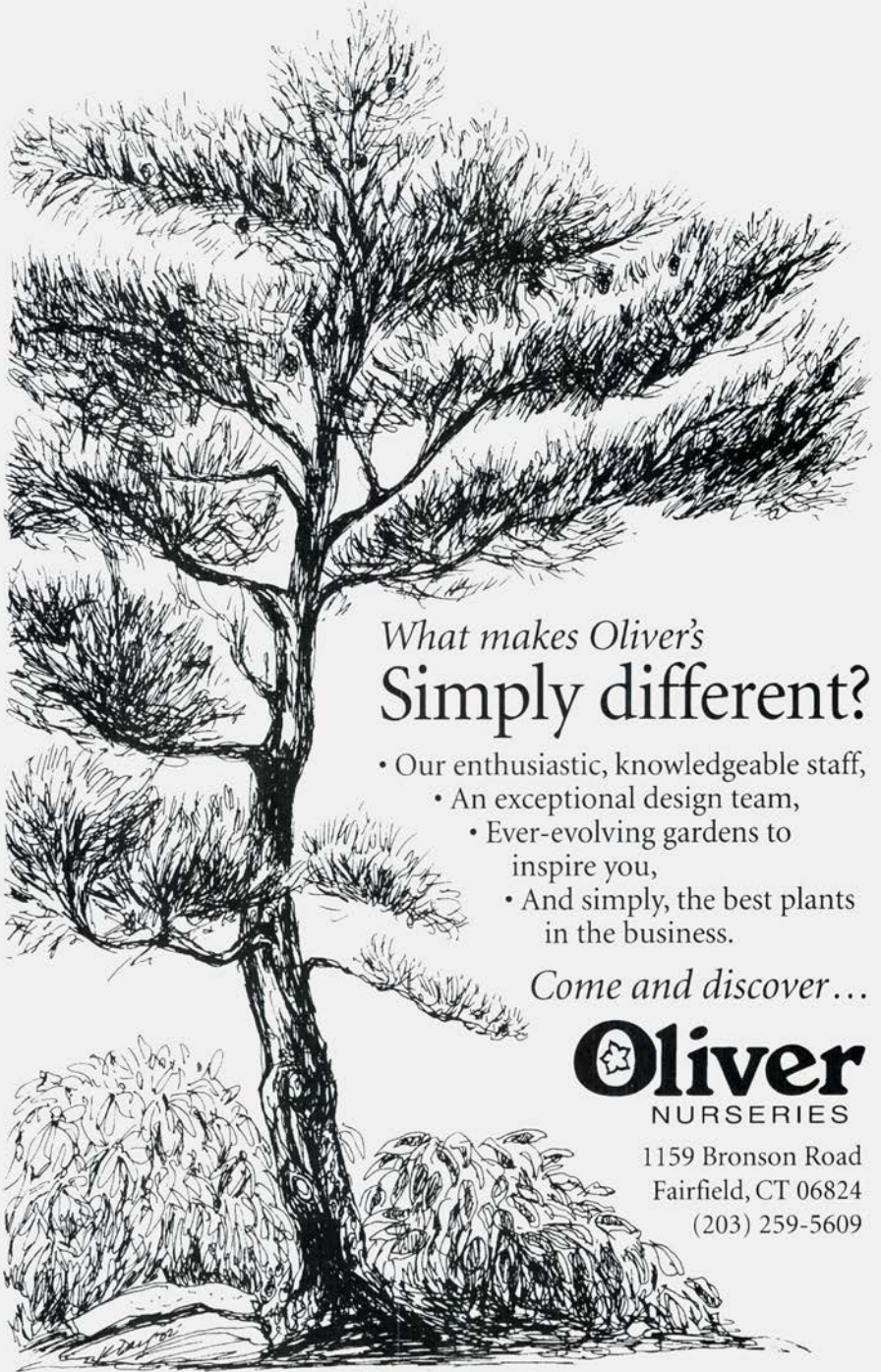
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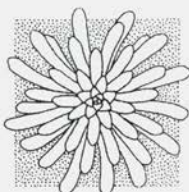
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ROCK GARDEN QUARTERLY (ISSN 1081-0765; USPS no. 0072-960) is published in January, April, July, and October by the North American Rock Garden Society, a tax-exempt, non-profit organization incorporated under the laws of the State of New Jersey. Submission deadlines are the first of Feb., May, Aug., or Nov. Periodical postage is paid in Millwood, New York, and additional offices. Address editorial and advertising inquiries to the Editor, Jane McGary, 33993 S.E. Doyle Rd., Estacada OR 97023. Address circulation inquiries to the Executive Secretary, nargs@advinc.com. Postmaster: Send address changes, report lost or damaged issues to: Rock Garden Quarterly, PO Box 67, Millwood NY 10546.

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