# ROCK GARDEN *Quarterly*



Volume 60 Number 2 Spring 2002

# Photo Contest

The Fall 2002 *Rock Garden Quarterly* will feature the winners in the first of what we hope will be annual photographic contests. In addition to the satisfaction of seeing their work in print for all to appreciate, the winners in each category will receive prizes—this year, the original artwork by Sue Allen that was reproduced on the covers of the 2001 volume. In addition, we are offering a Grand Prize: a one-year gift membership in NARGS for a present nonmember designated by the winner. Gain glory and do some Christmas shopping in one fell swoop!

Photos may be submitted as slides, as prints, or as high-resolution digital images. Please include whatever information you can about the camera, film, and technical details.

**Please do not submit photos as e-mail attachments.** The editor does not have the equipment to prepare them for judging by the committee or for reproduction.

Send entries to the editor (see address on the last page of this issue) no later than August 1, 2002. All photos will be returned no later than October 15, 2002.

For more information, contact the editor by mail, phone (503-630-3339), or e-mail (janemcgary@earthlink.net).

# The categories

Class 1. Portrait of a plant in the wild. While focusing on the plant, the image should also give some idea of its habitat.

Class 2. Portrait of a plant in cultivation.

Class 3. Rock garden scene, depicting both plants and rock features.

Class 4. Any subject, taken with a digital camera.

COVER: *Claytonia megarhiza, Mertensia,* and pika at Loveland Pass, Colorado Watercolor and colored pencil painting by Tanya Harvey, Lowell, Oregon

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# ROCK GARDEN Quarterly

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# Local Color

R ock gardeners look at traveling rather differently than other people do. Put us down in an unfamiliar city, and most of us will spend some time in its museums, but we soon seek plants—in particular, the native plants of the new region around us. If we've foresightedly contacted local NARGS members, we may get a guided tour. A local botanic garden or nearby ranger stations can sometimes direct us. Otherwise, we may be unaware of the delightful excursions locals take for granted.

This issue features plant-oriented trips from a few hours to a few days in length that you can plan around some major cities in the United States and Canada. Only the Ruby Mountains tour, a report of the first NARGS-sponsored "expedition," is longer; and even that will give you some ideas for a higher sort of amusement than gambling, should you ever find yourself trapped into a family vacation or convention in Reno or Las Vegas.

Take a day after a business trip to the Raleigh-Durham area to see the preserves described by Bobby Ward. Top off an academic conference in Toronto with Anna Leggatt's woodland walk. Let the rest of the family do Disneyland and Universal Studios in southern California while you find real-world excitement in the Mojave Desert or the Kern River Canyon. Take a day trip from soggy Portland to the sunny eastern slope of the Cascades, as locals do every spring. Follow the Stireman brothers' rapid botanizing loop out of Salt Lake City.

For readers who don't travel in North America, we hope the plant descriptions and photos will be inspiring, and the notes on their habitats informative. Most of the articles mention cultivation tips and sources for seed, so even if you never reach these places, you can see some of their plant gems in your own garden, and perhaps think of their homes in North America's vastly varied landscape.

# Montane Islands in a Desert Sea

# The First NARGS Expedition, 2001

# Theodore S. Cochrane

Northeastern Nevada offers a unique combination of historic sites and outdoor recreation, but it is the intriguing mountain scenery and the biological diversity that attracted an enthusiastic and compatible group of 19 NARGS members. The first NARGS-sponsored expedition was all the more successful thanks to Bill and Cathy King, who had already spent months visiting field sites, checking motels and restaurants, and planning the itinerary, and thanks to Bobby Ward, chairperson of the Expeditions Committee, who handled registration, correspondence, and money. Bill and Bobby shared the eight-day adventure in which we hiked more than 25 miles (40 km) in search of plants and drove 1081 miles (1730 km) to explore the Great Basin.

#### Great Basin

The Great Basin, a vast region of the Intermountain West (between the Sierra Nevada–Cascade chain and the Rocky Mountains), is characterized by basinand-range topography, internal drainage, and a cold desert climate resulting from the rain shadow cast by its mountainous periphery. Encompassing most of the northern half of what geographers term the Basin and Range Province, it centers on Nevada but stretches from the Sierra Nevada in eastern California to the Wasatch Mountains of Utah (Figure 1). This province is distinguished by its landform: about 300 north—south-trending lesser mountain ranges separated by broad, flat valleys, or basins. The ranges and basins alternate in seemingly endless rhythm. Minor ranges and large expanses of low relief surround the Ruby Mountains and the Snake and Schell Creek ranges, three of the larger ranges of eastern Nevada with accessible alpine flora.

#### Vegetation

Great Basin ranges, particularly the high ranges of the eastern basin, have climates far cooler and considerably moister than the valleys in both summer and winter. Most support woodlands, and many are high enough to have modified



Maps showing **A**, the Basin and Range Province and the Great Basin Division; **B**, the Great Basin Division and the mountain ranges of Nevada; **C**, localities mentioned in the text; and **D**, Nevada's state flower. (figure by Kandis Elliot)

Rocky Mountain montane and subalpine forests. Alpine areas are much smaller and more isolated than in the Rocky Mountains and the Cascades–Sierra Nevada axis. Although patches of alpine vegetation occur locally above the illdefined treeline in such Great Basin ranges as the Jarbidge, Schell Creek, and Snake, only the northern Ruby Mountains and Deep Creek Range support welldeveloped tundra. Generally, any true arctic-alpine zone is small and difficult to define because most populations of high-altitude plants and animals occur in open sites within the subalpine zone, or even lower.

The Ruby–East Humboldt complex has the greatest diversity of plant species of any Great Basin range and is home to the richest alpine flora. The vascular plants include many genera popular in rock gardens, such as *Potentilla, Draba, Penstemon, Saxifraga, Aster*, and *Dodecatheon*. Lewis (see "Further reading" below) lists 69 "arctic-circumpolar" species, and Loope records 41 "arctic-alpine" species; there are at least 72 additional species representing other floristic elements that are either alpine or extend into the alpine zone.

### **Botanical Exploration**

On 29 July 2001, 14 participants met in Salt Lake City for the optional warm-up hike. We boarded our expedition vehicle, a comfortable 26-passenger bus, and drove to Little Cottonwood Canyon, about 30 miles from downtown Salt Lake City in the Wasatch Mountains. At Sandy, we headed east on Road 210, which climbs past the resort villages of Snowbird and Alta to Albion Basin. We disembarked at the ski lift, also the Catherine Pass trailhead (9520 ft/2930 m elevation). Luxuriant subalpine meadows of wildflowers greeted us.

Bill King, an experienced field trip leader, led us steadily up the well-worn trail, and soon the beautiful *Linanthastrum nuttallii* and diminutive *Sedum debile* appeared on the rocky slopes. One seep was graced with *Castilleja rhexifolia, Geranium richardsonii, Mimulus guttatus*, and *Platanthera dilatata*, a northern orchid occurring in mountains from Alaska to California and Colorado. Continuing upward, we found *Agastache urticifolia* and *Mertensia ciliata* associated with trickles of water, *Castilleja applegatei* in crevices, and *Zauschneria latifolia* var. *garrettii* on cliffs; the zauschneria's vivid display of bright scarlet flowers makes it a welcome addition to any garden.

At about 9800 feet (3015 m), the environment and vegetation became more truly alpine. One of the numerous mountain meadows was dominated by *Artemisia* and included *Valeriana edulis* and both geraniums of the area, white-flowered *Geranium richardsonii* and pink-flowered *G. viscosissimum*, all common in northern Utah. Scattered single-stemmed plants of *Orthocarpus tolmiei* resembled a slender, pale castilleja. We spotted a family of blue grouse; the chicks, separated from their parents by the trail, finally crossed in desperation close to us, but the adult birds seemed unperturbed.

The exposed rock in the upper canyon changed from quartzites and shales to limestones, reflected in the flora with the appearance of the small, tidy *Aster kingii* 

var. kingii in meadows, and the dense, prostrate mats of Petrophytum caespitosum in crevices on cliffs, its typical habitat. Attractive in or out of bloom, this dwarf rock plant (its generic name literally means "rock plant") is treasured by rock gardeners. Conspicuous in meadows around 10,000 feet (3077 m) were Agastache urticifolia, Lupinus argenteus, and Valeriana edulis, associated with Swertia radiata, which towered over the other flowers. Spring-fed wet meadows blanketed by black-headed sedges and willows were splashed with color: magenta Pedicularis groenlandica, blue Mertensia, and deep pink Castilleja rhexifolia.

At Catherine Pass (10,210 ft/3142 m), we paused momentarily before continuing up a high, dry ridge toward Sunset Peak. In the upper edge of the windswept spruce zone, the trail passed through an area of crumbling sandstone with much windblown sand. There we saw such alpine prizes as *Astragalus kentrophyta* (photo, p. 131), *Haplopappus macronema*, and the lovely *Phlox pulvinata*, all locally abundant and in full bloom. Also present were *Astragalus alpinus* and *Townsendia montana* (both growable in troughs), as well as *Lesquerella utahensis*, *Penstemon whippleanus*, and *Linum lewisii*. Alongside in the krummholz were eriogonums, together with *Achillea*, *Solidago*, *Cirsium eatonii*, and the lily-like *Zigadenus elegans*. Near Sunset Pass, we paused in the shade of a cliff at 10,375 feet (3192 m). Ground-hugging mats of *Salix arctica* and *Antennaria* were punctuated by stems of *Ranunculus* and *Zigadenus*. Of mild interest were the Utah endemic *Erigeron garrettii*, whose distribution fits within a radius of 25 miles (40 km), and the diminutive *Epilobium alpinum*; drawing greater attention was the coarse and gaudy *Primula parryi*, a growable alpine primrose.

This had been a very dry year, and the plants were quite late in the blooming sequence; in a more normal year, following a winter with heavy snow, blooming would have peaked about the time of our visit. However, the lateness meant that we would encounter some species we had not before seen in flower.

We returned to Salt Lake City to meet additional participants, then departed for Wendover, Nevada, our first overnight halt. The next day we set off to Angel Lake in the heart of the East Humboldt Range, a northerly extension of the Ruby Mountains. We picked up Angel Lake Road at the West Wells offramp from I-80 and followed it to Angel Lake. There we met two more participants; one, Stuart Winchester of Diablo Valley College in Pleasant Valley, California, was to be our expert guide.

The trailhead at Angel Lake begins at 8375 feet (2577 m) and leads to Smith's Lake (1.4 miles/2.25 km each way) and to Grey's Lake (5 mi/8 km one way). We climbed the south side of a stony ridge covered with dense low shrubs. Dense thickets of low-growing aspen have developed where snow accumulates below the crests of exposed ridges. Evergreen shrubs here were *Ceanothus velutinus*, which has a pervasive odor of cinnamon, and in cracks in rocks and exposed soil, *Mahonia repens*, identifiable by the orange tint of its small holly-like leaves. *Ribes cereum* and other shrubs on the crest (8600 ft/2646 m) showed burn damage where winds had blown off the snow cover.

We left the Grey's Lake Trail in less than half a mile in order to climb a second, higher ridge (8950 ft/2754 m) that offered magnificent views of the Angel Lake

cirque directly to the south and of Clover Creek Basin, and beyond it, Clover Creek Valley, Wells, and playa lakebeds to the east (photos, p. 129). In the windswept, snow-free zone, southern plants like *Artemisia* survived together with *Silene douglasii, Castilleja linariifolia, Phacelia sericea*, and *Comandra umbellata* subsp. *pallida*. Toward the crest, the *Artemisia* species segregated themselves according to the amount of windshear they endured, *A. tridentata* surviving where there was a little more protection. Small, silver-leaved mats of *Eriogonum caespitosum* (photo, p. 130) grew on the exposed crest.

The vague trail all but disappeared as it crossed the downslope side of the moraine confining Smith's Lake. On this pine-covered accumulation of rocks grew an assemblage of small plants of quiet charm: *Aster, Galium, Silene,* and *Senecio,* along with *Heuchera cylindrica, Pellaea breweri, Valeriana acutiloba,* and the dandelion-like *Agoseris aurantiaca.* 

Smith's Lake (9096 ft/2800 m) is set prettily within a cirque in the shadow of Grey's Peak. We ate and rested, enjoying the sights and sounds from boulder perches on the open lakeshore or in the shade of the pines. The far side of the lake looked like a fell field, although it was not above treeline. A lush array of plants benefited from good soil, including mat-formers of special interest to alpine gardeners. *Juncus parryi, Arenaria aculeata, Antennaria rosea*, and *Selaginella watsonii* covered the ground, accompanied by *Castilleja viscidula, Eriogonum umbellatum* var. *porteri, Ericameria suffruticosa, Penstemon rydbergii, Potentilla drummondii,* and at the base of the larger boulders, the small, mat-forming *Sedum debile*. Two ferns—*Polystichum lonchitis,* an arctic-alpine disjunct, and *Pellaea breweri*—grew in vertical cracks of a low cliff, a drier habitat than the moist mossy sites of this *Polystichum* farther north.

The wind was roaring through the pines as we started down at 2:20 p.m., and soon we saw that it was raining in the valley north of us. A sandstorm persisted on the playa below during our descent. We drove west to Elko, where we spent an hour at the recently founded Northeastern Nevada Museum viewing exhibits on the cultural and natural history of the area.

The next morning, 31 July, we headed south and east from Elko on Highway 227 through valley sagebrush vegetation toward the Ruby Mountains, 20 miles (32 km) distant. The Rubies are approximately 100 miles long by 10 miles wide (160 by 16 km) and rise more than 5500 feet (1692 m) above the valley floor on the north. Our destination was Lamoille Canyon, one of only two canyons with public access along the western slope of the northern Rubies. From Ruby Summit onward, the drive offered beautiful views of the mountains and their many glaciated features. The slopes looked bare until we crossed the terminal moraine close to the upper edge of Lamoille Valley and entered the lower section of the 12-mile-long (19-km) canyon.

Disembarking at Road's End below steep canyon walls, we began the moderately strenuous but popular 6-mile (9.6-km) round-trip hike to Liberty Pass from the parking lot (8800 ft/2708 m), near the upper limit of the mountain brush zone. Owing to the relatively moist, stable substrate, many plants were still blooming. Although much of the ground was overspread with willows, we immediately encountered Helenium hoopesii, Ligusticum grayi, Helianthella quinquenervis, Pentaphylloides floribunda (syn. Potentilla fruticosa), and the extremely variable Potentilla gracilis. We soon found additional species that frequent shaded or semi-shaded moist places: Angelica arguta, Thalictrum fendleri, Geranium richardsonii, Aster occidentalis, and Veratrum californicum.

Some wild representatives of familiar garden genera appeared in light shade (e.g., Aquilegia formosa) and open areas (e.g., Delphinium diversifolium). We exclaimed over the showy, cup-shaped flowers of Calochortus nuttallii, the state flower of Utah, and the bright yellow Mimulus primuloides, which occurred together with the alpine grass Deschampsia caespitosa in wet, highly organic soil. On drier, rockier ground, shrubs were more evident than herbs: thicket-forming Ribes spp., Symphoricarpos oreophilus, and straggly Lonicera involucrata. However, several low-growing castillejas, erigerons, and eriogonums were common, as was the sticky Potentilla glandulosa. Plants of common yampah (Perideridia gairdneri) were so short this year that they looked like annuals.

The trail crossed little creeks narrowly edged with wet-meadow vegetation. At the first crossing, two robust leafy perennials, Arnica longifolia and Veratrum californicum, were associated with Allium validum, the bulbs of which were used as food by Native Americans and pioneers, and Ledum glandulosum, a low evergreen shrub with gland-covered, spicy-smelling leaves known as Labrador tea (the tea must be boiled for a long time to destroy poisonous alkaloids). The sound of trickling water at the next crossing was muffled by lush marginal mats of sedges and forbs. Here Arnica, Veratrum, and Polygonum bistortoides were accompanied by the sparse pastel flowers of an *Epilobium* and the delicate white flowers of Ligusticum grayi and Saxifraga odontoloma. Along the outlet stream of the Dollar Lakes, gurgling over granite stones at 9580 feet (2948 m), the wet, mossy turf was brightened by several treasures of subalpine elevations: Gentiana calycosa (photo. p. 130), Mimulus primuloides, and Parnassia fimbriata. The solitary, deep blue, tubular flowers of the gentians were nearly as long as the plants were tall. Allium validum, Kalmia microphylla, and Solidago multiradiata also grew in this green garden.

Adding color to a sheltered spot along the base of a cliff at 9520 feet (2929 m) were the relatively tall clumps of *Arnica cordifolia*, *Mertensia ciliata*, and *Primula parryi*, all in a photogenic row. Growing on a solid rock bench (9560 feet/2942 m) and a steep rocky slope between it and the base of the next cliff above was a natural garden of common alpine plants: *Arnica longifolia*, *Castilleja miniata*, *Geum rossii*, *Salix orestera*, and the alpine fireweed *Epilobium latifolium*, which has disproportionately large flowers that are deeper in color than those of *E. angustifolium*.

Almost immediately above the series of cliffs is a chain of still ponds called the Dollar Lakes. We stopped for lunch at the lowest (9620 feet/2960 m) of these water-filled depressions, which demonstrate the "hydrosere" pattern common in the subalpine zone of glaciated areas in the Great Basin. The vegetation changes from submersed plants in open water to a dark green lakeside ring of mat-forming sedges and grasses, then to a paler green band of shrubs as conditions become drier. Whether cradling sun-dappled lakes, wetland depressions, or flow-

ery meadows, bowl-shaped alpine settings like this are especially beautiful viewed from above.

Our group reconvened atop an open granite bench (9950 feet/3061 m) already known to tour members Anne Spiegel and Bill King. It was covered with a number of small bun- and mat-forming plants, burned out but nonetheless attractive: Astragalus kentrophyta var. tegetarius, Cymopterus nivalis, Draba sp., Erigeron watsonii, Eriogonum caespitosum, E. umbellatum, E. ovalifolium, Haplopappus acaulis, Ivesia baileyi, Leptodactylon pungens, Petrophytum caespitosum, Physaria chambersii, Pentaphylloides floribunda (mat-forming rather than erect), Selaginella watsonii, and nearby, Sedum integrifolium (depauperate, perhaps because it usually occurs in moister places). Many of these appear well suited for troughs and deserve to be more widely cultivated.

Near Liberty Pass, on a steep, rocky ridge practically devoid of plants, we were pleased to find a fine mat of *Silene acaulis* in bloom among the tumbled rocks. The pass itself (10,450 ft/3215 m) was an eminently satisfying destination for a day hike, offering magnificent views of the surrounding mountains. By continuing about 100 yards/meters to the far end of the pass, a hiker can look down, almost like a soaring bird, on Liberty Lake and the smaller, green-hued Favre Lake, lying directly below in a hanging valley high on the east slope of the Rubies; along Ruby Crest, the high divide of the Rubies, dominated by ten peaks over 10,000 feet (3077 m) in elevation; and across valleys to other ranges in the far distance. In the circue floors below and on nearby Wines Peak lie some of the lushest tundra meadows in the Great Basin. The boulder fields and ledges of the pass support pioneering mosses alongside miniature eriogonums, drabas, parsleys, and saxifrages in wee pockets where soil has accumulated.

On Wednesday, 1 August, we returned to Lamoille Canyon, stopping at the Lamoille Powerhouse picnic area long enough to look at the large thistle-like *Argemone munita*. From Camp Lamoille (7040 feet/2166 m), anticipating a hard, hot day, we opted to hike up Right Fork Canyon instead of Thomas Canyon as we had planned. On the bank of a beaver pond just upstream from the campground, the big willow clumps were accompanied by an introduced rose, *Oenothera lanceolata, Senecio serra, Solidago canadensis*, and the distinctive brown knobs of the rayless western coneflower, *Rudbeckia occidentalis*.

Dramatic changes of vegetation occurred where the trail closely approached the permanent stream or crossed small seeps. One streamside damp spot offered a disharmonious patch of *Equisetum laevigatum*, *Smilacina stellata*, and *Rubus parviflorus*; another, a garden of mixed flowers, including *Aconitum columbianum*, *Geranium viscosissimum*, *Senecio pseudaureus*, *Rudbeckia occidentalis*, and the stylish if less conspicuous *Galium bifolium*. Among tightly packed sedges and grasses in one of the more interesting seeps grew *Actaea rubra*, *Aster chilensis*, *Equisetum arvense*, and *Juncus ensifolius*.

Compared to the previous day, progress was slower and the climb harder; our shirts stuck to our backs, and sweat stung our eyes. We crossed the stream at a large prominence, scrambling up a beaver haulout, and continued up the rightbank trail past a series of beaver ponds and through tall shrub thickets. Understory forbs like Actaea rubra, Circaea alpina, and Pyrola asarifolia did not occur more than 5 yards/meters from the stream. Aiming for an overhang of a gray granite cliff above, we stopped at 7840 feet (2412 m). Tucked in crevices on the cliff were two ferns, Cystopteris fragilis and Polystichum lonchitis, and on sheltered ledges, two attractive members of the Saxifragaceae clan, Heuchera rubescens and Ribes montigenum.

We came back down the opposite side from that we had ascended, completing a moderate 2.5-mile (4 km) hike in good time, but we were worn out by the time we boarded the bus. That evening, we enjoyed a family-style dinner at the best of about five Basque restaurants in Elko.

We departed Elko for the last time on Thursday, leaving I-80 at the Halleck/ Ruby Valley offramp north of town. We entered the foothills on the west side of the Rubies. Fifteen minutes later, having traversed Secret Pass (6457 ft/1987 m), we turned south and drove down the beautiful Ruby Valley, passing bare-looking mountains on the right and dry or nearly dry lake flats on the left. Because the east slopes are steeper than the west slopes, they lose water faster. Their meltwater seeps down, forming springs that issue from the edge of the range and create the playa lakes. After passing a ghost town and the Franklin Lake Wildlife Management Area, we stopped at the forlorn Bessmer Cabin, a pioneer homestead within Ruby Lake National Wildlife Refuge. After lunch, we drove around a loop road atop the refuge dikes to view shorebirds and waterfowl. There was good fishing in the ditches for the herons and egrets, and good nesting habitat for several kinds of ducks.

From the refuge south, the road was lined by the sagebrush (*Artemisia*)–rabbitbrush (*Chrysothamnus*) association, but the dry hillsides at lower elevations were now clothed in pinyon and juniper. Under hot, cloudless skies, we followed the well-maintained gravel road slowly for almost an hour, all the while assailed by cowboy verse via cassette tape. After crossing the Overland Mail & Stage route at the south end of Ruby Valley, we entered Long Valley and continued our slow ride southward, finally striking paved road but not starting to climb until 25 minutes later.

East of Antelope Pass and 4.2 miles (6.7 km) north of Highway 50, we made a delightful stop to see some desert plants. Although seemingly desolate, this rather open pinyon-juniper woodland, at 6560 feet (2018 m) only a little above the flat expanse of desert, held an unexpected wealth of species for those with a keen eye. Some of these were attractive dwarf plants that might prove gardenworthy, although several, particularly *Astragalus*, might be difficult: *Astragalus purshii*, *Cordylanthus ramosus*, *Cryptantha* sp., *Eriogonum umbellatum*, *Haplopappus* sp., *Ipomopsis congesta*, *Oryzopsis hymenoides*, *Oxytropis* cf. *oreophila*, *Pedicularis centranthera*, *Phlox* sp., and *Senecio multilobatus*. Here, too, grew sundry *Erigeron* species (including the widely distributed and variable *E. pumilus*), the extremely variable *Eriogonum umbellatum* (seen in habitats ranging from low sagebrush deserts to alpine ridges), and *Swertia albomarginata*, an unusual gentian relative. There are many high- and mid-elevation erigerons of compact habit in Utah and Nevada, and one wonders why alpine gardeners have not tried more often to adapt them to their troughs and gardens. Certainly, dry mid-elevation habitats like this are worthy of botanical and horticultural exploration.

We spent the night in Ely, awakening Friday to a town refreshed by an earlymorning thundershower. Starting earlier than usual, we headed out to the Snake Range, 56 miles (90 km) east of Ely on the Nevada side of the Nevada-Utah border. The range, approximately 50 miles long by 12 miles wide (80 by 19 km), includes Great Basin National Park, which covers much of the South Snake Range and embraces Wheeler Peak, the only Great Basin peak outside the White Mountains that exceeds 13,000 feet (4000 m). The park entrance is 5 miles (8 km) west of Baker (which lacks lodging).

Arriving at the visitor center under glowering skies, we decided to take a 30minute tour of the Lehman Caves. We emerged to partly cloudy weather and boarded the bus for a slow but spectacular half-hour ride to Wheeler Peak Campground. Amid coming and going clouds, we entered a dense, almost continuous belt of conifers that bore slight resemblance to the subalpine zone we had encountered in the Wasatch. From the trailhead (9950 feet/3062 m), it was 2.8 miles and 4.6 miles (4.5, 7.4 km) round-trip, respectively, to the picturesque Bristlecone Pine Grove and Wheeler Glacier, the Great Basin's only glacier, which lies in the cirque beneath Wheeler Peak's north face. Nearly the whole way, hikers pass through a subalpine forest of limber pine, Engelmann spruce, and aspen. A thundershower interrupted our progress and soaked us. The tempest soon dissipated but left our ears and hearts pounding because of the thunder and the potential danger of lightning.

Soon the spruce yielded to still hardier limber pine, named for its pliant branches that withstand severe winds and heavy snows, and to the Great Basin bristlecone pine, the longest-lived tree species on earth. The Wheeler Peak bristlecone grove (at 10,200–10,570 ft/3138–3252 m) is unusual because it grows on a glacial moraine of quartzite boulders, whereas elsewhere—including the other two groves in the park—it grows almost exclusively on limestone. When cut down and sectioned in 1964, a tree on the Snake Range's Mount Washington was estimated to be about 4950 years old. In 1970, D. K. Bailey described the Great Basin bristlecone pine as a new species, *Pinus longaeva*, segregating it from the allopatric (geographically separated) Rocky Mountain species *P. aristata*.

The earlier downpour and changing light as the storm cleared created interesting coloration on the trees; the rain streaked the bark light orange, enhancing its contrast with the smooth, decay-resistant wood, which has been highly polished by wind-driven sand, snow, and ice. Near treeline, both bristlecone pines and limber pines appear to consist mostly of dead tissue. Their gnarled trunks and tortured limbs speak vividly of their ability to survive harsh growing conditions.

We were told to look for alpine plants like Androsace septentrionalis, Arabis drummondii, Phlox pulvinata, and Potentilla glandulosa while wandering through the grove, but between admiring the pines and feeling adventuresome, most participants overlooked this suggestion and resumed the climb. Emerging from the treeline, we almost immediately began climbing over a huge moraine spilling out of the bowl, or cirque (11,000 feet/3385 m), gouged in the face of the mountain. The sheer, ice-scoured headwalls of Wheeler Peak provided a formidable backdrop to a fantastic place to which any of us would gladly return. The sun was out by the time we reached the glacier, a small permanent ice pack obscured under a hill of talus. Early arrivals, already exploring for plants, were calling out the names of alpine tundra species that grew in protected spots on the open talus. The large heads of *Hulsea algida* made it the most striking species; however, the numerous (though inconspicuous) colonies of *Selaginella watsonii* tucked alongside rocks made it the most common one. *Arenaria fendleri* var. *glabrescens* and *Potentilla pensylvanica*, both mat-formers, were also common, as was *Erigeron watsonii*, but the gardeners among us seemed more impressed with *Polemonium viscosum* and *Astragalus kentrophyta*. The final find for the day was *Castilleja nana*, the real charmer among all the castillejas seen on the trip (photo, p. 131). Its low stature and dull pinkish-maroon coloration made it difficult to spot among the rocks until one learned how to look for it.

Our Saturday destination, Timber Creek, was new to all of us. It lies about 20 miles (32 km) north of Ely and 7 miles (11 km) due east of McGill in the Schell Creek Range. Five miles north of McGill, we turned east off Highway 93 north toward Duck Creek, then from Duck Creek Road south onto Success Loop, from which we picked up the partly unpaved access road to Timber Creek. After a bouncy ride, we parked at the upper campground (8480 ft/2609 m) to begin our final hike of the trip. Stu ferried some people up to the end of the 4-wheel-drive road, at the level where firs begin to enter the aspen zone (9180 ft/2825 m). From there we all left together, starting up the left-hand (north fork) trail, which lacked accommodating switchbacks; the trail proceeded directly upward, and the group became increasingly spread out. The dearth of interesting plants for the first three-quarters of the route made some wonder why they should continue; however, the last quarter was more satisfactory for both plants and broad views.

The first and only plant to capture our attention at lower elevations was *Mimulus guttatus*, crowded into bouquets along a spring-fed streamlet. Above 9360 feet (2880 m), the stream course turned dry and became increasingly clogged with rock debris. The woody vegetation soon thinned into a very open shrub cover dominated by grasses and sagebrush and dotted with stunted aspens. At 9470 feet (2914 m), a sparse sprinkling of limber and bristlecone pines appeared; and above them on even drier, more open ridges were *Mahonia*, *Symphoricarpos*, and mat-forming *Juniperus communis* spreading to 25 yards/meters across.

Photographers paused on an open, stony slope at 10,200 feet (3138 m) to take portraits of *Calyptridium umbellatum*, a handsome perennial with stems only about 2 inches (5 cm) tall and pink or white, papery flowers in capitate inflorescences. It was associated with the dominant mugwort in the area, *Artemisia michauxiana*, and a beautiful diminutive *Antennaria* with very blue leaves. Above 10,050 feet (3092 m), the intermittent stream course was in full sun. At these elevations, its bottom was filled with colonies of *Ericameria suffruticosa*, and its gravelly sloping sides were dominated by Artemisia michauxiana in association with Carex pachystachya, Eriogonum heracleoides, and Cirsium eatonii.

The top of the ridge (10,660 ft/3280 m) was high enough to have an alpine zone but too dry to support tundra vegetation. Besides gorgeous views, those who explored it saw alpine grasses and a few drabas and eriogonums, including one excellent candidate for the rock garden, the silvery-leaved *Eriogonum ovalifolium*, forming mound-like mats 8–9 inches (20–23 cm) across.

The four ranges we visited proved to differ from one another. The Rubies, the wettest and most heavily glaciated mountains in Nevada, with the best-developed alpine tundra in the Great Basin, seemed attractive and accessible, whereas the Schell Creeks, dry and stark by comparison, felt less friendly. Everyone's favorite hike was that to Liberty Pass, followed by Wheeler Peak.

Theodore Cochrane is Senior Academic Curator at the University of Wisconsin–Madison Herbarium. His botanical activities include both floristic (Wisconsin, western Mexico) and monographic (*Carex*, Capparaceae) research. Like many other NARGS members, Ted and his wife, Barbara, thank Gwen Kelaidis for introducing them to rock gardening.

#### Further reading

This selection of resources was compiled by William H. King. Numerous scientific papers have been published on all aspects of the natural history of the Great Basin. For additional references, write to Bill King (1564 Wasatch Dr, Salt Lake City, UT 84108) or Ted Cochrane (449 Jean St, Madison, WI 53703), or check the bibliographies in the following books and articles:

- Anderson, S., et al. 1998. Ruby Mountain Flora. A Guide to the Common Plants of the Ruby Mountains and East Humboldt Range. Elko, NV: Humboldt National Forest Interpretive Association. Descriptions and photos of 114 common plants.
- Cronquist, A., A. Holmgren, N. Holmgren, and J. Reveal. 1972–1997. *Intermountain Flora: Vascular Plants of the Intermountain West, U.S.A.* New York: Hafner Vols. 1–6. The series is incomplete, and some early volumes are outdated.
- Hyslop, L. 1999. *The Ruby Mountains: A Visitor's Guide*. Elko: C & L Publishing, 1060 Sewell St., Elko, NV 89901.
- Taylor, R. 1992. Sagebrush Country: A Wildflower Sanctuary. Missoula, MT: Mountain Press. Good photos and descriptions of lower-elevation species.
- Trimble, S. 1989. *The Sagebrush Ocean: A Natural History of the Great Basin*. Reno: University of Nevada Press. The best coffee-table book on the Great Basin, containing wonderful photographs and text by an award-winning author.
- Welsh, S., N. Atwood, S. Goodrich, and L. Higgins, eds. 1993. A Utah Flora. Provo, UT: Brigham Young University. Systematic treatise covering over 80 percent of the vascular flora of the Ruby Mountains, which are only 75 miles from the Utah border.

# Plants of California's Southern Sierra Nevada

## Andrew Osyany

M y early botanizing trips were under the auspices of Ontario's Muskoka Institute (directed by Barrie Porteous), but these take place in summer, and sometimes the off season seems too long. So where can one go in March? Then I discovered the Mojave Desert of southern California and also wandered into the Kern River Canyon (see map). I was hooked, and I've returned several times to California's southern Sierra Nevada and surrounding drylands.

The southern end of the Sierra Nevada, cupped into the ascending arc of Bakersfield (400 feet/130 m), Mojave, and Inyokern (2400 feet/740 m), rises quickly to 12,000 feet (3700 m). From the extremely dry Mojave desert, moisture increases northward. The eastern slope of the Sierra is drier than the western. Keeping these points in mind and factoring in the elevation effect, you can plan a successful itinerary in the area any time from February–March until late fall.

The first flowering peaks in March–April. Much depends on the winter rains; you may not be overwhelmed by the flowers after a dry winter, but you are bound to be at least whelmed. You may want to find out about the current winter rain conditions before planning your trip. In most winters, the high alpine passes are blocked by 20 feet (6 m) of snow. The highlights of this period are the low-land winter annuals, bulbs, and shrubs. Just outside the Bakersfield orange groves, you will see huge monoculture-like fields. At somewhat higher elevations in the Mojave Desert, the effect is more like a Persian carpet. In the lowest foothills of the Sierra, there are rich, undulating fields and patches of spring flowers, seeming to cover every growable spot. The effect is as great at 40 miles per hour as at a walk. At this early time of year, you can find choice plants in the higher desert, even at Walker's Pass (5,200 feet/1600 m), which in a good year is a forest of blooming *Yucca brevifolia* (Joshua tree). Later in the season, move to higher elevations like Sherman Pass (9200 feet/2830 m) for some true alpines.

In this article, I concentrate on Kern County, occasionally wandering to the north into Tulare County. The Kern County flora lists 1875 taxa, so here I can merely scratch the surface.

### Borage family

At lower elevations, the most visible elements of the flora are bulbs and forbs in the families Boraginaceae, Polemoniaceae, and Hydrophyllaceae. Kern County has only about 30 taxa in the Boraginaceae (borage family), so usually it is not too hard to work out what genus you are looking at. Fiddleneck is the common name for *Amsinckia*, clearly from the shepherd's crook form of the unfurling spike of yellow or rusty orange trumpets. Amsinckias are somewhat like castille-jas (paintbrushes): they make a stunning distant show, but they won't win many close-up prizes. The plants are strongly bristly and usually somewhat under 2 feet (60 cm) tall. To key out the species, you need the nutlets (seedheads), but most of what you see will be vast acreage of *Amsinckia intermedia*.

Perhaps even greater areas are covered by *Cryptantha*, another borage family member. This is a quintessentially Californian genus, with 90 percent of all species being found in that state. Plenty of them are "of botanical interest only," but some are lovely. The flowers generally resemble forget-me-nots in form, and the colors range from crystal white to dirty yellow. I don't mean to make the genus sound unattractive; a breeze rippling across a field of clear white *Cryptantha intermedia* will perk you up even on a dull day. Cryptanthas are almost all annuals or biennials, and again, in many cases you have to view the nutlets with a hand lens to key them out. Farther south, you can find *C. micrantha*, a tiny annual with a wisp of root, making a light-textured 1-inch (2.5-cm) carpet over the sand—easily worth a dollar a seed, if only someone would collect it.

### Phlox family

The Polemoniaceae, or phlox family, have showy flowers in five parts, bell-shaped to funnel-form. In the desert areas, you will find tiny members of the genera *Navarretia* and *Eriastrum*, though not in masses. The mass effect in spring comes from *Linanthus* and *Gilia*. *Gilia tricolor* (available from commercial seed houses) is a phenomenal early spring annual growing 6–8 inches (15–20 cm) tall. The flower has distinct pink, white and blue zones; close up it appears generally pink, but when you look at a field of it in the middle distance, blue predominates. *Gilia capitata* is quite widespread in the West and reseeds well in gardens. The light blue drumstick-shaped flower heads have a casual resemblance to onions, and the plant combines well with *Triteleia*. There are three dozen other gilias, mostly dryland annuals. There are only about a dozen species of *Linanthus*; perhaps the most notable are the lovely pink *Linanthus montanus* and the evening-opening, fragrant white *Linanthus dichotomus*. At higher elevations, clear pink *Phlox austromontana* can be found.

## Waterleaf family

The center of diversity of the Hydrophyllaceae (waterleaf family) is the western United States. If you know only the dingy purple of the overrated *Phacelia sericea*, while walking across the hard desert surface you will be stunned by the noble magenta gems of *Nama demissum* (photo, p. 134) sprinkled along the prostrate lace of the plant's foliage. However, the most prominent genera here are *Phacelia* and *Nemophila*. Again, most are annuals. This area is home to the popular garden annuals *Nemophila maculata* and *N. menziesii*, as well as six others. It is a pleasant surprise to come on these well-known plants in the wild, and we gladly incorporate them into our rock garden, where the former reseeds gently but reliably. The bigger phacelias can have rather excessive leaf mass in proportion to the flowers, but their colors are mostly intense blue-purple. Many phacelias have the coiled spike inflorescence mentioned in connection with amsinckias. There are two dozen species; interestingly, some of the larger ones are well adapted to shade and moisture.

# California poppies and their kin

There are also hillsides and fields of the California poppy (*Eschscholzia californica*), a million-dollar sight of luminous flowers over a long season, leaping out of sparse ground: What better symbol of optimism? You will find other species, too. In the Kernville area, *E. procera* forms almost shrubby plants, at 3 feet (1 m) the largest species in the genus. The latest *Jepson Manual* sinks this into *E. californica*. Going from large to small, *E. caespitosa* is similar in form but daintier, and yellow-flowered. Quite different is *E. glyptosperma*: a neat basal tuft from the center of which rise the 10–inch (25–cm) stems, each with a single flower at the tip. *E. lobbii* would be an attractive addition to a trough, looking quite a bit like a much reduced *E. glyptosperma*. *E. minutiflora* is well described by its botanical name.

# Snapdragon family

One of the most glowing spring colors comes from *Orthocarpus purpurascens*, an owl clover. (No prize for guessing the color.) We have now jumped into a section of the Scrophulariaceae (snapdragon family) containing annual green-root parasites. *O. purpurascens* is the most widespread and numerous, but there are also occasional patches of yellow and white members of this genus. The plants are generally under a foot high and have prominent bracts. *Jepson* has transferred many of them into the genus *Castilleja* and suggests that they are difficult to grow; however, communities in the Sierra Nevada foothills plant mixtures of native flower seeds in their public plantings, and *Orthocarpus* thrives nicely in boulevard planting schemes in Visalia. Since I think *O. purpurascens* is miles

ahead in quality and desirability beyond the later-blooming castillejas, I recommend that you get seed of it under its new name.

Continuing with the "scroph" theme, we are reminded how many of our good garden annuals come from California. *Collinsia heterophylla* is found here, along with a few other species, including *C. wrightii. Mimulus* is very well represented with about a dozen species, but most flower later in spring or early summer. There are dwarf ones, like *M. bigelovii* (photo, p. 134), *M. brewerii, M. constrictus, M. fremontii*, and *M. pictus*, but many grow 3–4 feet tall. Except for the stream residents, this is predominantly pink mimulus country. An exception is the orange-yellow of *Mimulus*, was the genus in which the shrubby *Mimulus* were plaecd). This amazing plant will grow in semishade, drilled into the tiniest rock fissure, and producing a cascade of large, open flowers for a long time. Not hardy in my Zone 5 area, it makes a very good winter pot plant, along with its red cousins. which are now also sunk into the same species. I don't think there is a poor member in this genus.

The straw-yellow *Keckiella rothrockii* (a close relative of *Penstemon*) is quite reminiscent of the shrubby mimulus in appearance, habitat, and hardiness. Nice to observe and covet, but not to try to grow in my climate—generally also true of the penstemons found here. With the exception of *Penstemon heterophyllus*, the local penstemons are all in the red-purple range. In northeastern American gardens, some struggle through one or two winters but depart before decent flowering. On location, however, their wow-factor is high. *Penstemon centranthifolius* (photo, p. 134) is reminiscent of *P. utahensis* with its generous array of long, tubular scarlet flowers on 3-foot wands surrounded by large smooth leaves with a distinct bluish cast; it grows up to 5000 feet (1540 m). The well-known *P. newberryi* appears this far south at very high elevations, making a clump under a foot (30 cm) wide, while the bigger *P. labrosus* and *P. rostriflorus* can be found a bit lower and in drier circumstances.

*Mohavea confertiflora* rounds out this quick review of the snapdragon family. This is a smallish desert annual, called ghost flower on account of its pale, largepetaled flowers, flecked with red toward the base to lead insects to the pollen sacks.

### **Bulbous** plants

This is prime bulb country. Interestingly, the bulbs from this area adapt well to eastern North American conditions—much better than do bulbs from the Rocky Mountains. The bulb season starts in March–April with seas of *Dichelostemma congestum* (syn. *D. pulchellum*) along many roadsides. It is not the most beautiful plant in terms of habit, but it is obviously robust and looks very good in masses. The congested umbel consists of 6–15 onionlike flowers. The only other member of this genus in the area is *D. volubile*, with a similar inflorescence but with stems 4 feet long or more that twine around other vegetation.

There are only two brodiaeas here. *Brodiaea coronaria* can grow to 4 feet (though usually shorter) and seems fairly widespread, taking to very rocky conditions as well as loamy soil. Its individual funnel-trumpet flowers can be 2 inches (5 cm) long and are radially distributed on 3-inch pedicels from the central stems. The 8 to 12 flowers tend to open in overlapping sequence. Its prevailing color is violet, with variations in hue and intensity in the many good-sized colonies. *B. terrestris* has a scattered distribution in the low, arid hills on the west slope of the Sierra Nevada. This treasure is a short-stemmed, trough-sized version of *B. coronaria*.

In *Brodiaea* the perianth is fused at the base, forming an obvious tube, while in *Bloomeria* the perianth is more or less free at the base, not forming an obvious tube. Golden stars is the common name for *Bloomeria crocea*, which is architecturally similar to the brodiaeas mentioned, except that the plant is small, with upturned, widely open yellow flowers that have a dark median line. This is a fairly widespread plant, modestly attractive.

*Triteleia* species used to be included in *Brodiaea* and are still known commonly by that name, but they have been distinguished on the basis that all six of the stamens in *Triteleia* are fertile, while only three are functional in *Brodiaea*, the other three being reduced to impotent stubs (staminodes). I award a score of ten out of ten to the locally abundant *Triteleia ixioides* subsp. *scabra* (photo, p. 135). Of the three subspecies in *Triteleia ixioides*, this is the best. The dark cream-colored petals are the largest; the umbel can have 16 flowers or more; and the flowers stay open in the evening. Early June-opening and very durable in eastern American gardens, it is rather slow from seed to flowering but can now be bought in mass-market bulb catalogs under the name 'Starlight': an absolute winner, incomprehensibly ignored by the rock gardening world. The blue *Triteleia laxa* is much like *Brodiaea coronaria* in color and size, so don't forget to check out the stamens to be sure of your identification.

There is a variety of small onions here, including some with very dark purple flowers (desirable, as all onions are), but the only one that I could key out is the well-known *Allium hyalinum*, growing in vernally wet conditions. This has clear white upfacing bowl-shaped flowers on short pedicels, appearing in June in the home garden in ordinary border conditions.

Although 10 species of *Calochortus* are reported for this area (including the well-known *C. kennedyi, C. venustus*, and *C. superbus*), I have only come across the common "fairy lantern" *C. amoenus*, which looks much like a pink *C. albus*, but not as tall. There are forms that grow to only 8 inches (20 cm), though in tall grass the plant will stretch upward. Small plants have just a couple of flowers, but the bigger ones can have up to ten. Adaptable in eastern gardens, mine lasted 7 years and survived one transplanting, but not a second. *Calochortus luteus* and *C. superbus* are reported to be common here, so the next time I hope to see them; it's just a matter of timing. Finding the high-altitude species *C. kennedyi* in bloom is said to be more chancy.

This review of bulb flora is by no means complete, but I want to mention just one more, because this is the only area I have found it: *Zigadenus exaltatus*. The

rather large bulb produces equally large plants, up to 3 feet (1 m) tall or a bit more, with light yellow flowers over 1 inch (2.5 cm) across; it is as good as *Z. fremontii*, which places it at the head of the class.

## Aster family

Some of the most interesting local members of the Asteraceae are winter desert annuals, such as *Eriophyllum wallacei*, a lookalike for the well-known perennial *E. lanatum*, but reduced to a little cushion no more than an inch high and across, coloring good-sized areas in Pointilliste style. More familiar are the various species of *Layia*, *Coreopsis*, *Chaenactis*, *Erigeron*, *Crepis*, and *Arnica*.

# Evening primrose family

The Onagraceae are also important here, and again the showy annuals carry the day. *Camissonia* (photo, p. 135) has a capitate, globby-ended stigma (as opposed to the four-parted stigma of *Oenothera*). There are about a dozen species of it here, ranging from mostly yellow, dainty desert annuals to more substantial and mostly white-flowered, leafy species to 1.5 feet (45 cm) tall. Almost as numerous are *Clarkia* species. This is a great genus, with elegant flowers, many of which are globe-shaped and dance on top of willowy stems, strongly resembling a field of *Calochortus*.

# Portulaca family

The name *Clarkia* reminds me that there is *Lewisia rediviva* (Portulacaceae) reported in the area, though I have not come across it. However, *Calandrinia ciliata* is quite widespread and seems reasonably adaptable. You can't miss the plants: the vivid, glossy carmine-purple flowers are somehow unexpected because this genus is mostly South American. Jumping from blazing carmine-purple to dusky pink, *Calyptridium* grows as a pioneer plant in dry gravel and has a predilection for road shoulders.

# Logistics

Information on just about anything is available on the Internet. In particular, check sites for the area's federally administered lands: Kings Canyon and Sequoia national parks, and Sequoia, Sierra, and Inyo national forests. For general planning, I strongly recommend the wonderful Automobile Club of Southern California, part of AAA. They produce large-scale maps of every county, maps of regions, city maps, and lots of incidental information like elevations, points

of interest, and so on. I find these AAA maps the best for me; all reasonable roads are shown in sufficient detail, and you still get an overall sense of the area. Do get spoiled here by the high level of service available from the AAA's numerous local offices.

For general background, history, and plants, I recommend *A Flora of Kern County, California* (ISBN 0-943460-22-0). The Twisselmann flora mentioned in my introduction is the second part of this book. The first part is a key to the plants by Moe, based on the latest *Jepson Manual of the Higher Plants of California* (ISBN 0-520-08255-9). *Jepson* is heavy and bulky, but it has good descriptions of the plants and lots of keys and illustrations. To round out, I take the superb book by Niehaus in the Peterson Field Guides series, *Pacific States Wildflowers* (ISBN 0-395-31662-6).

The Kern River Canyon, commencing east of Bakersfield, is the most dramatic entrance to this area (photo, p. XX). A warning sign carries a running total of river deaths. The canyon sides are steep, and the bottom is narrow; you want to dawdle along to admire the rich vegetation beside and above and gawk at the killer river below, but you are pushed along by a heavy stream of traffic, much of it heading to the recreation area at Lake Isabella upstream. Use the occasional pullout. After a while, the canyon widens and softens, and you get to Lake Isabella, where the two forks of the Kern River were dammed in 1952 for flood control purposes. There are some wetlands here. The area is so popular that on weekends and during the summer season you will need reservations for campsites or lodging. There is skiing in winter, boating in summer, and many hiking trails.

Kernville, at the northern tip of Lake Isabella, is my favourite headquarters, small and well situated to reach lots of places of interest. You can set off hiking right from Kernville, and before too long (depending how much botanizing you do on the way), you will reach some abandoned mines and marvel at the tenacity of the old-timers, hefting such massive pieces of machinery and doing major construction all with human and beast muscle-power. There are good hiking guides available, though they lack information on plants.

This area is largely in the Sequoia National Forest, so Forest Service maps are available. For the kind of "old-heart" botanizing that we do (no overnight hikes, generally not more than 3 hours away from the car, no more than 3000 vertical feet, no crampons), I have not found the National Forest maps very useful, but I buy them anyway. They have a tremendous amount of useful information, in spite of the color schemes and markings that deemphasize the information, rather than the reverse.

South of the Kern River Canyon is the dryish Breckenridge Mountain range, a great haven for bulbs. The moister Greenhorn Mountains are to the north, where you will find skiing in March. Among the many wonderful secondary roads on the AAA map, I recommend Rancheria Road, which starts close to the citrus groves near the western entrance of the canyon and then runs along the spine of the Greenhorn Mountains. The road is not maintained for tourists; washouts may stop you, especially if you are driving an ordinary car (otherwise adequate), and the high-elevation parts are likely to be blocked by snow in March, but I found more choice plants along here than at any other spot.

You will want to go through Walkers Pass, with excellent desert spring flora, including shrubs and shrubby lupines. Beside the road in the wet area on the western part of the pass are large colonies of *Anemonopsis californica* (Saururaceae), with showy white flowers. This is hardy with us and does not need to live in a bog, though it does like moisture.

All the zigzag roads in the western Sierra Nevada foothills are pretty and worth exploring. As well as the fields of wildflowers, there are many tiny, discontinuous colonies. You may happen on a glowing patch of scarlet *Silene californica* (photo, p. 133), comfortable in the semishade under shrubs, while elsewhere *Clematis ligusticifolia* clambers through the scrub. On our last visit, we were a little early and the winter rains had not been great, so we kept moving northward along the western side, all the way to the entrance to Kings Canyon National Park in Tulare County. We visited SCICON, a nature school which hosts conferences, and found it worthwhile for its hikes; we even came on *Saxifraga californica* and the ephemeral *Isopyrum occidentale*, as well as fields of the various commoner spring flowers. Farther along the way, Dry Creek Road (Road J21) was particularly good to us.

When Sherman Pass is open in the summer, it brings you to real alpine areas, eventually descending via the Kennedy Meadows Road on the eastern side to U.S. Highway 395. The road, steeply graded along the precipitous eastern mountain slopes, is spectacular and scary. This is eriogonum, astragalus, and penstemon country.

At an absolute minimum, allow three days to visit the area, but you won't have any problem filling a week or more. I generally allocate one roll of film per day.

#### Seed sources

Ron Ratko, Northwest Native Seed, 17595 Vierra Canyon Rd. #172, Prunedale, CA 93907 (initial catalog \$3)

Sally Walker, Southwestern Native Seeds, Box 50503, Tucson, AZ 85703 (\$2) Alan Bradshaw, Alplains, Box 489, Kiowa, CO 80117-0489 (\$3)

Jim and Jenny Archibald, Bryn Collen, Ffostrasol, Llandysul SA44 5SB, UK (\$3) Ginny Hunt, Seedhunt, Box 96, Freedom, CA 95019-0096 (\$2; includes annuals) Theodore Payne Foundation for Wildflowers and Native Plants, 10459 Tuxford Street,

Sun Valley, CA 91352-2126 (\$3; includes many annuals, even *Castilleja exserta*, syn. *Orthocarpus purpurascens*)

Andrew Osyany, an attorney, lives and gardens in Shelburne, Ontario, and is NARGS recording secretary as well as a leading force in the Ontario chapter. His Karmic Exotix seed company (PO Box 146, Shelburne, Ont. L0N 1S0, Canada) distributes seed from Czech collectors.

# Botanizing by the Bay

# Sue Smith

The hills and flats that surround San Francisco Bay are densely developed, but even within the confines of the city of San Francisco, we can reinvigorate our sense of the beauty and intricacy of native plant communities. The visitor with only a few hours to spare can reach all the sites described here by bus or a short taxi ride. The famously benign climate makes them worth a visit at any time of year, but the peak of flowering is in late winter through spring.

*Twin Peaks*, one of the highest points in the city, rises just beyond upper Market Street, with Portola Drive to the south. Most people come here for the incomparable views of the Bay Area, but gardeners—and especially rock gardeners—will enjoy the trails over the two northerly peaks. One of the most dramatic rock formations here is formed of banded radiolarian chert, 2–4-inch layers of red stone formed by fossils of single-celled marine organisms, each layer separated by a thin black line of shale.

As you walk along the paths, you will see coast rock cress (*Arabis blepharophylla*, an easy and bright garden perennial), Franciscan wallflower (*Erysimum franciscanum*), and the handsome succulent *Dudleya farinosa*, which can be grown in dry walls and crevice gardens where the climate is nearly frost-free. There are colonies of dwarf coyote brush (*Baccharis pilularis*; this form is in commerce as 'Twin Peaks') and the bright green fronds of the fern *Polypodium californicum*. Many rock gardeners grow the widespread seaside daisy *Erigeron glaucus*, which can form clumps 3 feet (1 m) wide in cliffside gardens. *Iris douglasiana* is named for the nineteenth-century plant explorer of this coast, David Douglas. By March, there are hints of the coming flush of goldfields (*Lasthenia californicus*, *Ranunculus californicus*, and the circumpolar *Cerastium arvense*.

There is more to see on the next peak over. Park near the bus turnaround at Myra Circle on the south side of Mount Davidson. Walk up through the tallest weed in California's landscape—blue gum eucalyptus—and take the first path to the right, contouring past coastal shrubs to open grassland. Late in February, we have found 23 species of wildflowers in bloom here. The showiest California violet, *Viola pedunculata*, is likely to be among them, along with footsteps-of-spring (*Sanicula arctopoides*) and the umbellifer *Lomatium dasycarpum* with gray, woolly

leaves. Two bulbs may appear at this time: *Muilla maritima* (the genus name is *Allium* spelled backward) and *Fritillaria affinis* with checkered greenish flowers. There are two or three lupine species and the related vetches and peas.

Uniquely beautiful is the north-facing slope, where shrubs and bunchgrasses grow shoulder to shoulder. Woody plants include the huckleberry Vaccinium ovatum, Rhamnus californica, Gaultheria shallon or salal, the snowberry Symphoricarpus albus, and the creambush or ocean spray Holodiscus discolor, a serviceberry or Amelanchier. Prominent grasses are Festuca californica and Calamagrostis nutkaensis. The lighting on this plant landscape is ideal for photography. Where the low form of Berberis pinnata is abundant, so is red elderberry (Sambucus racemosa), bravely facing the blue gum horde that threatens to invade the grassland further. Most of these plants range far to the north at mid elevations up to British Columbia; this far south, they prefer the coolness of the northern exposure.

To see a lovely sand dune plant community, visit the restoration being carried out in the **Presidio** by the National Park Service. There are trails along the bay, with easy parking at Crissy Field just beyond the yacht harbor. The bay trail is lined by sand dune and sand terrace native plant species. You can view the bay over the plantings on one side, and a lagoon on the other. Yellow and pink sand verbenas (*Abronia latifolia* and *A. umbellata*), which are threatened by coastal development and motorized vehicles over much of the Pacific coast, are two very showy ground covers just above the high tide line. Beach bur (*Ambrosia chamissonis*) and American dune grass (*Elymus mollis*) tolerate the salty air and blowing sand. Among many new plantings are dune sage (*Artemisia pycnocephala*), beach strawberry (*Fragaria chiloensis*), *Lupinus chamissonis*, and coast paintbrush (*Castilleja wightii*).

A significant rock formation awaits the rock garden enthusiast in two other areas of the Presidio; this green, glassy serpentine is also associated with plate tectonics. If you enter the Presidio from Arguello Boulevard and continue past the golf course (where there is an inviting restaurant), you can park at Inspiration Point. A trail leads down and around the serpentine grasslands.

In March and April, there is a type of vernal pool display immediately below the bench and lookout. Vernal pools are a plant community typical in western American Mediterranean climates; shallow ponds formed by winter rains diminish as the weather becomes warmer and drier, and specialized annuals germinate, grow, and flower in rings on the moist soil exposed by the retreating water. This is one of the most endangered plant associations in the West because of development and agriculture. Here on the Presidio this area features tidy-tips (*Layia platyglossa*) and goldfields (*Lasthenia californica*). Lower on the slope in late May, you may view the flowers of *Clarkia franciscana*, an endangered species with only one other site. In June, *Triteleia laxa* puts on a great show in the shadier areas.

Sue Smith formerly owned a travel agency specializing in international garden tours and is active in rare plant conservation efforts in San Francisco. She owns an 80-acre native plant preserve in Sonoma County, California.

# A Wildflower Tour along Oregon's Deschutes River

# Dave Dobak

The Deschutes River drains a large area of central Oregon, flowing into the Columbia River at The Dalles, about one and one-half hours' drive east of Portland. Forty-five river miles south of The Dalles is the site of Sherar's Bridge and Hotel, constructed in the late nineteenth century at one of the few spots where travelers then could cross the swift Deschutes. The river flows through a narrow valley surrounded by hills around 1500 feet (450 m) high. Along the east side is a gravel road, built on the remains of a railroad that was started in the early twentieth century. This road is one of our favorite spring botanical driving trips. The road is on land administered by the Bureau of Land Management, and information is available from the BLM office in Prineville, Oregon. The gravel road is two lanes wide and is accessible for ordinary passenger cars.

Sherar's Bridge is situated on Oregon Highway 216, 8 miles east of its junction with US highway 197 near the town of Tygh Valley, about 30 miles south of The Dalles and 100 miles north of Bend. Visitors from west of the Cascades can reach the area either via the Columbia Gorge on US Highway I-84 or via Oregon Highway 26, the route over the southern flank of Mount Hood.

Pause at the bridge to view the falls. In salmon season, Native Americans still fish from platforms precariously overhanging the rapids. Contemplate for a moment traveling this road in an ox-drawn wagon. On the cliffs nearby, search for the viscid leaves of *Mimulus jungermannioides* (don't be distracted by *M. guttatus*, also found there; *M. guttatus* leaves are not slimy, and the upper calyx tooth is prominently longer than the others). Cross the Deschutes River, then cross Buck Hollow Creek, and then turn left on the Deschutes River Road and set your trip odometer to zero.

At 1.8 miles, park on the roadside by a large volcanic scabland formation to your left. From mid-March to mid-April, look on the flats just east of the large volcanic lumps at the river's edge for the large lavender flowers of *Viola trinervata*; its leaves and pods persist into May. Like other Western dryland violets, this showy species tempts rock gardeners but usually defeats their efforts to cultivate it. On the volcanic lumps themselves are little-leaf rockcress (*Arabis microphylla*) and another species of *Arabis* that has defied our efforts to identify it. The little yellow-flowered annual *Crocidium multicaule* and the golden bells of *Fritillaria pudica* dot the landscape in March and April. The clustered cylindrical leaves of bitterroot (*Lewisia rediviva*) are visible in early March; by mid-May, it comes into flower, along with white to pale pink taper-tip onion (*Allium acuminatum*) and pale blue *Triteleia grandiflora* subsp. *howellii* (formerly *Brodiaea howellii*).

If you're lucky you will see—but not step on—a clutch of killdeer eggs, laid on the gravel without nest or other protection. You will also see the "copper" moss, *Bryum miniatum*, the easiest of all mosses to identify because of its coppery color. Look closely at the prairiestars, members of the genus *Lithophragma* (Saxifragaceae) with racemes of pink to white flowers and sparse foliage, growing as geophytes from little tubers. There are three species here: hairy-leaved *Lithophragma parviflora* (photo, p. 135), glabrous (smooth-leaved) *L. glabra*, and *L. bulbifera*, which produces little red bulbils in the axils of the stem leaves.

At 3.8 miles, stop at an old-growth elderberry (Sambucus caerulea) for a tutorial on shrubs. Here you can spot red-osier dogwood (Cornus stolonifera var. occidentalis), western mock orange (Philadelphus lewisii, flowering in May), cascara (Rhamnus purshiana), virgin's bower (Clematis ligusticifolia), chokecherry (Prunus virginiana var. melanocarpa), serviceberry (Amelanchier alnifolia var. semiintegrifolia), and a Rosa species. Here and there along the road are impressive displays of purpleflowered Penstemon richardsonii and Collomia grandiflora, a tall annual topped with apricot-yellow flowers that is often grown in gardens, where it reseeds readily.

At 9.0 miles, stop at an isolated hackberry tree (*Celtis reticulata*) on the west side of the road and look along the cut bank on the east side of the road for the shining yellow flowers of the sagebrush buttercup (*Ranunculus glaberrimus*). By mid-April, all traces of this plant will have disappeared. In May, the large pink flowers of *Phlox longifolia* are abundant here and elsewhere along the road.

Walk just down the road, and at 9.2 miles, look amid the sagebrush on the slopes east of the road for the pink or white fragrant flowers of daggerpod (*Phoenicaulis cheiranthoides*), which begin to appear in early April (photo, p. 135). This is a crucifer often cultivated in rock gardens, where it tends to be short-lived. Getting close to these lovely plants is a bit of a scramble; they can be seen more easily along US 197 north of Tygh Valley (near milepost 28, on the west side of US 197 just north of the road to Friend, and also on the east side south of there).

Bald eagles, ospreys, kingfishers, common mergansers, Canada geese, redtail hawks, turkey vultures, meadowlarks, canyon wrens, red-winged blackbirds, magpies, herons, and other birds complete the scene. The weather here in the rain shadow of the Cascades is often clear when the Portland area is cloudy, making this a popular day trip during the long, wet Willamette Valley springtime.

Dave and Jan Dobak of Portland, Oregon, are very active in both NARGS and the Oregon Native Plant Society. For more information on this site and others nearby, you may contact them at <jddobak@pcez.com>.

# Guanella Pass A Day Trip from Denver

# Robert Nold

O n those increasingly rare days when I feel fortunate to live in Denver, it's pleasant to think of the high, silent world above timberline—a world free from construction noise, boom cars, smog, and all the other delights of a city whose population has tripled in the past twenty years. My favorite alpine destination nearby is Guanella Pass, the summit (11,669 feet/3557 meters) of which is only an hour's drive from our front door. Guanella Pass Road has everything: spectacular scenery, ghost towns, switchbacks, an absence of trophy homes littering the landscape, ledge roads, the chance of being crushed to death by huge boulders crashing down the mountainside... and plants.

Guanella Pass is an old wagon route connecting South Park with Georgetown. The road runs roughly north to south; the summit affords a superb view of The Sawtooth and Mount Bierstadt (14,060 feet/4285 meters), forming what is essentially the "back" or western side of Mount Evans. The best times to see flowers (depending on the depth of winter snowpack and its time of melting) are mornings in late June and July, and all day in August and early September. Only the foolhardy stay above timberline after noon in Colorado in June and July; thunderstorms can develop in minutes on early summer afternoons. Every year, several people are killed by lightning in Colorado. (Thanks to Bill Jennings and Caryl Shields for helping me keep the facts straight in this article.)

There are two ways to reach the pass from Denver. The first, heading west on Interstate 70, is mostly for people who enjoy driving through the mountains in bumper-to-bumper traffic. After you arrive in Georgetown (usually a few hours later than you planned), the road out of town is clearly marked. It immediately leaps upward in a series of switchbacks on what is, to my eyes, an unpleasantly narrow road. This paved road, relatively uneventful in regard to exciting plants, straightens out later as it follows South Clear Creek. A mile or so up the valley is the turnoff for the awful road to Argentine Pass and the ghost town of Waldorf, situated as high as the summit of Guanella Pass itself. The Argentine Central, which functioned both as a mining and tourist railroad at the end of the nineteenth century, was the highest steam railroad route in the world. The mining residents of Waldorf had alpines growing at their doorsteps. The other route is to drive west on U.S. Highway 285 to the town of Grant. From there the road—sometimes paved, sometimes not—follows Geneva Creek through forested areas until it comes to the first (and not too scary) switchback. The roadcut, like roadcuts throughout the West, is studded with desirable plants; here, *Penstemon glaber* var. *alpinus* is particularly impressive, sheeting the roadcuts with deep blue for weeks on end.

At the top of the switchback, the road straightens out a bit as it skirts the edge of a meadow called Geneva Park. The meadow is filled with thousands of plants of *Pentaphylloides* (I believe there are, for once, sound taxonomic reasons for segregating this taxon, more generally known as *Potentilla fruticosa*, out of the otherwise herbaceous genus *Potentilla*); it's worthwhile to stop the car, get out, and look down along the side of the road. *Penstemon crandallii* is here, as is a particularly fine species of pussytoes, possibly *Antennaria microphylla*. On bluffs over the road are colonies of *Penstemon virens* (photo, p. 136) growing in grus (decomposed granite); I once collected some of this granite from the road for mulch in the troughs and have been weeding penstemons out of it ever since.

The second switchback is larger, with more plants on the roadcut. The pavement ends abruptly here; in the rivulets at the roadside are the little red "elephant head" flowers of *Pedicularis groenlandica*.

The road now climbs higher and hugs the western side of Geneva Mountain and other, unnamed peaks; the dropoff on the other side of the road is perhaps best ignored. Here there are acres of Engelmann spruce (*Picea engelmannii*), with witches' brooms, many of them dead, almost everywhere.

A little way up this section of the road is one of Guanella Pass's two known sites of the bizarrely elusive (considering its popularity with rock gardeners) little columbine *Aquilegia saximontana*. About a quarter-mile (400 meters) past the entrance to the abandoned Geneva Basin ski area, a colony of about ten plants hides among the boulders. The second colony, of eight plants, is in a pile of rocks near the entrance to the Duck Lake Resort. The plants occasionally betray their presence by producing a flower or two.

At this point in the trip, it's best to have one person scanning for flowers and the other—preferably the one behind the steering wheel—actually looking at the road. Infrequent spells of wet weather can cause landslides, and one year the road was blocked by sizable boulders that, it was extremely comforting to discover, had just tumbled down the night before. Driving around boulders on a ledge road is not my idea of fun.

The last stretch of road to the summit is easy, and there are large, old colonies of *Penstemon hallii* here and there, as well as various willows. There are trails heading east and west from the parking lot at the summit. The path eastward goes down to Deadmans Lake, and then up, very much up, to Mount Bierstadt. *Castilleja rhexifolia* (photo, p. 136) is plentiful just below the parking area; that's as far east as we've ever gone.

To the west, the trail heads across a flat area of alpine turf, with *Eritrichium are*tioides, Polemonium viscosum, and Hymenoxys (Rydbergia) grandiflora here and there, and, later in the season, scattered bells of *Lloydia serotina*. I suppose it's a bad idea to leave the trail and walk on the turf itself, so I try to levitate across the turf to the scree just southwest of the summit. This south-facing scree, lying at the angle of repose, has fabulous, ancient cushions of *Arenaria obtusiloba*, *Phlox condensata*, *Silene acaulis*, and *Eriogonum jamesii* var. *xanthum*.

Most of these plants (including, believe it or not, the eritrichium) have proved themselves amenable to cultivation from seed in my Denver-area garden, but one other cushion plant—the dwarf clover *Trifolium nanum*, one of my favorites has not. This tiny clover forms a congested mat of hairy, gray little trifoliate leaves, with relatively large rose-colored pea flowers sitting right on top; the whole plant is no more than half an inch (1 cm) tall. I've obtained seed that wasn't viable, so maybe I should try again, and one day this treasure might be mine.

Now that I've wandered onto the subject of ungrowable plants, there are still plenty of things to see after mid-August, after the main floral display is over. Mid-August is about the time I usually get around to going up into the mountains to see plants and avoid being struck by lightning, always a priority with me. The beautiful arctic gentian, *Gentiana algida* (some botanists place this in a separate genus, *Gentianodes*) can be found in damp turf; I've had this in the garden for a while, but it always insists on dying instead of blooming. The other gentian here, even more conspicuous in late summer, is the gorgeous blue *Gentiana parryi* (sometimes placed in a genus *Pneumonanthe*), usually found at the base of the willows that form huge colonies on the summit.

When the gentians bloom, there is already frost at night. Snow is now possible at any time. A few sudden, screeching plant stops notwithstanding, maybe that's why we always seem to race home so quickly, to savor those last few days of summer, before, usually sometime in September, the snow falls in our garden too.

Robert Nold of Lakewood, Colorado, is an avid gardener and the author of *Penstemons* (Timber Press, 1999). He is now writing a book on aquilegias. Cindy Nelson-Nold, his wife, took the photographs illustrating this article and is also a botanical artist.

# **Stansbury Island** *Winter Respite near Salt Lake City*

### William H. King

When winter seems like it will never end (in Utah, this happens around February or March) and the rock garden is still covered with snow, it's time for us to take a trip to Stansbury Island in the Great Salt Lake. Because the lake buffers the temperature, spring comes early to the island. Even though it snows a foot or two there, the snowfall is much lighter than the 6 feet (2 meters) we receive on the foothills of Salt Lake City, and it melts relatively early. Each year, we overcome the late-winter blues by taking this short trip. The stark, bleak appearance of Stansbury Island from a distance gives little clue to its floristic wealth and subtle beauty.

The flora of Stansbury Island resembles that of the Great Basin high desert more than it does that of the Wasatch or Uinta mountain ranges of Utah. The base of the island lies at about 4200 feet (c. 1290 m), and its highest peak is 6649 feet (c. 2050 m). The perimeter of the island hosts a typical desert shrub community but is dominated by salt-tolerant plants of the Goosefoot family (Chenopodiaceae), such as salt bush (*Atriplex*) and greasewood (*Sarcobatus*). The areas we are most interested in, early in the season, are the rocky slopes just above the desert shrubs, particularly those with south and west exposures where bloom comes earliest.

Among the plants we might find blooming early are members of the parsley family (Apiaceae): *Lomatium grayi*, *Cymopterus longipes*, and *C. purpurascens* (photo, p. 139). The adorable yellow bell lily, *Fritillaria pudica*, is definitely worth searching for, but it never seems to bloom in the same spot two years in a row. *Fritillaria atropurpurea* also grows on the island but flowers much later. *Castilleja chromosa*, a brightly colored paintbrush, will just be starting to emerge from the ground. The phlox family (Polemoniaceae) is represented by *Phlox hoodii* and *P. longifolia* (photo, p. 139), which are scattered about. *Claytonia lanceolata*, known as spring beauty, is also an early bloomer on the island; *Lewisia rediviva* (bitterroot) comes later.

The milkvetches (Astragalus, Fabaceae) are among the first to bloom on Stansbury Island. Astragalus beckwithii, A. cibarius, and A. nuttallianus are residents but can't outshine A. utahensis with its showy magenta blossoms and woolly seedpods. The bright orange *Sphaeralcea grossularifolia*, of the mallow family (Malvaceae), should just be appearing at about the same time.

Visiting speakers for the Wasatch NARGS Chapter often arrive in very early spring, when our gardens are still under snow. After Dick Van Reyper suggested Stansbury Island as a place to take them, we have been going there regularly. One day in March several years ago, we took Christopher Grey-Wilson, editor of the AGS journal *The Alpine Gardener*, out to Stansbury Island and showed him the usual sunny locations. However, he wandered over the hill to a north-facing slope and discovered the beautiful violet buttercup, *Ranunculus andersonii* var. *andersonii*, in full bloom (photos, p. 138). Chapter members have subsequently found thousands of them on the island and have shipped the seed around the globe in hopes of bringing it into cultivation. We have had several reports of successful germination, but only one report (by Amber Hern) of bringing it to bloom. This *Ranunculus* goes completely dormant in the extreme heat of the summer, as many other species on the island do.

Later in the spring, during April and May, a new wave of plants starts blooming on the island. The showiest are the sego lily (*Calochortus nuttallii*), leopard lily (*Fritillaria atropurpurea*), and claret-cup cactus (*Echinocereus triglochidiatus*; photo, p. 137). Many yellow composites also flower now; the most interesting is a Great Basin endemic, the Stansbury rock daisy (*Perityle stansburyi*), which grows in limestone cracks.

To get to Stansbury Island, take Interstate Highway 80 from Salt Lake City west to the second Grantsville exit, #84, near the Morton Salt Plant. Follow the diked dirt road north to the island and park at the bicycle trailhead, about an hour's drive. Only the south end of the island is open to the public. The best time to visit is from late February to May. Summer days here are hot and insectridden.

Bill King is a Salt Lake City businessman who enjoys wildflowers. He is program director of the Wasatch Chapter of NARGS and co-chair of the Utah Native Plant Society.

#### Sources

Many of the smaller species that grow among the rocks on the island are gardenworthy but not readily available except as seed or bulbs. *Astragalus utahensis* is grown by some local nurseries and does fine in the garden, but it can die mysteriously almost overnight. Seeds of some of species mentioned, as well as many more Great Basin species, are available from Sally and Tim Walker, Southwestern Native Seed, Box 50503, Tucson, Arizona 85703, catalog \$2; and from Ron Ratko, Northwest Native Seed, 17595 Vierra Canyon Rd, #172, Prunedale, CA 93907-3352, catalog \$3.

# A Xeric Route

### John Stireman

**P**anayoti Kelaidis has written of Wyoming's "bunneries," the dry, windswept, big-sky landscapes with an abundance of plant species growing as "buns," their crowded stems and leaves huddled tight against the earth (see vol. 44, p. 70, of this journal). Among today's rock gardeners (including the Stireman brothers, John and Tony), there is growing interest in such xeric species, especially in the western United States, where woodland plants crisp in June and many alpines melt away during the long, hot summer.

My brother Tony, long interested in Utah native plants and enticed by Panayoti's descriptions, suggested that we do a lightning-fast three-day tour of southwestern Wyoming. With visions of plant buns dancing in my head, I took a wild guess at a date and came up with mid-June. If we missed the flowers, maybe we'd find seed.

We roared out of the Salt Lake valley of Utah on June 15 and made only one stop before reaching Evanston, Wyoming, the first major town on Highway 80. Near the state border, *Lupinus lepidus* was finishing a healthy bloom season. This lupine is of rock garden stature at 6 inches (15 cm) or less, but its light-colored flowers, tucked tight against the hairy stem, are not conspicuous. It is a compelling species for those who love growing (that is, trying to grow) the most difficult plants. There was no ripe seed, saving me the disappointment of failure.

Past Evanston, we turned north on Highway 189 and we made our first real exploratory stop at a rocky ridge near the junction with Wyoming Highway 412. While driving, we watch for barren ridges or slopes; that's usually where the best plants are to be found—for example, *Phlox muscoides*, a bun-forming plant if I ever saw one. The dense, ancient mats of gray grew an inch (2.5 cm) thick and up to a foot (30 cm) across. Judging from the withered flowers and ripening seed capsules, a few weeks earlier those plants had been magnificent patches of snow splashing the rocky ground. Scattered among the phloxes were many plants of *Astragalus simplicifolius*. Inch-long stems held tiny pods ripening over the dense tufts of near-white, linear leaves. The violet pea flowers are small but in proportion with the miniature plants, and the species is among the more easily grown astragali. Hoping the seed was well developed, we pinched off some of the pods.

Another perfect bun-forming xeric is *Arenaria hookeri*, which typically makes hemispherical mounds of quarter-inch spike leaves, nearly as closely packed as the common ground cover called "Irish moss" (*Arenaria balearica*). The 1.5-inch flower stems, which bore half-inch white stars, were now drying and would soon blow free of the bun, leaving a clean plant. In the coming weeks, the buns would yellow as leaves dried for summer dormancy, to green again with fall rains. In the rock garden, *A. hookeri* will remain green though summer with moderate watering.

*Eriogonum shockleyi*, a buckwheat with cream flower puffs just above half-inch mats of tiny, hairy silver leaves, was represented at this site (photo, p. 140), but we wouldn't see it again until we reentered Utah. We found a few *Penstemon caespitosus*, tiny-leaved, ground-hugging, wandering mats of stems still flowering lavender blue in response to a drought-tempering rain the area had experienced a week earlier. A little *Townsendia* species was still opening white-petaled heads. *Cryptantha* species are easy to find at dry mid elevations; here the white forget-menot flowers had finished weeks earlier, and the plants yielded hard ripe seed. Cryptanthas are surprisingly easy to grow from seed and to summer over in pots for fall planting. Once they are planted out in the rock garden, their xeric nature takes over, and one must be careful not to overwater them.

We stopped at several places near Kemmerer and wandered over rocky hills. We found the silver tufts of *Eriogonum ovalifolium* displaying a variety of colors in its waning flowers. In this species, balls of flowers on long, thin stems start out with red tints, open fresh in yellow or white, and finish in buff, brown, yellow, orange, red, or purple. Here, the most striking ones were dark red-purple (photo, p. 139). Waning flowers mean ripening seed, and we gathered some from the finest plants. A second *Eriogonum* species displayed compact foliage reminiscent of *E. shockleyi* but had flowers on stems 1–1.5 inches long: this was *E. caespitosum*, which occurred through most of our Wyoming route on ridges or among dwarfed sagebrush (*Artemisia*). The flowers are yellow, fading to burnt orange and brick red. It's another easy-to-please rock plant, taking its own sweet time forming a mat and adapting to gardens in many parts of North America.

*Penstemon caespitosus* was everywhere, but other species of this showy genus were notably few. Many penstemons seem to disappear during the driest years, and the paucity of flowering *Castilleja* species, the paintbrushes, added further evidence of drought.

*Haplopappus acaulis* forms pleasing mats of sharp-tipped, stiff green leaves and throws up naked stalks, each with a single happy yellow daisy. It is a common species at mid elevations throughout Utah and appeared throughout our threeday trip. I never pass up a chance to collect its seed. It is a slow-growing, longlived, easy plant for the rock garden in our region. It was mixed in some places with *Hymenoxys acaulis*, also bearing yellow daisies and easily distinguished by its more relaxed, very linear leaves. The similar, leafless flower stalks waved maturing seeds 5 inches (12 cm) above the ground. *Hymenoxys acaulis* is widely distributed in the West and varies from one locale to another; the flowers may be sessile or may dance 18 inches (45 cm) high over equally variable foliage. It's another easy and rewarding addition to a sunny rock garden, tolerating regular watering but looking better without it.

The loose-growing *Phlox longifolia* was here, as well as two other small-leafed phloxes that I did not recognize. *Astragalus* species, with the exception of *A. simplicifolius*, were harder to find than expected. One resembled a miniature *Astragalus utahensis* with nearly white foliage and woolly white pods filled with nearly mature seeds.

As we drove north, the landscape flattened into gentle hills and expanses of sagebrush studded with cattle. *Phlox muscoides* and *P. longifolia* (photo, p. 139), mats of antennarias and eriogonums, cryptanthas, erigerons, and yellow composites characterized the small plant community scattered among the sage and surviving the trampling hooves.

Near Fontenelle Reservoir, a dirt road led to a slope of nearly white, heavy soil where we found a large population of the rare starveling milkvetch, *Astragalus jejunus*. The 3-by-3-inch (7.5 cm) mounds of green, pinnate leaves held stems of attractively red-mottled, inflated pods. The few late lavender flowers were small but its general appearance was pleasing. The diminutive growth of nearby physarias and cryptanthas, as well as other common species, reflected the wretched nature of the soil, yet *A. jejunus* seemed happy there and nowhere else.

We camped at Boulder Lake in the foothills of the snow-laden Wind River Range. While an osprey soared overhead, we walked a ridge of volcanic rock. A few bitterroots (*Lewisia rediviva*), leaves already withered and gone, held fat pink buds of deep pink-petaled flowers closed tight for the evening. I enjoy the many variations among astragali, and more grew on that ridge than at other stops, though all were past flowering. Especially nice was a very silvery *Oxytropis*, another legume.

The second day, we drove south on many miles of gravel road and found more *Lewisia rediviva* bravely blooming on heavily grazed, rolling sagebrush hills. As the route became more hilly, we stopped at a high point and found a hillside of thousands of *Penstemon laricifolius* subsp. *laricifolius*. A few plants bloomed with pink flowers on wiry stems over thin, upright leaves. Nonflowering plants so resemble tiny tufts of grass that we might have dismissed them as drought-stricken fodder.

There were no additional findings of interest until, south of Rock Springs on Wyoming Highway 430, a splash of violet caught my eye on a series of road cuts. The plants were *Astragalus aretioides*, as tight and low as *Phlox muscoides*; the largest were 14 inches (35 cm) across. The buns were three-quarters through flowering, the tops covered with dry, bleached flowers and the edges dense with lavender ones. A single plant bore white flowers. I had to spread a mat apart to see the tiny, hairy, three-leaflet foliage that distinguishes this species from single-leaflet *A. spatulatus or A. simplicifolius*. They certainly looked better than the two *A. aretioides* I have in troughs.

At the Colorado border, we leapt off the good pavement onto a better-thanit-looked red gravel road. We camped in the narrows of Irish Canyon, where we found another astragalus and the first decent population of a penstemon other than *P. caespitosus*. The 15-inch (40 cm) plants had dried blue flowers, but their identification was beyond us. The solitary, prickly balls of *Pediocactus simpsonii*, long since finished flowering, were thickly distributed in some rocky openings in the pinyon/juniper woodland, and we took care hiking through them.

Continuing our route through northwestern Colorado, we stopped to explore a windy ridge and collect pods of the *Astragalus simplicifolius* lookalike, *A. spatulatus* (photo, p. 140). There we found an old, dead *Arenaria hookeri* that had grown to a foot across. The taproot was over an inch in diameter. I wondered how puny the roots of my little garden specimens had grown, pampered with far too much water and too little wind.

U.S. Highway 40 brought us, dodging prairie dogs, into Utah. On a slope just west of Vernal, we garnered seeds of *Astragalus*, *Castilleja*, and *Penstemon*. Another stop just east of Duchesne revealed the severity of years of drought. Several years earlier, the white-flowered, silver-leafed *Oxytropis sericea* and the violent pink *Astragalus detritalis* had created a marvelous display; this year, there was no evidence of either species, dead or alive. *O. sericea* had retreated to a nearby wash, along with some astragalus. Huge plants of the twinpod (*Physaria chambersii*) billowed with straw-colored, over-inflated seed capsules in the wash bottom. Most of the twinpods in the Uintah Basin are *Physaria acutifolia* with much smaller pods. The extra moisture in the wash produced magnificent specimens of a number of species, including a foot-wide mound of tiny white flowers. I parted the blossoms to reveal the thready leaves of *Gilia congesta*, a common and usually unimpressive Utah plant. My brother Patrick grew one almost as handsome (photo, p. 140), but it perished in the midst of flowering.

We made one final stop on the way home—near Starvation Reservoir, to look for *Eriogonum tumulosum*, a tiny-leafed buckwheat with nearly sessile white flowers aging plain brown. We found the plants I knew were there, and the flowers were indeed brown in the June heat, but still pleasing on the small, neat mats supported by thick, gnarled roots. Last year was even drier, and the plants never flowered.

We covered too much ground for a three-day trip, although it was botanically rewarding. In 2002, if southwestern Wyoming has a normal or better water year, we will visit the Kemmerer area again, though earlier, and expect to find more diversity by concentrating on a smaller area.

John, Tony, and Patrick Stireman are rock-gardening Utah brothers and members of the Wasatch chapter of NARGS. John is the editor of the Wasatch chapter's newsletter.

#### Sources

Seed of many of the plants mentioned can be purchased from Alplains, Rocky Mountain Rare Plants, and Northwest Native Seed; see their advertisements in the back of this issue.
# A Woodland Walk in Southern Ontario

## Anna Leggatt

The forests in Southern Ontario have been extensively logged, and only remnants of managed woodlots survive. Here, selective removal of larger trees has increased the light reaching the forest floor, resulting in a wide array of native plants.

My favorite area to take visitors to the Toronto area is part of York Regional Forest, just north of the city. There is a network of rides (bridle paths) passing through a variety of habitats. You will find representatives of most of the common local flora, as well as a few rarities. The rides and paths are laid out mostly on a grid system, so if you keep turning right (or keep taking the second right, and so on), you should find your way back to your starting point.

To reach this spot, travel north of Toronto on Highway 404 from Highway 401. Take the Aurora Road, exit 45. Go east toward Ballantrae for 7 kilometers. Just after a "60km" sign, turn left (north) on McCowan Road. After one kilometer, you should see a sign with regulations posted, labeled Hall Tract (this sign is loose and may be missing). After almost 0.5 kilometer, park on the right side of the road by the "70km" sign. Go around a big log and proceed east along a wide track on level ground.

As you walk past mixed woodland, with *Acer saccharum* (sugar maple) dominating, you will find common wildflowers in mid-May. *Trillium grandiflorum* abounds. Blue-purple stalks and leaves of *Caulophyllum thalictroides* (blue cohosh), with tiny flowers, are starting to turn green. Beside the track, *Hepatica acutiloba* and *Sanguinaria canadensis* (bloodroot) form large clumps of leaves. *Erythronium americanum* is dying down. *Viola pubescens* (yellow forest violet) is plentiful. White *Viola canadensis* grows among the planted spruces on the other side of the trail, as does *Maianthemum canadense* (Canada mayflower).

After a few minutes' walk, another track crosses. Turn left, down a narrow, sandy path. Actaea rubra (red baneberry), Aquilegia canadensis, Arisaema triphyllum, the leaves of Claytonia virginiana (spring beauty), various Dentaria species, Hydrophyllum, Polygonatum biflorum, Smilacina racemosa (false Solomon's seal), and Trillium erectum all grow on the west-facing slope. You may find a creamy variant of Trillium erectum and the uncommon Streptopus roseus (twisted stalk). The steeper, shadier east-facing slope provides enough moisture for various ferns: large clumps of *Adiantum pedatum* (maidenhair fern) and *Dryopteris marginalis* (marginal shield fern), and you may find a tiny grape fern, probably *Botrychium dissectum*. The yellow poppies are the exotic *Chelidonium majus* (celandine poppy), not the rare native *Stylophorum diphyllum* (wood poppy).

Return to the main ride and continue east. As the ride curves right, look for a steep path leading to the left. Follow it slowly down a cool northeast slope. *Hepatica acutiloba* is mostly white and pale pink here, some with attractive leaf mottling. *Mitella diphylla* (mitrewort) is abundant.

The bottom of the slope is shady and damp. Turn right and look for the endangered *Medeola virginiana* (cucumber root). There are large patches of *Adiantum pedatum* and *Clintonia borealis* (bead lily) with shiny green leaves. A particularly large-flowered form of *Asarum canadense* (wild ginger; photo, p. 141) grows here. In a clearing, a few steps on, you will find more ferns: *Onoclea sensibilis* (sensitive fern), *Osmunda claytoniana* (interrupted fern), and *Thelypteris noveboracensis* (New York fern). Pink patches of *Polygala paucifolia* (fringed polygala) grow on the sunnier edges of the clearing.

Turn left up the slope. Where the bank is shaded by *Tsuga canadensis* (Eastern hemlock), look for different color forms of *Hepatica*. I once found one that was grayish and had about 16 petals. I now can find neither this nor the variegated *Polygonatum* that had one side of the leaf yellow and the other green. As the path levels, you will find large patches of *Dicentra canadensis* (photo, p. 141). Once we found a fallen log covered with its tubers; the origin of its common name, "squirrel corn," was obvious.

If you turn left at the next crossing, you will find almost at once a large patch of *Waldsteinia fragarioides* (barren strawberry). Retrace your steps or follow a smaller path leading left again, which will take you back. Ignore the first left and continue straight at a staggered path crossing. The second left will eventually take you back to the first crossing on the main ride. You will see more *Dicentra*, *Polygala*, and various violets, as well as club moss.

Other plants in the area include Actaea pachypoda in the usual white form and also the uncommon red-berried forma rubrocarpa, Cornus canadensis (bunchberry), Dicentra cucullaria (Dutchman's breeches), Gaultheria procumbens (wintergreen), Panax quinquefolius (American ginseng), Pyrola elliptica (shinleaf) and Uvularia grandiflora (bellwort).

You may be startled by deer or grouse. Hazards include mosquitoes, poison ivy, and horse manure (but walkers must pick up after their dogs). No motorized vehicles are permitted on the paths, but you may meet one anyway. No plant material of any kind may be removed.

Looking at plants in the wild is very important if you want to grow them successfully in your own garden. Notice which plants form the strongest clumps, and which are the most floriferous. Are there any clues to why this occurs? Can you replicate these plants' conditions in the garden? For example, *Erythronium americanum* flowers best at the base of deciduous trees; perhaps its deep roots cannot develop when they reach the tree roots. The best clumps of *Trillium* grow in hollows, perhaps because these hold a deeper accumulation of leafmold. *Hepatica, Mitella*, and *Aquilegia canadensis* are more frequent on slopes: Is this because of better drainage, or better light? They grow on flat ground in my garden under apple trees. Our ferns are mostly on north- or east-facing slopes or in damper spots. *Clintonia* grows where the soil is always moist, but not waterlogged.

All the plants mentioned in this article (except *Cornus canadensis, Gaultheria procumbens,* and *Pyrola elliptica*) grow in rather light shade. The three exceptions prefer more acidic soils in deeper shade; they are not happy in my raised acidic beds above alkaline soil. *Polygala* seems happy under young trees, probably in a more sandy soil; it often associates with small species of *Carex* (sedge), but I haven't tried this in my wildflower garden. Most of the plants are easy to grow in this region as long as the soil has plenty of leafmold and does not get too dry in summer; this moisture is important even for plants that are dormant in Ontario's muggy summers.

Anna Leggatt is a botanist working for the Toronto and Region Conservation Authority as a nature interpreter. Her Toronto garden hosts some wildflowers obtained through plant rescue, nursery propagation, and seed growing. She also teaches at and writes for the Civic Garden Centre and lectures widely to horticultural groups. Her favorite activity is exploring mountains around the world and photographing the flora.

# Natural Areas in Piedmont North Carolina

## Bobby J. Ward

For both visitors and locals, there are natural areas to savor in the Piedmont region of central North Carolina, within an hour's drive of Raleigh. The Piedmont Plateau embodies topography with gently rounded hills and ridges at elevations from 300 to 600 feet (100–200 meters). The present topography reflects erosion by streams on rocks of unequal resistance, which has produced fascinating outcrops where unique flora and fauna have evolved. The six sites described in this article present particularly interesting topography and flora.

**Flower Hill**, situated in northeastern Johnston County at a juncture of the Piedmont and the Coastal Plain, consists of a 10-acre (4 hectare) tract of northfacing bluffs that rise about 80 feet (24 m) above Moccasin Creek. The site is about 30 miles east of Raleigh, off N.C. Highway 231 and Flower Hill Road. It is open to the public and is owned and managed by the Triangle Land Conservancy, a nonprofit corporation organized to protect natural areas in central North Carolina through purchase or conservation easements. May is a good month to visit; Mother's Day is the traditional time for locals to clamber up the hill.

The main attraction here is a stand of *Rhododendron catawbiense*, the largest easternmost population in North Carolina. The Catawba or purple rhododendron grows on steep (55°) bluffs. Here one can also find chestnut oak (*Quercus montana*), white oak (*Q. alba*), and a few longleaf pines (*Pinus palustris*). One edge of the site has a high canopy of tulip poplar (*Liriodendron tulipifera*). Throughout there is an understory of flowering dogwood (*Cornus florida*) and American holly (*Ilex opaca*).

Visit in spring if you want to see herbaceous plants in bloom along with the rhododendron: Catesby's trillium (*Trillium catesbyi*), trout-lily (*Erythronium umbilicatum*), and wild ginger (*Asarum canadense*). Serviceberry (*Amelanchier canadensis*) and pink azalea (*Rhododendron nudiflorum*) are here, too, but they bloom earlier than the Catawba rhododendron. Scattered about are ferns, such as the locally common broad beech fern (*Thelypteris hexagonoptera = Phegopteris hexagonoptera*).

Wake County contains several flatrocks, which are small areas characterized by exposed rocks with level topography; such sites, scattered throughout North and South Carolina and Georgia, may be very wet or very dry, depending on the time of year. There are two good examples near Raleigh, both outcrops of the geologic formation known as the Rolesville Granite Batholith, a large plug or pluton of granite underneath much of eastern Wake County. **Temple Flat Rock** encompasses 35 acres, but the outcrop itself is an unspoiled one-acre "bare" rock rich in lichens and mosses, sandwort (*Arenaria glabra = Minuartia glabra*), and stonecrop (*Sedum smallii*), whose red sweeps burst open with starry white flowers in mid-spring. Here you will see how "erosion" of bare rocks by lichens has begun to create rudimentary soil for higher plants. In depressions where soil has accumulated, there is rush foil (*Crotonopsis elliptica*), pine-weed (*Hypericum gentianoides*), and beargrass (*Yucca filamentosa*). In the woods adjacent to the rock are wild pink (*Silene caroliniana*), a plant more typical of the Sandhills, and bastard toadflax (*Comandra umbellata*), a partial parasite on the roots of other plants, and *Viola pedata*.

The other flatrock site, known as **The Rocks**, is a ten-acre dry site containing the easternmost outcrop of flat, ground-level granite in North Carolina. Denizens include fameflower (*Talinum teretifolium*); the piedmont false pimpernel (*Lindernia monticola*), an uncommon species in the state; a large population of the rare Small's portulaca (*Portulaca smallii*); and many of the species also found at Temple Flat Rock. Adjacent to the rock grow prickly pear cactus (*Opuntia compressa*), red cedar (*Juniperus virginiana*), and winged elm (*Ulmus alata*).

Temple Flat Rock is located 4 miles northeast of Knightdale. The Rocks is near the small community of Lizard Lick, west of Zebulon. Both sites are managed by the Triangle Land Conservancy. Visits to the two sites are restricted; contact the Conservancy to arrange a guided tour.

There are two "must-see" sites south of Raleigh, near the town of Cary. **Hemlock Bluffs Nature Preserve** is significant because it contains a disjunct population of Canadian hemlock (*Tsuga canadensis*) occurring about 200 miles east of its normal range in the Appalachians. The hemlock coppice, a relict from earlier, cooler times of the Pleistocene, covers about 4 acres and is situated on steep, north-facing bluffs overlooking Swift Creek. The preserve contains other plants with montane affinities: mountain laurel (*Kalmia latifolia*), galax (*Galax aphylla*), chestnut oak (*Quercus montana*), and the saprophytic sweet pinesap (*Monotropsis odorata*). There are at least two orchids on the preserve: showy orchid (*Orchis spectabilis*) and yellow lady's slipper (*Cypripedium calceolus* var. *pubescens*). The mesic hardwood forest community includes beech-dominated slopes (*Fagus americana*) on the 150-acre site. There are two miles of trails and a visitor's center.

The second site nearby is **Swift Creek Bluffs**, 1.5 miles downstream of Hemlock Bluffs. Here on the south bank of Swift Creek, north-facing slopes rise about 100 feet (30 m). The bluffs contain *Hydrangea arborescens*, witch-hazel (*Hamamelis virginiana*), and pagoda or alternate-leafed dogwood (*Cornus alternifolia*). Among the herbaceous plants are bloodroot (*Sanguinaria canadensis*), hepatica (*Hepatica americana*), wild ginger (*Asarum canadense*), numerous ferns, American ginseng (*Panax quinquefolius*), and trilliums (*Trillium sp.*). In the floodplain along Swift Creek there are good specimens of overcup oak (*Quercus lyrata*), a species rare in central North Carolina. Hemlock Bluffs, managed by the Town of Cary, is situated at 2626 Kildaire Farm Road, south of Tryon Road, in Cary. Swift Creek Bluffs, a Triangle Land Conservancy property, is on Holly Springs Road at the Swift Creek bridge in Cary.

White Pines Natural Area is a 250-acre site famous for its large stand of eastern white pine (*Pinus strobus*), a species normally found in the cool mountains of western North Carolina. The site is about 75 miles east of the nearest known natural occurrence of the species and contains individuals that are at least 150 years old. Other disjunct species with cooler, northern associations include the lovely spring ephemeral Dutchman's breeches (*Dicentra cucullaria*), witch-alder (*Fothergilla major*), and Catawba rhododendron. Along the slopes are areas of anemone (*Anemone lancifolia*), black cohosh (*Cimicifuga racemosa*), and foamflower (*Tiarella cordifolia*). The White Pines Natural Area lies at the confluence of two Piedmont rivers, the Deep and the Rocky, which impart steep slopes and promontories to the site. The area, in Chatham County off SR 1958 outside Pittsboro, is managed by the Triangle Land Conservancy.

Many of the plants from these natural areas easily adapt to the rock garden. Asarums, erythroniums, hepatica, tiarellas, sanguinaria, and trilliums grow readily in the deciduous woodland garden, where they take advantage of the spring sun; in particular, the erythroniums and sanguinaria are sometimes agreeble spreaders. In terms of the "rock" areas, the *Minuartia* species is growable in rock gardens, as is the *Talinum teretifolium*, though it is not so showy as some of the western talinums. *Viola pedata*, the birdfoot violet, is a suitable rock garden plant that tolerates dry, rocky areas and requires a sunny location. *Silene caroliniana* grows to a maximum height of 8 inches (20 cm) and is found naturally in open, rocky areas, and thus it is suitable in the rock garden in a wall. Once *Galax* is established, it is a handsome evergreen for the shady rock garden and, in time, can produce a charming ground cover. The elegant broad beech fern is good for a sunny spot in the woodland garden, but can be vigorous.

Besides the trees mentioned, there are plants that will provide structure and architecture to the garden. *Yucca filamentosa* is an adaptable garden plant for a variety of soil conditions, often thriving for years in full sun or light shade. *Kalmia latifolia, Hydrangea arborescens,* and *Hamamelis virginiana* will require more garden expanse but are worthy additions. (I appreciate advice from Mike Chelednik, Julia and Robert MacKintosh, and Dave Stephan on the garden-worthiness of some of the plants described in this article.)

Bobby J. Ward, a botanist, author, and vice president of NARGS, lives and gardens in Raleigh, N.C.

# Plant Portraits

### Claytonia megarhiza

RICK LUPP, Graham, Washington

I first laid eyes on this issue's cover plant, *Claytonia megarhiza* (in its variety *nivalis*) about 30 years ago, while I was climbing on the lower slopes of Ingalls Peak in the Wenatchee Mountains of Washington state. This was some years before I developed a strong interest in alpine plants, but the sheer beauty of this plant stopped me in my tracks; its spoon-shaped leaves formed succulent green rosettes that were almost covered by nearly stemless pink-purple blooms. I unloaded my camera from my pack and took a picture. The fact that this beautiful plant was one of the very few things growing in the stark, barren rock rubble that covered the entire lower reaches of the mountain made this encounter all the more memorable. I suppose that this memory has a lot to do with the fact that I still consider *Claytonia megarhiza* var. *nivalis* the epitome of alpine plants in my part of the world. Since this first encounter, I have come to know and grow other forms of *C. megarhiza*, including the Rocky Mountain form shown on the cover and var. *bellidifolia* (syn. *C. bellidifolia*) from Oregon.

*Claytonia megarhiza* var. *nivalis* takes very well to cultivation in pots and troughs, and in the open when grown in a cool position with excellent drainage. I have had it growing in one of my open sand beds for several years now in a narrow north-facing crevice among rocks. The sand bed is about 30 inches (75 cm) deep and is filled with very coarse washed sand. The bed is lined with a permeable groundcloth that prevents earthworms from introducing humus into the bed, and the liner excludes moles from the bed as well. I fertilize the bed with a very small amount (about one-quarter the manufacturer's recommended low application rate) of encapsulated fertilizer once a year in late winter; the area is not watered after the first year following initial planting. The claytonia has flourished in these conditions and covers itself with 50 or more blooms each year. Nothing in this bed gets covered in the winter, even though we get 50–60 inches (125–180 cm) of precipitation a year, with most falling between October and June.

The type Claytonia megarhiza differs from var. nivalis in several ways, but the

most obvious difference to the grower is in the blooms. While var. *nivalis* has large pink-purple flowers, its cousin from the Rocky Mountains normally has smaller white flowers, although I have grown some plants with pink-tinged or pale pink blooms (like those shown on the cover) as well. Var. *nivalis* forms can also be found with rich pink to very light pink blooms. Another difference is that var. *nivalis* produces more offsets than var. *megarhiza*.

*Claytonia megarhiza* var. *bellidifolia* grows in the Central Cascades of Oregon and makes a smaller plant than either of the other two varieties. It sports masses of small white blooms for a long time during spring and early summer and produces a fair amount of seed, which is a good thing because it does not offset much.

Offsets from both forms root with ease in spring and provide a good way to increase your plants. Simply treat the offsets as you would a *Lewisia* cutting, and you will have no problems rooting them. I get only sporadic germination from *C. megarhiza* seed from all the different varieties, even when it is collected fresh from my own plants. The seed ripens erratically, which makes it difficult to collect, so I have never been able to build up a big stock of the diminutive beauty *C. megarhiza* var. *bellidifolia*.

The specific epithet *megarhiza* means 'large root', and all forms of this species make large taproots that delve deeply into their growing medium in search of nutrients and moisture. Both these large taproots and the succulent foliage are very prone to rot if the plants are not given very sharp drainage. The best way to obtain this drainage in the open is to grow your plants in a rock crevice, as suggested above. Pot- or trough-grown plants should be given a sharp-draining mixture and several inches of coarse grit top-dressing. It is a good idea to clean up pot-grown plants a couple of times a year; the old foliage is very prone to rot as it ages to yellow or brown. Rot in the foliage will soon spread into the roots and kill your plants.

In nature, *Claytonia megarhiza* is usually found growing in north- or east-facing rock rubble or screes, and plants grown in pots or troughs prefer a cool position with good air circulation. I keep my stock plants in flats in a bright position where they do not get direct sun, on the floor of one of my hoop houses, where they remain cool in summer and bloom well. Plants grown in troughs in the open do best with an eastern or northern exposure.

Pests are not a big problem with *Claytonia megarhiza*, although slugs will do a bit of damage to the foliage and blooms if they are not controlled. My biggest problem with growing this plant in the open is rabbits and deer, which both enjoy the succulent foliage. I have found that a little aversion training with rat traps baited with apple slices soon puts an end to this problem.

*Claytonia megarhiza* has somehow acquired a reputation as difficult to please in cultivation. I think, however, that most growers will find it quite a good candidate for the scree or trough, given its few basic needs of very sharp drainage and a cool position.

#### Source

Mt. Tahoma Nursery, 28111 112th Ave. E., Graham, WA 98338 (catalog \$2)

## Callianthemums

BARRIE PORTEOUS, Richmond Hill, Ontario

The name *Callianthemum* is derived from the Greek words *kalli*—'beautiful' and *anthemon* 'flower'. Effusive though Reginald Farrer might have been, it is hard to argue with his comments regarding *Ranunculus rutaefolius* (then the name given to *Callianthemum anemonoides*) in his book *My Rock Garden*: "A prettier flower no one ever beheld. And the leaf too is of the loveliest blue-grey, as succulent and even more glaucous than that of *Ranunculus glacialis*. It is an extraordinarily charming plant, and, after the paradoxical habit of its kind, extremely easy to grow. "

Farrer's last comment may come as a surprise to those who feel that many members of the Ranunculaceae, and callianthemums in particular, are difficult to grow. Nothing could be further from the truth; in my experience, they tend to be floriferous, long-lived plants that can put up with a variety of conditions and are not in the least temperamental.

The first callianthemum I grew—and, in fact, the only one I have seen in the wild—is *C. kernerianum* (photo, p. 143). A native to Monte Baldo near Italy's Lago di Garda, it can be easily found on limestone gravel in early to mid-June, depending on the snow cover, just to the south of the chair lift that runs up from the busy tourist town of Malcesine. In bud it is quite pink, but within a few days, a clean, white daisy-like flower emerges. The oldest of my own plants was obtained in 1991 and now smothers the ground with more than a hundred flowers each spring before the leaves emerge. The reddish stems are one feature that distinguishes this species from other European ones.

Closely allied to *Callianthemum kernerianum* is *C. anemonoides*, an Austrian native (photo, p. 143). There is, in fact, a growing belief that these are one and the same, and that it is only their geographical separation that that has caused them to be viewed as different species. Certainly the form that I grow is one of the most exciting plants in my garden. Early in the spring, bright red buds start to peek out of the ground; within a few days they begin to open, yielding extraordinary red flowers that fade to shimmering pink. It is possible that this unusual color is a result of my growing conditions, which are largely acidic, the plant normally being found in slightly alkaline soil in its native habitat. There are other examples of this within the Ranunculaceae, notably the white and pink variants of *Ranunculus glacialis; R. parnassifolius*, again usually white, is found in a vibrant pinkish red form in the Picos de Europa of Spain.

I am growing on seedlings from several of Joseph Halda's collections of *Callianthemum alatavicum* made in the mid-1990s. This has not yet bloomed here, having taken a number of years to germinate. *C. alatavicum*, found in the Tien Shan range of Central Asia, has white flowers on short to slightly elongated stems.

Callianthemum coriandrifolium, though again perfectly growable, tends to be one of the less exciting members of the genus (photo, p. 143). It is altogether a taller plant with longer flower stems and smaller white flowers, at least in the form that I grow. The same may be said of *C. pimpinelloides*, which has been reported (based on specimens found in the wild in Yunnan) to be not particularly garden-worthy. It may, however, be fairly variable over its wide range from Kashmir through Afghanistan and Tibet into China.

*Callianthemum angustifolium* also has white flowers, although one collection from the Altai Mountains of Central Asia was described by Josef Halda as having a purple eye. Pink forms have reportedly been found as well. In habit, in the garden at least, *C. angustifolium* is similar to *C. coriandrifolium* in that it has lax flower stems that tend to lie along the soil.

*Callianthemum sajanense*, collected by Halda in the Altai during 1994, 1995, and 1997, did not germinate for me. He described it as growing on alpine tundra and bearing huge, adpressed white flowers. *Callianthemum farreri*, with gorgeous china blue flowers, certainly looks worth trying if only seeds were ever available. Found initially by Farrer and named after him, it has been rediscovered by recent expeditions and may be commercially introduced one day.

Callianthemums, like many other members of the Ranunculaceae, are somewhat difficult to grow from stored seed. Nevertheless, this is quite possible, and certainly it is how I obtained all my plants. Perhaps 25 percent of *C. kernerianum*'s flowers get pollinated; on my largest plant, this yields around 250 seeds. Some of these fall to the ground and sprout up as young plants the following spring. My normal procedure for handling seeds obtained from exchanges or expeditions is to sow them in a mixture of Promix and perlite contained in a 3-inch (7.5-cm) pot enclosed in a Ziploc bag. The pots are then placed outside in a shady spot for the rest of the winter. Once spring arrives and we can drive to our vacation property, usually around mid-April, the pots are sunk into a sand bed and left for up to 3 years. Seedlings, once they have had a few months of growth, are transplanted into either troughs or gravel beds.

Because snow in the Muskoka region of Ontario has a pH around 3.5 to 4.0, everything becomes acidic sooner or later, no matter what sort of soil is used initially. The key to success in growing callianthemums is to ensure that there is a long, cool root run with plenty of drainage. The surface layers are made up of chipped granite and coarse sand, while 9–12 inches (22–30 cm) beneath is a layer of soil and composted leaves. I never fertilize the plants—possibly because I am a frugal Scot, but also because I believe that this would create plants whose habit could be completely out of character.

The callianthemums are grown either at our summer property (USDA Zone3b/4a) or at our garden in Toronto (Zone 5a/6b). The former has cool summers and long snowy winters, while the latter has hot muggy summers and milder winters with intermittent snow. In either location, callianthemums seem to thrive. They are a welcome and sometimes spectacular addition to the rock garden.

### Collomia debilis

#### PANAYOTI KELAIDIS, Denver, Colorado

You can look through the hundreds of volumes on alpine plants published over the past century or so and find endless descriptions of *Dianthus alpinus, Primula auricula, Saxifraga paniculata* (née *aizoon*), and a few Americans like *Phlox subulata, Lewisia cotyledon*, and *Iris cristata* delineated at length and with relish. In fact, a sort of iconography of classic alpines occupies a vast proportion of the handbooks on our art, and it is obvious the authors have been looking over one another's shoulders, so to speak, to make sure they haven't left anything essential out. One can hardly blame Graham Stewart Thomas for proclaiming (in *The Rock Garden and Its Plants*, 1989) that all the best plants had already been introduced into gardens: rock garden literature has been quite focused on *Androsace/Campanula/Dianthus/Gentiana/Primula/Saxifraga*, with a little garnishing here and there from lesser genera on the level of *Arabis/Draba/Edraianthus/Soldanella*.

Whenever I thumb through old rock garden tomes, I always marvel at the minimal presence of so many of the plants I enjoy most in nature and the garden: various composites like *Erigeron, Tanacetum*, and *Townsendia*, the infinite variety of *Aethionema, Eriogonum*, and *Veronica*, or the multiplicity of *Iris*. One plant that has thrilled me again and again all over the West (and in my gardens), *Collomia debilis*, essentially does not exist at all in the rock garden literature.

I first saw this gem in Betty Lowry's garden in Renton, Washington, where a fine blue-flowered form that used to be known as variety *trifida* had spread enough to be a bit of a pest. This form is widespread in Idaho, where steep screes can boast thousands of dense mats of this remarkable plant studded with lavender to true blue cups all summer long (photo, p. 142).

The form I first found in nature, however, was once known as variety *ipomoea*, presumably for the brilliant pink, magenta or even nearly crimson flowers that somewhat resembling a morning glory (*Ipomoea*) in form when they open widely (photo, p. 142). Both varieties have been sunk by recent workers into the type variety *debilis*. I first encountered the pink race on steep screes in the redundant Wyoming Mountains of Wyoming. We have since found the same plant elsewhere in that state, and also many places in the Wasatch Range just east of Salt Lake City, Utah.

There are particularly compact races, sometimes classed as separate species, in the Sierra/Cascade ranges; I have neither seen nor grown these. Although the talus and scree slopes in the Middle Rockies harbor tremendous biodiversity, this *Collomia* is such a spectacular plant over a long season that knowledgeable visitors keep their eyes on talus slopes all over the West hoping to find some variant, some new race.

I suspect that *Collomia debilis* would be a common plant in gardens today if it were not afflicted with the habit of unpredictable germination under conventional rock garden seed-sowing methodology. If you obtain seed collected the previous summer and sow it in seed pots in winter, you can almost be sure that nothing will appear the following spring. Another plant restricted to steep, moving screes—*Lamium eriocephalum* from the Toros mountains of southern Turkey—shares with *Collomia* the characteristics of spotty germination and intensely aromatic foliage. Both taxa respond to gibberelin (GA3) treatment. We have found that both sometimes germinate quite well if sown in a sterile potting mix and grown in a greenhouse. Once you have raised seedlings and got the plants growing in a properly constructed rock garden, *Collomia debilis* can persist for several years, blooming from late spring through the entire summer season.

Both *Lamium eriocephalum* and *Collomia debilis* are capable of becoming minor pests in the garden, popping up far from the parent plants and sometimes growing thickly enough to smother smaller neighbors. Seedlings that appear in the garden can be potted up and grown on in pots for a while until they reestablish, and then planted elsewhere or given away to continue the process of domesticating one of America's showiest unknown plants.

#### Source

Seed of *Collomia debilis* is offered by Alplains, P.O. Box 489, Kiowa, CO 80117; catalog \$3.

### Roscoea cautleoides

RICHARD WILFORD, Royal Botanic Gardens, Kew, England

The pointed shoots of *Roscoea cautleoides* (photos, p. 144) pushing through the soil are an indication that spring is nearly over and summer is not far around the corner. This genus of exotic-looking perennials brings some welcome summer color to the rock garden, and *R. cautleoides* is usually the first to make an appearance. The buds soon protrude from the tips of the emerging shoots, and in no time at all the first lemon-yellow flowers are open. The flowers consist of two narrow lateral petals, a single hooded upper petal, and a large drooping lower petal, over 1 inch (2.5 cm) long, that is notched and wrinkled, giving it the appearance of crumpled tissue paper. Two or more of these flowers can be open at any one time, and more blooms continue to open as the stem grows taller and the narrow leaves lengthen.

Some forms of *R. cautleoides* emerge a little later and may not flower until midsummer, by which time the peduncle (flower stem) can be over a foot (30 cm) tall. There are purple forms of this species in cultivation, which flower in the summer; white and pink forms are also known, but it is the yellow variety that is usually the first to bloom in the garden, sometimes as early as late April.

It has been nearly 200 years since the genus *Roscoea* was formally described by the English botanist James Edward Smith, the first president of the Linnean Society of London, which he founded in 1788. Smith described the first species in this genus, the Himalayan *R. purpurea*, in 1806, in the second volume of his

*Exotic Botany.* He named the genus after William Roscoe, one of the founders of the Liverpool Botanic Garden and an expert on the ginger family (Zingiberaceae), to which *Roscoea* belongs.

There are now around 19 known species of *Roscoea*, occurring along the Himalaya and into Western China. The Chinese *R. cautleoides* is found in the provinces of Yunnan and Sichuan, growing in open meadows, scrub, and forests, and on rocky slopes, up to 11,500 feet (3500 m) above sea level. This species was first described in 1902 by the French botanist François Gagnepain, from specimens collected in 1883 by the missionary Père Jean Marie Delavay, near Dali in Yunnan. The specific epithet means "resembling a *Cautleya*," a genus of yellow- or orange-flowered plants also in the Zingiberaceae, and is sometimes spelled *cautleyoides*. Both spellings are acceptable, but *cautleoides* seems to be the preferred option and is the one favored by Jill Cowley in her revision of the genus, published in the *Kew Bulletin* in 1982.

Roscoeas are herbaceous perennials that die down in the fall to a small rhizome with tuberous roots. New shoots appear above ground from late spring, but some species, such as *R. purpurea*, may not show until well into summer. The leaves of roscoeas are wrapped around each other at the base, forming a false stem, and the flowers emerge from the top of the plant, held on a peduncle. The peduncle can be very short and hidden among the leaf sheaths so that the flowers peer over the top of the false stem, or it may be clearly exserted and hold the head of flowers well above the leaves.

The flowers of *R. cautleoides* are held on a peduncle that gradually elongates through the season. The first flowers may be held only a few inches above ground and open when the leaves are just developing, but the peduncle grows remarkably quickly and in a couple of weeks it can be 12 in. (30 cm) long. Forms of this species that don't begin flowering until the middle of summer produce their flowers at the end of a long peduncle, by which time the leaves have also grown several inches. The three or four leaves will eventually reach over a foot long but are rarely more than an inch (2.5 cm) wide.

*Roscoea cautleoides* is more amenable to cultivation than some other species and consequently is one of the best-known and most widely available roscoeas. It even tolerates dry periods during its growing season, but ideally the soil should be kept moist throughout the summer. It prefers a cool position but can cope with plenty of sunshine if you provide some shade at the roots by placing it close to rocks or small shrubs, or planting among low-growing perennials. If it is planted in too much shade, however, the stems will become etiolated and drawn upward as they reach for the light, eventually flopping over. A deep, moistureretentive but well-drained soil is required so that the soil is never waterlogged during the plant's winter dormancy. Good drainage is especially important in areas with heavy winter rainfall.

Roscoea cautleoides is a hardy plant that can be grown outside in areas with winter temperatures as low as  $-10^{\circ}$ F ( $-24^{\circ}$ C), or even  $-20^{\circ}$ F ( $-29^{\circ}$ C) if there is reliable snow cover; after such cold winters, however, the shoots may not emerge until June or July. It is best to plant the rhizomes at least 6 inches (15 cm) below

the soil surface to help protect them from the cold in winter and from drying out in summer.

The easiest way to propagate *R. cautleoides* is by division of established clumps. Plants gradually increase underground, sending up new shoots in the spring and eventually forming bold groups. As the leaves begin to brown in late summer, lift the roots and clean away the soil. Carefully pull the brittle roots apart, separating the individual crowns, each with its cluster of fleshy roots. They can then be spaced out and replanted to increase the size of the colony.

Raising new plants from seed is another common method of propagation. The seed pods of *R. cautleoides* are held up high at the end of the peduncle, in contrast to some other species, such as *R. purpurea* and *R. tibetica*, which hold their seeds deep inside the upper leaf sheaths. As the seed pods open in late summer, collect the rounded, brown seeds before they fall to the ground. They are best sown fresh in the fall but can be sown until late winter. Use a moisture-retentive but free-draining soil mix and cover the seed to a depth roughly equal to its diameter. Place the pot in a frame that is closed only during heavy rainfall or freezing temperatures, and don't let the pot dry out. In areas with very cold winters, the seed may benefit from the extra protection of a greenhouse. Germination usually takes place in late spring or early summer.

The seedlings should be potted up individually as soon as they are large enough to handle and before their roots become entangled. Grow them on somewhere light and cool and keep the soil moist. They should be potted on the following winter or, if growth is strong, they can be planted out in the fall. They may send up a few flowers in their second season, but as they grow older the plants will become larger, more vigorous, and more floriferous.

Hybrids in roscoeas are not uncommon, and *R. cautleoides* is thought to be one of the parents of *R.* 'Beesiana'. The other parent is probably the purple-flowered Himalayan *R. auriculata*; the hybrid resembles this parent but has the exserted peduncle of *R. cautleoides*. The flowers are pale yellow with varying amounts of purple flush, particularly on the lower petal. Another probable hybrid is *R.* 'Kew Beauty', which was found growing on the rock garden at Kew in 1939 and was originally named *R. cautleoides* 'Grandiflora'. The other parent is most likely to be another early flowering species, the Chinese *R. humeana*. 'Kew Beauty' is similar to *R. cautleoides*, but the leaves are wider, the peduncle is shorter, and the flowers have a wide, hooded upper petal. This is a strong, vigorous plant that produces its bright, soft yellow flowers over several weeks in late spring.

#### Source

Collector's Nursery, 16804 N.E. 102nd Ave., Battle Ground, WA 98604. <a href="http://www.collecgorsnursery.com">http://www.collecgorsnursery.com</a> (Catalog \$3)



NARGS 2001 tour group (p. 83) on a ridge between Angel Lake and Smith's Lake in Nevada's East Humboldt Range, with the Clover Creek basin in the distance. (T. C. Cochrane)

Angel Lake, looking south across Gray's Peak cirque to 10,000-foot-high Chimney Rock. (T. C. Cochrane)





Eriogonum caespitosum (p. 87) in Lamoille Canyon, Ruby Mountains. (T. C. Cochrane)

*Gentiana calycosa* (p. 88) along the creek flowing out of Dollar Lakes in the Ruby Mountains. (Ted Kipping)





Castilleja nana (p. 92) in Wheeler Peak cirque in Nevada's Snake Range. (T. C. Cochrane)

Astragalus kentrophyta (p. 131) with Selaginella watsonii, Wheeler Peak. (T. C. Cochrane)





A mat of *Petrophytum caespitosum* (p. 89) and tufts of *Ivesia baileyi* near Liberty Pass in the Ruby Mountains. (Ted Kipping)

Left: Parnassia fimbriata (p. 88), a large-flowered species found in moist places among the West's arid mountains, in Lamoille Canyon. (T. Kipping) Right: Antennaria umbrinella grows in the dry scree above Lamoille Canyon. (T. Kipping)





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The Kern River Canyon (p. 94). (Andrew Osyany)

Silene californica (p. 101) in Sequoia National Forest, California. (A. Osyany)





Left: *Penstemon centranthifolius* (p. 97) in Anza Borrego Desert State Park near San Diego, California. (A. Osyany)

Below left: *Mimulus bigelovii* (p. 97) near Blythe, California. (A. Osyany)

Below right: *Nama demissum* (p. 96) near Needles, California. (A. Osyany)







Left: The robust *Triteleia ixioides* subsp. *scabra* in Sequoia National Forest, California (p. 98). (A. Osyany)

Right: An annual *Camissonia* (p. 99) in Wilson Valley in the southern Sierra Nevada closely resembles its relative *Oenothera*. (A. Osyany)

Left: *Phoenicaulis cheiranthoides* (p. 105) is a large-flowered, gray-leaved crucifer common on the Columbia Plateau. (Jay Lunn)

Right: *Lithophragma parviflora* (p. 105), photographed in the Columbia Gorge, is also common along Oregon's Deschutes River. (Jay Lunn)







Penstemon virens (p. 107) on Guanella Pass, Colorado. (Cindy Nelson-Nold)



Castilleja rhexifolia (p. 107), Guanella Pass. (C. Nelson-Nold)



*Echinocereus triglochidiatus* (p. 110) on Stansbury Island, Utah, with the Great Salt Lake in the background. (W. H. King)



Ranunculus andersonii (p. 110) and its typical habitat on Stansbury Island in the Great Salt Lake, Utah. (W. H. King)





*Cymopterus purpurascens* (right; p. 109) and *Phlox longifolia* (left; pp. 105, 109), photographed on Stansbury Island, Utah, are widespread in the arid intermountain West. (W. H. King)

A fine red form of *Eriogonum ovalifolium* (p. 112) near Starvation Reservoir in the Uinta Basin. (John Stireman)





Left: *Physaria chambersii* (p. 114) in the garden of Patrick Stireman, Salt Lake City, Utah. (J. Stireman) Right: *Eriogonum shockleyi* (p. 112) is another Uinta Basin buckwheat. (J. Stireman)

Left: Thelosperma subnudum clings to a tiny pocket of soil near Starvation Reservoir. (J. Stireman) Right: Astragalus spatulatus (p. 114) in the Uinta Basin. (J. Stireman)





Dicentra canadensis (p. 116) and Asarum canadense (p. 116) in York Regional Forest near Toronto, Ontario. (Anna Leggatt)





Left: *Erythronium americanum* is a denizen of woodlands in the North Carolina Piedmont (p. 118). (Courtesy of Triangle Land Conservancy)

Below: Two races of *Collomia debilis* (p. 125) show distinct colors in the wild. (Panayoti Kelaidis)





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*Callianthemum coriandrifolium* (left; p. 124) and *Callianthemum kernerianum* (right; p. 123) in the Porteous garden. (B. Porteous)



Callianthemum anemonoides (p. 123) in the Ontario garden of Barrie Porteous. (Barrie Porteous)



Yellow and purple forms of Roscoea cautleoides (p. 126). (Richard Wilford)





### Iris bucharica

#### GERALD TAAFFE, Ottawa, Ontario

Early spring in my cold Zone 4 garden brings the welcome sight of *Iris bucharica* (photo, p. 144) emerging in densely packed little sheaves of wedge-shaped leaves, each sheaf parted down the middle as neatly as an old-fashioned haircut. Over the next few weeks the leaves expand, bright green and glossy, and flower buds emerge from the upper leaf axils and open in a burst of glory.

Each of the dozens of stems, 25–35 cm (10–14 inches) high, produces five or six thick-textured flowers with 5-cm-long (2-inch) perianth tubes. They are a waxy-looking, translucent white, except for prominent bright yellow blades on the falls, which are complicated deliciously by a ridge and irregular darker markings. The flowers look downright edible, putting me in mind of window displays in elegant pastry shops in Venice or Vienna.

*Iris bucharica* increases nicely in the garden. The two 10-bulb patches that I planted about six years ago have multiplied several times over. They seem happy in a very well drained bed topped with 10 inches of very coarse sand and exposed to full sun. By contrast, a planting at the base of a rocky slope eventually died out after a long spell of wet spring weather. (I haven't grown the yellow-flowered form of this species, often wrongly labeled as *I. orchioides*, but others tell me it is just as easygoing.)

One of the few caveats is that, like others in subgenus *Scorpiris*, or Juno iris, it has fleshy, brittle roots attached to the bulbs that have to be handled with care at planting time. More serious is that the plant begins to go dormant soon after flowering; not unlike the spring growth of many colchicums, it gets downright ugly before fading away.

Like many of the 55 or so species of Junos, *I. bucharica* is native to arid lands and hills of Central Asia. The name comes from the ancient Silk Road city of Bukhara, the last important stop before fabled Samarkand. Unlike most of the others in the subgenus, though, this Juno adapts willingly to the open garden. *I. magnifica* and *I. aucheri*, with pale blue or violet flowers, have also done well for me in the garden, but two other supposedly easy Junos, *I. graeberiana* and *I. warleyensis*, lasted only one season.

The flourishing growth of *I. bucharica* in the garden more than makes up for the recalcitrance of its harder-to-grow cousins. Like Pamino in *The Magic Flute* and his cherished locket with the lovely Pamina's portrait, I fell in love at first sight of a picture of this plant with the glossy leaves in perfect balance with spunsugar flowers. In the garden it has, if anything, exceeded the high expectations stirred by the photo.

#### Sources

*Iris bucharica* is available through many mass-market Dutch bulb catalogs, shipped dormant in fall. See also the lists of Potterton & Martin and Odyssey Bulbs, addresses in the advertising section of this issue.

# Books

**Bulbs of North America.** Edited by Jane McGary. Portland: Timber Press and the North American Rock Garden Society, 2001. ISBN 0-88192-511-X. 251 pp., 101 color photos. Hb, \$34.95. Available from the NARGS Book Service at a reduced price.

Reviewed by HAROLD KOOPOWITZ, Santa Ana, California

My name is Harold Koopowitz and I am a bulboholic. Not only do I grow considerable numbers of bulbous species, but I breed bulbous plants and I collect books on bulbs. It was therefore with great delight that I saw the publication of *Bulbs of North America*, because there has always been a dearth of information about those plants, and few people realize how rich North America, especially the West, is in geophytes (plants that spend part of their life cycle as underground storage organs such as bulbs, corms, and tubers). The literature on our North American bulbs has always been scattered and difficult to find.

In this book Jane McGary has assembled a fine team of experts, and with the exception of trilliums, irises, and North American orchids (for which there exist many monographs), all the major and minor monocotyledonous genera are covered. Now for the first time we have most of the information that plant enthusiasts need collated into one collection.

The book is arranged as a series of chapters, each devoted either to a single genus or larger group, depending on the size of each taxon. Thus, there are separate chapters for *Allium, Calochortus, Erythronium, Fritillaria*, and *Lilium*. Other chapters cover Amaryllidaceae, Iridaceae (exclusive of *Iris*), and the *Brodiaea* alliance. The remaining species are in three chapters, divided geographically into Eastern North America, the Northwest, and the Southwest. Each chapter lists the various species, with descriptions and cultural hints, and every chapter has its own bibliography for those who wish to chase some of the information back to its original sources.

The chapter on alliums is a joint work by Mark McDonough, Jim Robinett, and Georgie Robinett. They describe more than 90 species, giving the geographical range, flower color, and size of the umbel, and often the diagnostic features. Other members of the Alliaceae—*Bloomeria*, *Brodiaea*, *Dichelostemma*, and *Triteleia*—are dealt with in a chapter by Parker Sanderson and Jane McGary. There is a key that lets one distinguish between these genera, and there are also some nice line drawings that point out their distinguishing features.

The chapter on *Calochortus* by Frank Callahan covers 36 pages and enumerates 71 species and 15 distinct varieties. Well written, it covers the intricacies of these unusual flowers and ends with a section on their cultivation. It is nice to find a detailed yet succinct treatment of this group. Molly Grothaus contributed a chapter on the North American erythroniums, dealing first with the western and then the eastern species. Once again, it is good to have all these descriptions in a single place. The 20 American *Fritillaria* species are covered by David King, who also gives a fairly detailed exposition on their culture. Edward A. McRae is responsible for the chapter on *Lilium*. He covers this group thoroughly, even describing bulbs and underground growth habits in some detail. The remaining chapters deal with a miscellany of species.

One of the features that comes through in the writing is the intense personal experience that each writer brings to his or her chapter. One has no doubt that these people know what they are writing about—something that is not always evident when authors assemble encyclopedic works on bulbs. Even if they have not grown every species described, they have experience in cultivating a large number of the species.

If there is a weakness in the book, it lies with the color illustrations. Although most of them are excellent and many are of species that are not often illustrated, not all species have photographs. All the pictures are ganged together in the center of the book. This, of course, makes the book cheaper to produce and allows the publishers to sell it at a reasonable price, but it would have been nicer if the pictures were associated with the descriptions and all the species were illustrated. Many of the pictures, however, are stunning, and they are sure to ignite dormant interest in our native bulbs.

The North American Rock Garden Society and Timber Press must be congratulated on bringing this book to fruition. It does the society proud and it does the editor proud as well. This book is a must for rock garden and alpine gardeners and also for bulb aficionados, and it needs to be in every serious plant enthusiast's library.



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