ROCK GARDEN

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COVER: *Meconopsis horridula*
by Rhonda Williams, Wasilla, Alaska

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ROCK GARDEN QUARTERLY

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FEATURES

DEPARTMENTS

 Alpine Rock Garden at Bellevue Botanical Gardens at one year after construction

A Public Rock Garden: How?

The Alpine Rock Garden at Bellevue

by Micheal Moshier

After Steve Klass asked "Why a Public Rock Garden?" and so succinctly answered his own questions in the Fall 1999 *Quarterly*, now is an opportune time to discuss the construction of such a garden. In short, this article describes the "how" of a public rock garden, the process of the design and construction of the Alpine Rock Garden at the Bellevue Botanical Garden (BBG), Wilburton Hill Park, in Bellevue, Washington, that state's second largest city.

Just as Steve did not suggest that his list of reasons why was all inclusive (although indeed I found no omissions), I will, likewise, not suggest this article answers all the "how-tos", or that it is the correct or only way to undertake such a project, for there are many variations on the theme. For the most part, what has been written on the subject has been directed toward the smaller, private alpine garden enthusiast with a simple, back- or front-yard approach and what can reasonably be built on a small scale. Though the basic techniques of construction may be very similar, the issues of scale and public exposure do present unique considerations and challenges. We will explore some of these issues as the story of this garden unfolds.

Politics and Procedure

Before we lift a shovel or even move one stone, we must recognize the very important fact that we are talking about a *public* garden. What this means, in very general terms, is that its financial support, tosome degree, comes from taxpayer dollars. Many botanical gardens (and arboreta) are located on park property owned and operated by a municipal entity: a city, county, state, or even federal government. Those situated on public educational system properties, such as a state college or university, fit into this category as well. And as tax dollars may be shy in finding their way to public gardens, another entity, a nonprofit society or foundation dedicated to the support of the garden, may become a major player in the overall garden support structure. Without these associated societies or foundations of very hard working and dedicated individuals who volunteer their time, energy, expertise, and most importantly, *raise money*, the beauty of public gardens, as

we know them, would not exist. Overall support and management for a garden can come from any number and combination of the above groups working in partnership.

All that being said, the Bellevue Botanical Garden Alpine Rock Garden (BBGARG) is a cooperative venture of the Bellevue Botanical Garden Society (BBGS) and the City of Bellevue Parks and Community Services Department.

A very thorough design process is strongly advised and for this project was required. Design drawings and blueprints are the map and directions to the finished garden. Besides providing construction details and specifications and arriving at a necessarily accurate cost estimate, they supply building contractors with information required to successfully bid a project and guide them through construction. In addition to blueprints, three-dimensional drawings, an artist's concept of the finished garden, were created to serve as tools to promote the project and serve as fundraising tools.

The City required that the necessary funds be raised before construction could begin. A volunteer task force of knowledgeable rock gardeners, whose wisdom and understanding were indispensable in formulating the design concept, formed to assist this designer in developing a vision for the garden. As this vision began to unfold, fundraising efforts began in earnest. Under the persistent and determined leadership of BBGS and NARGS Northwestern Chapter member Nell Scott, in whose honor the garden is dedicated, over $85,000 was raised in less than two years. By the end of this time, with money in hand and drawings completed, a contractor was selected, and construction began.

At this point, it would be helpful to clarify a few things and offer a few personal observations. By Bellevue City law public projects exceeding $25,000 must be advertised and are subject to an open bidding process by contractors. This rule may vary with different government jurisdictions. It may also be required that the lowest bid be accepted. Ideally, the designer is a licensed contractor, submits a reasonable bid, and is awarded the contract. Knowing very well that there were many contractors other than myself far more capable of bulldozing around hundreds of yards of soil and tons of rock, I declined to bid. As well, to avoid any perception of conflict of interest as a BBGS Board Member, I took leave of absence from that Board until the contracts were signed. It was agreed upon by the City and the Society that, as the designer, I would be retained as a consultant to the contractor during construction of the project, to insure it was built according to design and specification. Complex as all this may seem, it was our situation. We worked our way through this veritable mine field very carefully, thoughtfully, and slowly.

At last, let us start moving some soil and rock! However, let's not be too anxious with a shovel. First, we need a bulldozer.

Site

A bowl-shaped, north-facing hillside adjacent to the East Entry Patio was selected for the location of the garden. Offering exposures ranging from northwest to northeast, the site was ideal except that it was too steep. This required that the "toe", or bottom of the slope, be moved northward a considerable distance, decreasing the angle and allowing the width of the new garden to be approximately doubled. The site was limited on the east and west by existing pathways. The most important blueprint drawing for this phase was one that illustrated the

Figure 1
solid line: finished contour
dashed line: preexisting grade
dotted line: new subsurface contour

grade, new sub-surface contour, and finished grade, with all existing and proposed elevations of the garden. Sample cross sections of the garden, viewed from the side, illustrated the relationship of these elevations for the contractor's reference. **(See fig. 1)** A professionally prepared site survey by an engineering firm served as the basis for this drawing. Since the finished garden would not rise in height much above the elevation of the East Entry Patio and no higher than the elevations along both adjacent pathways, the upper areas were excavated to a depth of nearly 2', the excess soil being bulldozed down to form the sub-surface of the extended toe. After much fine tuning, constantly surveying for elevation accuracy, our very capable contractor, Ellroy Oster of Pacific Earth Works, Monroe, Washington, completed the subsurface exactly as specified.

Soil

The next step was the addition of the soil mix, and probably no other aspect of the garden's planning and construction required more careful consideration. Not only did the soil have to be suitable for successfully growing alpines, it had to be composed of ingredients that were readily available in sufficient quantities. It had to be weed- and seed-free, have the right qualities for aeration and drainage, be mixed in the desired proportions, and have suitable texture. Since the garden is a little over 6,000 square feet in size, to insure a planting medium 14–18" in depth over 300 cubic yards of soil mix was required. As there are no commercial ready-mixed soils available that meet the requirements for growing alpines, a custom soil mix was created. Three ingredients were chosen.

A 3/8", screened, washed, crushed rock made up the largest proportion of the mix, 50%. (It might be noted here that rock is usually sold by the ton and soil by the yard. To insure correct ratios, keep in mind that rock is generally heavier than soil, and ask your rock supplier the conversion ratio of tons to yards when calculating required amounts of ingredients. Ratios are normally calculated by volume, not by weight. Many rock yards measure gravel in tons, soil by the cubic yard.) This material proved most

commonly 5/8" in size and larger. The crushed rock made up the largest proportion of the soil, so its texture was an important consideration; even 5/8" gravel has a coarse appearance. After much searching, a 3/8" material was located. It is important to find rock that is washed and screened. Unwashed and unscreened material is full of "tails" or "fines," smaller-size stone, sand, and soil. While suitable for packing well on paths or driveways, the smaller particles may wash down into the mix and settle into a thick, hard, often soggy layer that can clog the soil, interfering with drainage and aeration. Rounded materials, such as pea gravel, are to be avoided as well, as they are not stable underfoot or on slopes. An order of 150 tons (or yards) may be large enough to make a special order from a quarry possible.

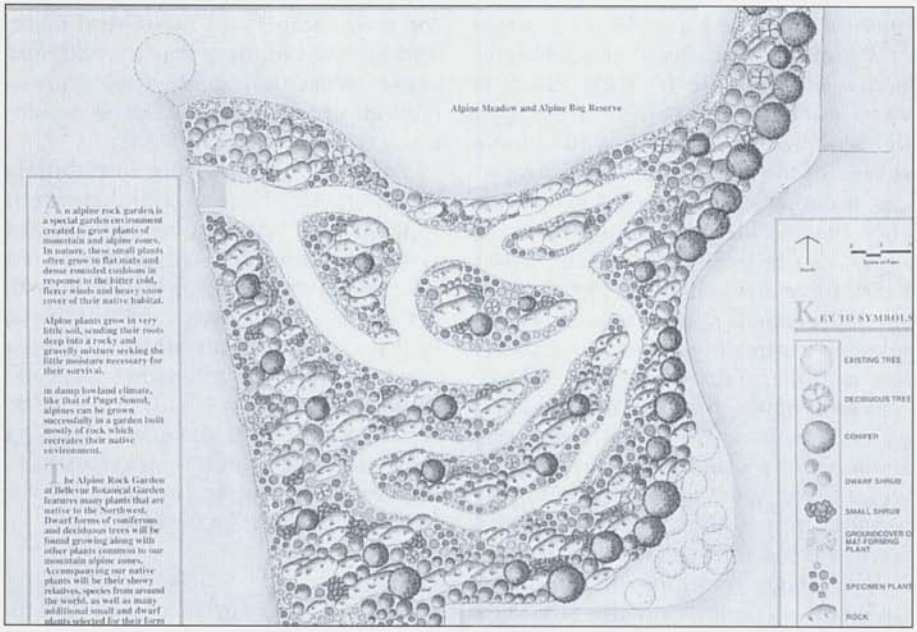
To help insure aeration, create a light soil, and obtain fast drainage as well as good moisture retention, 20% of the mix is comprised of pumice. Light in color, it blends well with the overall growing medium and the larger rock. The pumice was difficult to find, but we were able to special-order 60 yards from a large company that purchases it by the trainload from quarries in eastern Oregon for use in bagged potting soil mixes. Though the pumice was probably not necessary, it most certainly has had a great deal to do with the success of the soil mix, as demonstrated by the vigor and health of the plants in the rock garden.

Last, but not least, is the organic component of the garden's soil mix. At only 30% of the total volume, the amount needed was 90 cubic yards. Landscape supply companies carry a large number of blends and mixes composed of many different ingredients. Sandy loams, wood-chips-and-manure, compost, or other combination soils may all work as a suitable component, but our choice had to be available, consistent, clean, and, most importantly, weed- and seed-free. Despite claims of soil companies, that is a tall order to fill. There was, however, an ideal product available. A local company produces a material called Cedar Grove Compost that is made from the City of Seattle's Clean Green Program. Seattle collects garden waste separately from other refuse. This material is ground, screened, and composted hot and long enough to be sold "guaranteed weed-free." After four years of observing the mix, I would not argue with this claim. Indeed, though there are constantly weeds to pull in the garden I would say nearly all the seed has blown in.

All the soil ingredients were thoroughly mixed by a soils contractor, delivered by the truckload, dumped adjacent to the garden site, and then distributed, with a frontloader, evenly throughout the garden, to the required depth.

Rocks

And, yes, this certainly is a *rock* garden. The most common garden building stones in the Northwest are basalt and granite. Both are in plentiful supply, and either would have been appropriate. For a variety of reasons, mostly aesthetic, the latter was chosen. First of all, basalt is, for the most part, very hard, so it is blasted into pieces in a quarry, and then sorted by size into piles. Fractured and irregular, it has a rather rugged nature, but doesn't appear natural or weathered. It is most suitable for building retaining walls, a landscape device for which the Puget Sound region is famous. It was most important that the garden not even come close to this retaining wall appearance; local rock gardeners have faithfully and painstakingly endeavored to distinguish between this style,



Above, preliminary two-dimensional design drawing of the Alpine Rock Garden (photo, Micheal Moshier); below, aerial photo of the garden taken to provide the grid for recording plantings (photo, Soundview Aerial Photograpy)

referred to here as a rockery, and that of a rock garden. Another consideration is the color of the rock. Basalt is very dark, and against the much lighter-hued soil mix, it would have stood out too much and given the garden a contrasting, polka-dot appearance that would be visually distracting. Granite boulders, on the other hand, have a much softer appearance, since the majority of available rock is selected from the surface, and therefore is more rounded, eroded, and natural-looking. Lighter in color, it blended very well with the soil mix. Over 300 tons, of rocks, varying in size and weight, some up to a ton or more in weight, some with mosses and lichens, were selected for the garden.

With large, hydraulic-lift-equipped, rock-setting trucks on the site, as a truckload of stone arrived, the stones were each picked carefully from the truck one at a time and set carefully into the soil. This was a critical phase of construction. Though more time-consuming than simply dumping the rock, this individual handling of rocks prevents them from being scarred and broken. It is advisable that this part of the construction process be given more than enough time and budget to be executed carefully and thoughtfully. It is also wise to select only the best of local rock-building companies, making sure the workers are sensitive to your design specifications and intent and will willingly and cheerfully work in cooperation with the garden designer or other persons in charge of rock placement. It is not enough to just say that an artist's eye is needed, but the persons involved need to be experienced and have some knowledge of how rock looks in nature. This can be, and was in our case, an exciting team effort. Credit here must be given to the great work crews from Marenakos Rock Center of Fall City, Washington, for their careful and thoughtful labor, and their willingness to work with and satisfy what they might have considered an uppity, city landscape designer.

I will not attempt here to elaborate on the much discussed and debated topic of rock setting. One suggestion I will make, however, is that there is not necessarily one right or wrong way to set a rock. Some ways, or only one, will look better than others. Agonize too long over the multitude of possibilities, and the rock will *never* work, regardless of what one does. Choose a way, decisively and with conviction, and move along to the next. Three hundred tons is a lot of rock.

Paths

Essential, of course, for a successful garden experience, is the location and configuration of pathways and the accessibility of the garden to the public. Keep in mind that by federal law the Americans with Disabilities Act (ADA) requires that all public facilities, including gardens, meet ADA standards for accessibility by handicapped, or physically challenged, persons. Not all paths must conform to these regulations, but enough must to provide reasonable access for all to enjoy the garden. Major paths in the BBGARG are wide enough for a wheelchair to turn around on and are no steeper than a 5% grade.

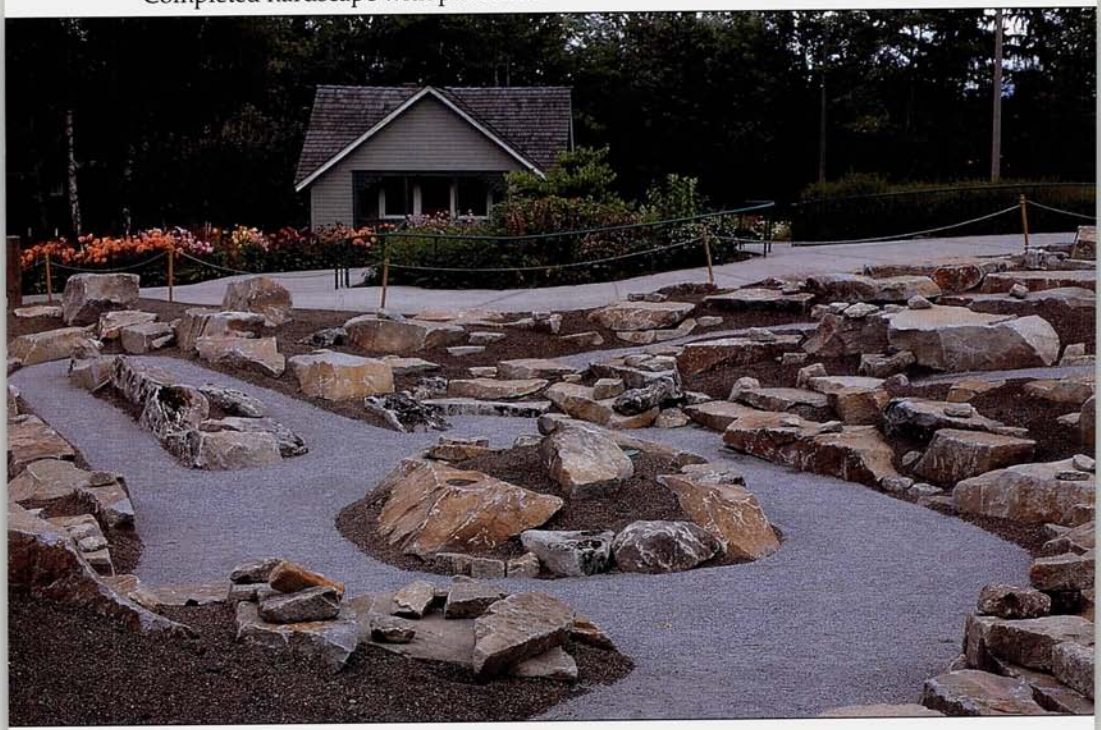
It seems that no matter how a garden is laid out and how well pathways are defined, people will still choose their own direction. It is nearly impossible to anticipate this in theory or on paper in advance. Sometimes it is best to see how a garden is accessed over a period of time after construction, and then make adjustments to existing paths accordingly. In a garden's infancy, massing plants and utilizing larger specimens can be helpful

Site of the Alpine Rock Garden at Bellevue Botanical Garden before construction

Preparing the subsurface contour of the garden photos, Micheal Moshier

Completed stonework

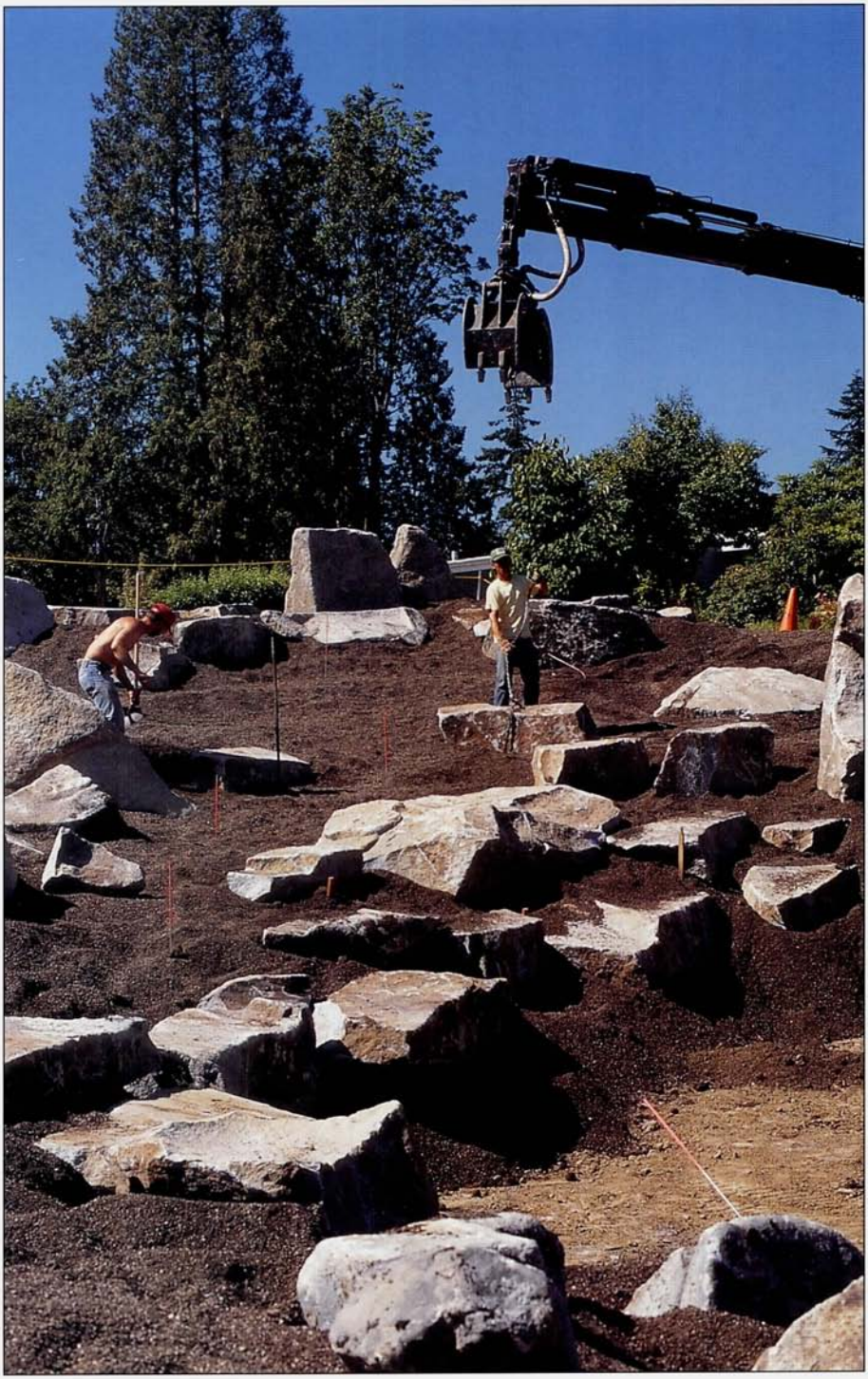
Completed hardscape with path detail



Volunteers planting the Alpine Rock Garden

One year after planting

photos, Micheal Moshier



 Placing rock at the Alpine Rock Garden
Micheal Moshier

in difficult spots where you need to discourage shortcuts and protect tiny plants from wanderers. In time, as plants mature and spread, it is easier for people to understand where, and where not, to walk. Broad, well-defined paths allow for a better sense of direction. Visitors will want to sit and enjoy the garden and will find their own spots if none are provided for them. This is what one recent contributor to Alpine-L referred to as preventive "traffic control." A few conveniently located stones, with no plantings at their base, alongside a path may help people choose the right road. Planting at the base of welcoming, comfortable-appearing rocks only invites repeated damage to plants.

Choice of a contrasting path material can be very helpful. Path surfaces of the same size, color, and texture of adjacent garden areas will be indistinguishable from the garden itself to most visitors. In the Bellevue rock garden a crushed and screened granite grit provides an appearance just different enough to define where to walk. Decomposed granite, unavailable at the time, would have been an ideal choice, as it packs into a hard surface more readily. Occasional light dustings of a darker sand help to tone down the path still more and knit the loose gravel together more firmly. One caution is to select a material that does not contrast too sharply with the rest of the garden; avoid the appearance of a chocolate-marble cake!

Irrigation

The last feature of the hardscape construction was the installation of an irrigation system. Generous piping buried throughout the garden allowed for many valve stations from which to pull water. As the garden was planted at the beginning of autumn rains, no supplemental watering was needed. During the first winter the City's garden staff added a micro-spray and drip irrigation system, its spaghetti-like tubing just below the surface. This system serviced every plant whenever needed during the dryness of the next summer. Though we believe that, once established, when plant roots reach down into the always-damp subsoil, the garden may need little or no watering, an irrigation system was necessary for the majority of the plants to survive through the garden's first few years. Strategically located quick couplers allow for hoses to be attached for any needed supplemental hand watering.

Documentation

For several reasons, thorough documentation of the plant collection is also required. Not only is there simply the need to be able to keep track of the number of plants; there must be a method to provide accurate identification, and a system for recording plant performance. As we know, there are public gardens several hundred years old, especially in the British Isles and in Europe, and the gardens themselves have a way of outliving all of us. Information collected today is very valuable in sharing botanical experience and knowledge with others worldwide and is indispensable for future gardeners, who will follow in our paths long after our footprints have faded away. And, if among the objectives of the public garden is the mission to educate the public, this documentation serves as the database. This objective is clearly stated in the Mission Statement of the Bellevue Botanical Garden Society.

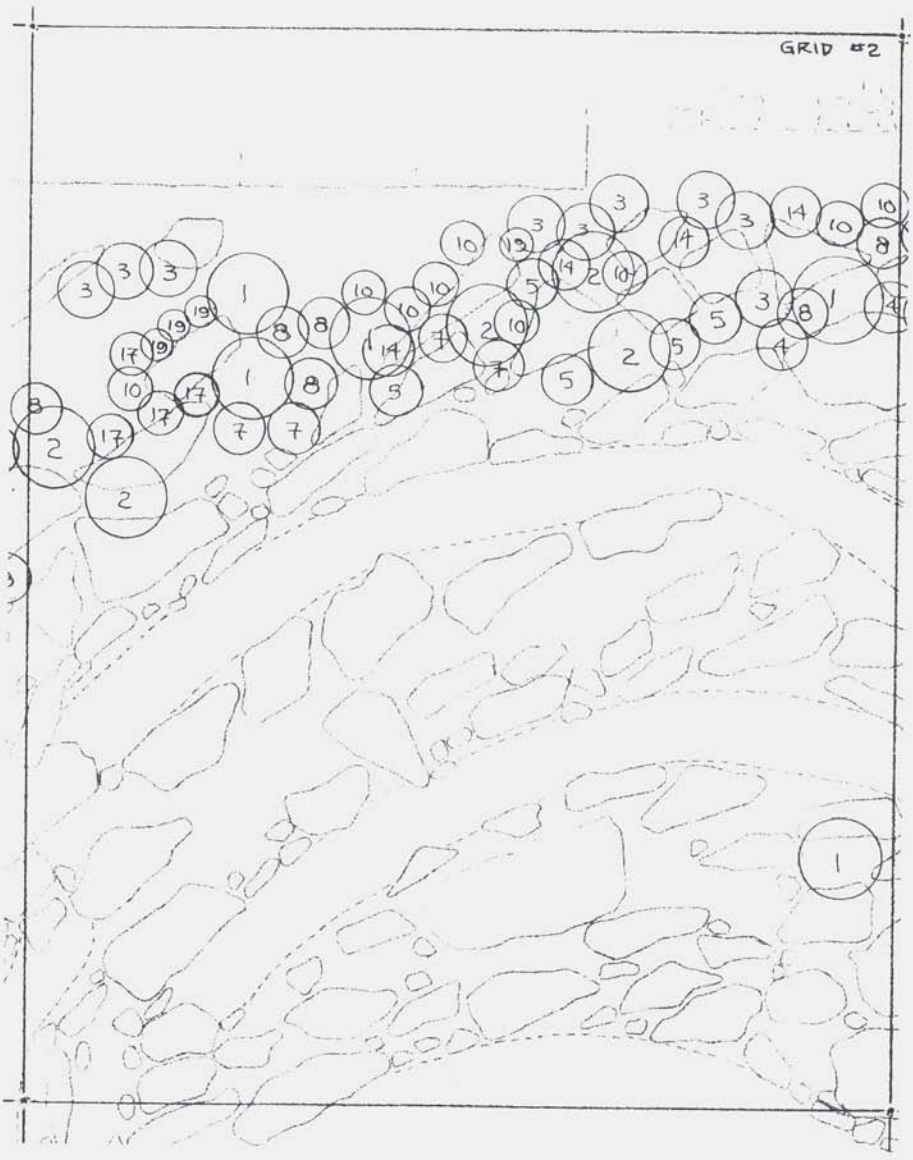
It seemed at first to be an insurmountable task to get an accurate representation of the thousands of plants tucked in amongst hundreds of rocks in the garden and to precisely pinpoint their locations on paper. There was a

way, however, to capture an accurate image of the exact features of the finished hardscape and save an enormous amount of field drawing (and erasing) time. A stationary aerial photograph was taken from directly above the garden. A 5'-long, clearly visible panel was laid on the ground beside the garden so that the finished photographic print could be enlarged to the scale of 5' equaling 1". From this photo, a drawing traced on clearprint provided an exact guide for every nook, cranny, and crevice, and an outline of each rock in the garden. Using this master drawing as the basis for an as-planted grid system, with a substantial amount of fieldwork in the garden, the exact location of every plant was recorded on greatly enlarged individual grids, and each was assigned an accession number (see sample map, p. 103).

After Construction

Now that the dust from construction is settling, it might appear the garden is about completed. But not so; in reality, our work has only just begun. We have finished building the garden, but that has been the easy part. Now we face the task of maintaining and managing it. The importance of this aspect of a public garden cannot be overstated and represents issues that must not only be addressed, but clearly defined and agreed upon by all parties concerned, well before that first shovelful is ever turned or stone is moved. Simply put, *Who takes care of it?* Though many details of who will do what may be dealt with daily, over time, as the garden grows, the basic responsibilities of all individuals involved, as well as groups working in partnership, must be thoroughly explored before the garden is begun. Are there paid staff? How will their work be funded? Who will raise the funds? Are there dedicated volunteers? And who directs them? Is there knowledgeable rock gardening expertise available to guide the garden's development? Who will make plant selections, and who will purchase and plant? Who has authority to make what decisions, and whose responsibility is it to implement them? Answering these questions and many more can, and should be, the most exciting part of the public garden experience. For their efforts, for all those involved who are willing to listen, learn, and work hard, to assume and share responsibility, and to provide strong leadership, a garden with acclaim and recognition is the reward and will be a great source of community and public pride.

Well, I said the dust was clearing, but as of this writing there are further developments on the garden's horizon. This spring will see the implementation of an Interpretive Plan for the BBG, developed by the Portico Group of Seattle. The Alpine Rock Garden has been selected to serve as the model for the plan that will eventually be employed throughout the entire Botanical Garden. This brings us back to the issue of educating the public. The garden must be presented in a form that can be understood by the average garden visitors who wish to understand, even just a little, what they are looking at. It is easy for us, surrounded by our circles of gardening friends, to presume that people will simply understand the concept of a rock garden. This could not be further from the truth. Most people could not even *define* an alpine (something even *we* never all seem quite to agree upon), let alone comprehend an alpine ecosystem. Some physical changes in the garden structure will improve access and circulation, as well as provide room and settings for interpretive



Partially Completed Grid Map of Plantings
Alpine Rock Garden at Bellevue Botanical Garden

panels. New plants will be added, and some removed. Others will be moved to new positions in the garden, seeking to achieve a more ecologically correct model, the basis for interpretation. This has truly been a cooperative effort by individuals representing the City of Bellevue, the BBGS, The Portico Group, and members from the Northwestern Chapter of NARGS; our objective now is to provide an even more wonderful garden experience to visitors to the BBG.

Let's see, has anything been forgotten? It seems like the garden is pretty well completed. What have I left out? It seems like there is something...oh, yes! The plants! Hmmm.....that could require a whole article unto itself. It appears that the plants might best be saved for another visit.

What I can tell you is that there are over 500 species and more than 5,000 individual plants in the garden, providing year-round interest for the garden visitor. Tantalizing hints do come to mind though, such as the dazzling display of *Lewisia* species in early May (they are self-sowing like weeds!), or the soft-hued blossoms of more than two dozen species and varieties of *Penstemon* draping and crawling over the rocks. There are the richly rust-colored needles of *Larix laricina* 'Newport Beauty' warming the cool fall air, and the gentle plum hues of *Juniperus* and *Cryptomeria* in winter. There are *Dryas*, *Douglasia*, and *Draba* to delight, and...well... Come for a visit and see for yourselves! In the meantime, thanks for reading.

Micheal Moshier is a garden designer and consultant as well as a fine artist. His illustrations may currently be seen in the new Timber Press release, Lewisias, *by B. LeRoy Davidson. He lives and gardens near Port Angeles, Washington, in the rain shadow of the Olympic Mountains, where he grows 'Lewisias, at Least'. Drawings by the author, except where noted. Below, Moshier directing stone placement (photo, Tom Kuykendal).*

DWARF RHODODENDRONS
IN ATLANTIC CANADA

by Todd Boland

Many of the alpine plants we grow in our rock gardens are herbaceous in nature. However, the use of some woody material is always desirable. Dwarf conifers are probably the most commonly used woody plants in rock garden situations, but there is another large group of woody plants that can not only supply year-round interest through evergreen foliage but can provide an attractive floral display as well. This large group is the rhododendrons. The genus *Rhododendron* contains around a thousand species and well over 30,000 hybrids. Being such a large genus, there is much variation in size. In the wild, some species are native to the subtropics and grow to tree-like proportions, exceeding 36 m. Others grow to the Arctic Circle or atop the highest mountains and are diminutive plants rarely exceeding a few inches. These interest us alpine enthusiasts the most.

In recent years I have become a bit of a 'rhodophile'. If this sounds like some sort of rare disease, I sometimes think it is. It seems once you get a couple of rhododendrons, you get hooked on them and want as many as you can find. The problem is, what do you do when you have only a typical garden lot? Thankfully, you can invest in many dwarf rhododendrons.

Dwarf rhododendrons are not suitable for all rock gardens. Rhododendrons have certain cultural requirements that can limit their usefulness in many standard rockeries. One of the main requirements is acidic soil. Growing rhododendrons with lime-loving *Dianthus*, kabschia saxifrages, and *Pulsatilla* is not very practical. Rhododendrons also require well-drained, yet moisture-retentive soil high in organic content. Scree conditions just won't cut it. A healthy rhododendron is a lovely sight; an ailing one can look downright horrendous.

So how can you develop a rock garden suitable for rhododendrons? Most rhododendrons hail from moist, humid climates, either coastal areas with regular rainfall or high elevations where clouds release moisture as they rise over the mountains. Most grow on slopes that are naturally well-drained. Thus, in the garden, such conditions should be duplicated. The easiest way to determine if your drainage is adequate is to dig a hole, fill it with water, and see how fast the water drains. If it remains for longer than a few minutes, the drainage is not

good enough. Rhododendrons require moist soils, so regular irrigation during dry spells will be required. Rhododendrons have virtually no drought tolerance.

Highly organic soil is critical, and the easiest way to create this is with peat moss. That's not to say that 100% peat is necessary; such soil might not even be well drained. In my garden, I use about four parts good topsoil, two parts peat, one part compost and one part coarse sand. Such a mix drains readily yet also holds moisture. The compost and peat help to maintain the needed acidity, which for most rhododendrons should be between pH 5 and 6. In Atlantic Canada, we generally do not have to worry, since our soil is naturally acidic. If you live in an area where the soil is neutral or alkaline, use iron sulfate, at the manufacturer's recommended levels, to help acidify the soil. Don't use aluminum sulfate, because it is toxic to rhododendrons. Rhododendrons have very shallow roots, so the planting area should not need a depth of more than 45 cm of prepared soil.

Rhododendrons, especially the evergreen types, require shelter from cold, dry winter winds. In zones 5 and 6, it's best to avoid west and northwest exposures. Having said this, you should also avoid heat pockets or placing rhododendrons near large rocks that are exposed to and reflect hot sun. Most rhododendrons dislike excessive heat, instead preferring fog and mist. A hot site, especially during the flowering season, can quickly end the floral display. Excessive heat can also lead to leaf scorch, especially on the dwarf red-flowered varieties and the small-leaved alpine varieties.

Most large-leaved "standard" rhododendrons benefit from light shade, especially in the afternoon. However, most of the dwarf types prefer full sun and will maintain a more compact habit if grown under sunny conditions.

Of course, the main consideration, when deciding to grow dwarf rhododendrons in a rock garden situation, is whether you live in a climate where they can be grown. Within North America, the best areas for the dwarf rhododendrons are along the eastern seaboard, from maritime areas of Atlantic Canada (my growing area in St. John's, Newfoundland, is about at the northern limit) south to around Washington, DC; along the Appalachian Mountains west to the southern Great Lakes area; and in the Pacific Northwest from British Columbia south to northern California. Alpine enthusiasts from the Great Plains, Prairies, and Rockies will, unfortunately, be hard-pressed to grow rhododendrons. Most of the species and hybrids that are about to be suggested are hardy to zones 6, many to zone 5, and a few even to zone 4.

If you live in an area with adequate snowfall, you can get away with growing dwarf rhododendrons that are not, in theory, hardy in your area, i.e., a zone-6 rhododendron in zone 5. Under a blanket of snow, the dwarf rhododendrons may be protected from cold snaps that would otherwise damage them in areas where snow is not guaranteed. In regard to general winter protection, I give very little to my dwarf types. Heavy snow does not cause that much damage, and in fact, is mostly beneficial. However, in areas where snow is not regular or in windier sites (and that does include St. John's) the erection of a wind barrier is recommended. I place a 1.2 m-high wire fence covered in burlap along the windward side of my dwarf rhododendron bed to provide shelter from excessive winter winds. Alternatively, you can place evergreen boughs vertically in the ground around the rhododendrons to provide similar protection.

Once you have decided that you can attempt dwarf rhododendrons, you have to decide which ones. In the Winter 1998 issue of the *Rock Garden Quarterly*, Arthur Dome wrote a wonderful article introducing us to many of the popular dwarf rhododendrons available. I can concur with his suggestions, as I or local gardening friends grow many of the hardier species and/or hybrids he described. The main purpose of my article is to introduce additional species and/or hybrids that may similarly be used in a rock garden situation. All of the dwarfs described here are either growing locally in my area of St. John's, Newfoundland, or are growing in similar coastal areas of Nova Scotia. John Weagle, a fellow rhodophile in Halifax, Nova Scotia, has provided me with much information on the dwarfs growing in his area and the hardiness ratings of many of the selections I suggest.

I should make one final note: some of the rhododendrons mentioned are not truly dwarf but rather are more or less low growing. Species like *Rhododendron pachysanthum*, *R. pseudochrysanthum*, *R. roxieanum* var. *oreonastes*, and *R. yakushimanum* are far from dwarf and would not be suitable for any but the largest of rockeries. However, they are of such low, compact habit and beautiful foliage that they can be used as foundation plants or for placing along the front of a shrub border. They are also slow growing, so will take some years to outgrow their allotted space.

Rhododendron calostrotum ssp. *calostrotum* is the perfect rock garden rhododendron. Plants are very compact if grown in an open site and rarely exceed 30 cm. Flowers are produced individually but appear oversized for the size of the plant. The flat-faced flowers are rich purple, and the leaves have a silvery sheen. The cultivar 'Gigha' is most recommended. Midseason; –21°C.

Rhododendron fastigiatum is one of the best and easiest dwarfs to grow. Plants have a neat, compact habit (mostly under 45 cm) and attractive, glaucous leaves. The purple-blue flowers are freely produced. Midseason; –26°C.

Rhododendron ferrugineum is the well-known Alpenrose of the Alps and the Pyrenees. It is one of the latest-blooming dwarfs, producing small clusters of rosy-pink flowers as late as July! A neat, mounding plant to 60 cm with attractive, deep green foliage. Best in full sun; –26°C.

Rhododendron hippophaeoides may be variable in size and habit, compact or sprawly. Under ideal conditions, plants may reach 120 cm, but in full sun and with a spartan diet, will mostly remain under 90 cm. Plants are very floriferous with lavender-blue flowers produced early in the season. One of the hardiest dwarfs; –32°C.

Rhododendron impeditum (photo, p. 109) is one of the most widely available dwarf rhododendrons. And rightly so, as plants are very tight (to 30 cm), with small, very glaucous leaves that rival the foliage of the best blue dwarf conifers. Numerous, small, purple-blue flowers are produced early in the season. –26°C.

Rhododendron pachysanthum is relatively new in cultivation (introduced as recently as 1972) but is a first-rate rhododendron grown primarily for its won-

derful foliage. New growth is silver-white; the thin, silvery tomentum on the upper surface of the leaf remains all summer, while the undersides have persistent, thick, felt-like, reddish brown indumentum. Mature leaves are thick, rigid, and pointed. Plants are compact (75 cm after 10 years) but can eventually reach 150 cm. They are slow to bud but once mature will produce a rounded truss of 11 or more appleblossom-pink flowers in early to midseason. –21°C.

Rhododendron pseudochrysanthum is another rhododendron grown for its foliage. It is closely related to *R. pachysanthum*. Its leaves are also thick, rigid, and pointed, and covered in white tomentum on the new growth and reddish, felt-like indumentum on the undersides. While some plants may reach 3 m, there are many dwarf selections available that slowly grow to 60 cm. Plants are also slow to bud but when mature will produce a loose truss of 6–10 appleblossom-pink flowers in early to midseason. –21°C.

Rhododendron roxieanum var. *oreonastes* is beautiful, if not bizarre. The leaves are very narrow and stiff, giving the plant a distinctive, porcupine-like appearance. The plants are compact, upright, and slow growing. They may reach 120 cm, but this will take many years. The new growth is closely invested with cinnamon-red tomentum. As the leaves mature, the upper surface becomes rugose and shiny green, while the undersides retain the cinnamon-red indumentum. The 6–15 creamy-white, pink-flushed flowers are produced in a compact, rounded truss early to midseason. –23°C.

Rhododendron rupicola is a dwarf with exceptionally deep purple flowers. The plants are fairly compact and will reach 60 cm. Full sun, an open site, and excellent drainage are required for best results. Early to midseason; –26°C.

Rhododendron russatum, like *R. hippophaeoides*, can be variable in size. Most are under 120 cm and have an open, upright growth habit. Avoid shady areas, as the low light will result in leggy plants. Bright purple-blue flowers are generally produced in abundance. Early to midseason; –23°C.

HANDY NUMBERS TO REMEMBER
CENTIMETERS VERSUS INCHES
(approximate conversions)

2.5 cm	1" (approx. length of first finger joint)
6.3 cm	2.5" (pot)
10 cm	4" (approx. width of hand)
25 cm	9.8"
31 cm	12"
50 cm	20" (almost)
61 cm	24"
75 cm	29.5" (almost 30")
91.5 cm	36"
100 cm	39.4"

Rhododendron 'Towhead' (p. 116)

Rhododendron impeditum (p. 107) photos, Todd Boland

Rhododendron 'Scarlet Wonder' (p. 116)

Rhododendron 'Manitau' (p. 115) photos, Todd Boland

Rhododendron 'Tottenham' (p. 116)

Rhododendron 'Ramapo' (p. 115)

photos, Todd Boland

Rhododendron 'Brickdust' (p. 113)

Rhododendron yakushimanum 'Mist Maiden' (p. 113) photos, Todd Boland

Rhododendron sargentianum has clusters of creamy-white, *Daphne*-like flowers on a very compact bush, generally under 60 cm. The small, deep green leaves have a pleasant fragrance when rubbed. Unlike most rhododendrons, this species will tolerate some lime. Grows best in full sun but dislikes excessive heat. Midseason; –23°C.

Rhododendron yakushimanum is a larger-leaved, compact, mound-forming plant with beautiful foliage and flowers. The new growth is covered with silver-white tomentum. As the leaves mature, the upper surface becomes smooth, shiny green, while the undersurface retains a thick, felt-like, cream-to-buff-colored indumentum. The flowers are produced in a large, dense truss. They open light pink from dark pink buds but quickly fade to white. Plants range in height from 60–150 cm but are generally much wider than tall. The best cultivars are 'Ken Janeck' and 'Mist Maiden' (photo, p. 112). Midseason; super hardy to –32°C, but buds killed below –26°C.

Rhododendron 'Alexander' is an evergreen azalea that has a low (30 cm) trailing habit. Plants look especially good cascading over a rock or low rock wall. Their lovely, reddish orange flowers are produced in abundance quite late in the season. –21°C.

Rhododendron 'Arctic Tern' is a unique cross between a *Rhododendron* and a *Ledum*. This dwarf hybrid (45–60 cm) produces tight, rounded clusters of white flowers that look like a glorified *Ledum*. This hybrid blooms later than most dwarfs and is very hardy. The mid-green leaves are aromatic and, unlike those of *Ledum*, stay green in winter. Plants perform best in full sun. Mid to late season; –26°C.

Rhododendron 'Baden Baden' is one of the best dwarf red rhododendrons. Plants produce a loose truss of 4–7 deep red, shiny flowers during midseason. The leaves are wavy-edged, dark green, and glossy, with a ribbed appearance. This hybrid produces a low, 60-cm mound of stiff branches. Plants are free-flowering from a young age. –26°C.

Rhododendron 'Bremen' is a *R. williamsianum* hybrid and has rounded leaves similar to those of that species. Nodding trusses of relatively large, rose-red flowers on a strong-growing, dense shrub, together with attractive foliage, make this a great plant. Unfortunately, it's borderline hardy in my area. Plants reach 75 cm and bloom midseason. –18°C.

Rhododendron 'Brickdust' (photo, p. 112) is another *R. williamsianum* hybrid that has inherited the round leaves and reddish new growth of that species. It is another very attractive rhododendron, even when not in bloom. The large, dusty orange-rose flowers are produced in a loose truss during midseason. This compact, 75-cm plant flowers quite freely. Again, it's borderline in hardiness in my region; –18°C.

Rhododendron 'Chikor' is a twiggy, rounded 45-cm bush with shiny, round leaves that turn bronzy in winter. The soft yellow flowers are relatively large.

This hybrid requires a loose, well-drained soil and dislikes excessive summer heat. Early to midseason; –21°C.

Rhododendron 'Dora Amateis' is one of the most popular dwarf rhododendrons. It is vigorous and may reach 90 cm after 10 years. Although with time it may exceed this height, the plant is so adaptable and lovely that I decided to include it in this listing. Even when large, the plant maintains a compact habit if grown in full sun. From pink buds snow–white flowers with small, green flecks open. Plants bloom early to midseason and are very floriferous. –23°C.

Rhododendron 'Eider' produces small clusters of white flowers with noticeable dark stamens around midseason. The flowers are exceptionally long lasting. The compact plants may reach 90 cm. –21°C.

Rhododendron 'Elviira' is THE hardiest red-flowered rhododendron and a dwarf to boot! Plants are dense and generally under 60 cm with shiny, somewhat curled leaves. The flowers are quite large and bright red, produced in a loose truss early to midseason. Super-hardy; to –34°C.

Rhododendron 'Golfer', a cross between *R. yakushimanum* and *R. pseudochrysanthum*, has inherited the exceptional foliage of both parents. The new-growth leaves are silver-white; mature leaves have persistent silvery tomentum on the upper surface and felt-like, beige indumentum on the lower surface. Flowers are pale pink fading to white on a domed truss during midseason. Plants grow wider than tall and reach 75 cm in 15 years. –26°C.

Rhododendron 'Intrafast' looks similar to *R. fastigiatum* with lovely, glaucous foliage, easy flowering, and very dense habit (45 cm). The violet-blue flowers are produced early to midseason. Plants grow best in full sun. –26°C.

HANDY NUMBERS TO REMEMBER
CELSIUS VERSUS FAHRENHEIT

37°C	98.6°F	(body temperature)
22°C	72°F	(room temperature)
16°C	61°F	
10°C	50° F	
4.5°C	40°F	
0°C	32°F	(water freezes)
–2°C	28°F	
–18°C	0°F	
–21°C	–5°F	
–23°C	–10°F	
–26°C	–15°F	
–29°C	–20°F	
–32°C	–25°F	
–34°C	–30°F	

Rhododendron 'Karen Seleger' is a compact, mound-forming dwarf (to 60 cm) that looks similar to 'Purple Gem' or 'Ramapo'. Small clusters of purple-blue flowers are produced early in the season. Full sun will help maintain a tight habit. Very hardy; to –32°C.

Rhododendron 'Kermesina' is an evergreen azalea with bright pink flowers on a compact (60 cm) plant with shiny, green leaves. Blooms mid to late-season. Other sports of 'Kermesina' include 'Kermesina Rose' and 'Kermesina Purple'. –23°C.

Rhododendron 'Komo Kulshan' may be a selection of *R. kiusianum,* but its relatively large flowers would suggest otherwise. Small clusters of light pink flowers with deep pink edges give a wonderful two-tone effect to the blooms. Plants are quite floriferous, low, and spreading (60 cm). They bloom mid to late season. Leaves turn a wonderful burgundy in autumn. –23°C.

Rhododendron 'Maricee' is very similar to *R. sargentianum* but is more vigorous, floriferous, and easier to grow. From pink buds come small *Daphne*-like clusters of white flowers tinted pink. Plants are upright, yet compact (to 60 cm), with aromatic foliage. Midseason; –21°C.

Rhododendron 'Manitau' (photo, p. 110) is a wonderful choice in a dwarf rhododendron. The mounded plants reach 60 cm and are literally smothered in light pink flowers early to midseason. The shiny leaves turn a bronzy shade in winter. Highly recommended. –26°C.

Rhododendron 'Pink Diamond' ('Diamant Pink') is an evergreen azalea with small, pink flowers produced mid to late season. Plants have a low, mounded habit to 60 cm. There is a whole series of 'Diamond' azaleas including 'Lilac', 'Rosy-red', 'Salmon Pink', 'Purple' and 'White'. –23°C.

Rhododendron 'Pink Pancake' is an evergreen azalea with a growth habit very similar to 'Alexander' (30 cm after 15 years). It is also at its best cascading over a rock or low stone wall. The strong pink flowers are produced late in the season. –21°C.

Rhododendron 'Purple Gem' is one of the hardiest and most popular of the 'blue' dwarfs. Plants form a dense, rounded mound to 60 cm that is smothered in purple-blue flowers early in the season. Young leaves have a blue tint. Full sun will keep the plants compact. Very hardy; to –29°C.

Rhododendron 'Ramapo' (photo, p. 111) is the sister of 'Purple Gem' and is just as popular. Plants look very similar to 'Purple Gem' but the flowers are more pinkish violet. They are also very floriferous and hardy. Early season; –29°C.

Rhododendron 'Sapphire' is another popular 'blue' dwarf with clusters of small, light purplish blue flowers. Unfortunately, it's not as hardy as 'Purple Gem'. Plants produce an open, rounded bush and may reach 75 cm. The small leaves are gray-green. Early to midseason; –21°C.

Rhododendron 'Sarled' is very similar to 'Maricee' and *R. sargentianum.* Plants

are dense and low (to 45 cm) with small, aromatic leaves. Small clusters of white, pink-tinted flowers look similar to those of *Daphne*. Easier to grow than *R. sargentianum* and slightly more dwarf than 'Maricee'. Midseason; –23°C.

Rhododendron 'Scarlet Wonder' (photo, p. 110) is a sister to 'Baden Baden' and looks very similar, although it is not as hardy. The main difference is in the flowers, which are cardinal-red instead of deep red. Midseason; –21°C.

Rhododendron 'Tottenham' (photo, p. 111) is an easy dwarf rhododendron that forms a rounded mound to 75 cm. The lavender-pink flowers, being produced mid to late season, make 'Tottenham' ideal for extending the rhododendron season. Mature leaves are very dark green, while new growth is almost lime-green, making for an attractive contrast early in the season. –23°C.

Rhododendron 'Towhead' (photo, p. 109) is very dwarf (under 45 cm) and compact, with relatively large, cream-white flowers produced midseason. It is free-flowering from a young age. The winter foliage is almost chocolate-purple in color. –26°C.

I will admit that few of these species and hybrids are available locally. However, the many mail-order nurseries that deal specifically with rhododendrons or ericaceous plants may offer these or other dwarf selections. Local chapters of the American Rhododendron Society in your area may have yearly plant sales that can be a source for many dwarf rhododendrons. Such plant sales can provide a wealth of information on the plants you'd like to buy and grow. Between the selections I suggest here, and those that Arthur Dome suggested in his article, you should have plenty to choose from should you decide to create a rock garden devoted to dwarf rhododendrons and their companion plants.

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Todd Boland gardens in Newfoundland.

Rhododendrons by Winter-Cold Hardiness

Hardy to -18°C (0°F)
R. 'Bremen'
R. 'Brickdust'

Hardy to -21°C (-5°F)
R. calostrotum ssp. calostrotum
R. pachysanthum
R. pseudochrysanthum
R. 'Alexander'
R. 'Chikor'
R. 'Eider'
R. 'Maricee'
R. 'Pink Pancake'
R. 'Sapphire'
R. 'Scarlet Wonder

Hardy to -23°C (-10°F)
R. *roxieanum var. oreonastes*
R. russatum
R. sargentianum
R. 'Dora Amateis'
R. 'Kermesina'
R. 'Komo Kulshan'
R. 'Pink Diamond'
R. 'Sarled'
R. 'Tottenham'

Hardy to -26°C (-15°F)
R. fastigiatum
R. ferrugineum
R. impeditum
R. 'Arctic Tern'
R. 'Baden Baden'
R. 'Golfer'
R. 'Intrafast'
R. Manitau'
R. 'Towhead'

Hardy to -29°C (-20°F)
R. 'Purple Gem'
R. 'Ramapo'

Hardy to -32°C (-25°F)
R. hippophaeoides
R. *yakushimanum* [buds killed below -26°C (-15°F]
R. 'Karen Seleger'

Hardy to -34°C (-29°F)
R. 'Elviira'

Clockwise from upper left: Bulbs of *Lycoris squamigera; L. radiata* ssp. *pumila; L. radiata* ssp. *radiata; L. sprengeri;* and *L. longituba*

LYCORIS

NEW CHINESE SURPRISE LILIES

by James Waddick

Although two species of the genus *Lycoris*, the surprise-lily, are well known (in the North the common *L. squamigera*, and equally in the South *L. radiata)*, the remainder of the genus is not very familiar to gardeners. There are well over twenty species in a wide range of plant sizes, flower colors, and cultivation needs. Until recently, few of these were either cultivated, or even available. Within the last ten years more than 30 Chinese species and hybrids have been introduced into cultivation in the USA.

My introduction to the breadth of this genus came (by surprise) in eastern China more than ten years ago. I was visiting the Herb Garden of the Hangzhou Botanic Gardens in Hangzhou, Zhejiang Province, China, and was shown a mass planting of various *Lycoris*. This being mid-May, the "display" consisted of bare ground and labels in Chinese and Latin. I made contacts with growers there, and by fall of that year I began importing and introducing bulbs to good growers and collectors.

THE GENUS

Most of the species in the genus *Lycoris* are found in China, a few more in Japan and Korea, and the rest scattered from Viet Nam to Myanmar (Burma), possibly as far as Thailand or Nepal. The genus has two distinct subdivisions, and the two species most commonly grown in the US illustrate the striking differences between the divisions. The subgenus *Lycoris* is characterized by spidery flowers with narrow tepals. Often the tepals are crisped, crinkled, and ruffled. Frequently the stamens extend well beyond the opening of the flower, and many species produce their foliage in autumn. These tend to have a more southern distribution and are considered a more tender group. You may recognize the features of *L. radiata* in this description.

Lycoris radiata is called the red surprise-lily, and it is sometimes planted in dazzling numbers. It has flowers of bright orangey red, six or more per scape, the scape reaching1–2' in height. The distinctive narrow foliage is deep green with a wide, white band down the midline. Although considered a southern species, I have grown *L. squamigera* here for more than ten years and have

known of plants growing in Kansas City for twice that duration.

The subgenus *Symmanthus* has regular, more lily-like flowers with wide, overlapping tepals. Most produce foliage in spring, and the stamens usually do not extend beyond the flower tube. These are more northerly in distribution and have greater cold hardiness. Gardeners familiar with *Lycoris squamigera* recognize that it belongs to this section.

One recent English-language name for *Lycoris squamigera* is the pink flamingo flower, and this suggests its powerful color, height, and attitude. An older name is naked ladies. This species can produce flower stalks nearly 3' in height with five or more 3–4", bright pink flowers. Old clumps produce masses of broad, slightly glaucous foliage in spring. *Lycoris squamigera* can be grown as far north as southern Canada.

Each subgenus contains about half the known species. Some common characteristics of the genus as a whole are summer-dormant foliage, late summer to early fall bloom on bare flower stalks, and specific requirements for moving and reestablishment in the garden. Oddly, the two commonly grown species, *Lycoris squamigera* and *L. radiata*, are both sterile triploids and do not produce seeds. They are both exceptionally vigorous and have spread far beyond their original homes. The common *L. radiata* (photo, p. 122) should more properly be called *L. radiata* var. *radiata*, wheras the less commonly cultivated *Lycoris radiata* var. *pumila* is a fertile, diploid species. The triploid variety is expectably larger in all parts: bulb, foliage, and flower. It is usually found in disturbed terrain and around cultivated areas. The smaller *L. radiata* var. *pumila* is found only in China and then in more secluded, natural areas away from human disturbance. It is thought that the large triploid form was long ago selected for garden use and brought to Japanese gardens and then beyond.

Success with *Lycoris*

Since I imported and have grown the Chinese species for more than ten years, I have come to know a few species that have shown their superior horticultural worth and garden impact in northern climates. These comments are based on having grown these bulbs here outside Kansas City, Missouri, on the border between USDA zones 5 and 6. All bulbs are grown in lightly shaded, woodland conditions. Soils tend toward heavy clay. Most importantly, the climate is definitely continental, that is, cold winters and hot, mostly dry summers—what the literature calls baking conditions for bulbs.

Much of the influential English literature suggests that few *Lycoris* are very hardy, but my experience is just the opposite, and I believe our success is based on our extreme temperatures and long, hot, sunny, dry summers in particular. Also important for successful establishment is that the bulbs be transplanted while they are dormant, but before they have dried to a stressed state. This means a period from about six weeks after their foliage goes dormant (mid-April to early May) and before they bloom (August through early October), the exact timing depending on species and climate. Planting in this prime period allows bulbs to grow new roots, perhaps to bloom, but certainly to rehydrate before winter cold sets in. I believe this is very critical.

For example, I grow *Lycoris radiata* var. *radiata* from bulbs that have grown and bloomed annually here for over 20 years, yet routine literature suggests this species is not hardy north of Zones 7 or 8. I believe that bulbs sold in the tradi-

Lycoris chinensis and *L. longituba* (p. 125)

Lycoris houdyshellii (p. 127) photos, James Waddick

Lycoris radiata (p. 120)

Lycoris incarnata (p. 127) photos, James Waddick

Lycoris sprengeri (p. 126)

Lycoris haywardii (p. 126) photos, James Waddick

Calylophus serrulatus (pp. 137–8) Larry Vickerman

Calylophus serrulatus 'Prairie Lode' (p. 138) Harlan Hammernik

tional bulb season of October through November are simply too stressed and unable to establish before cold kills them outright. These bulbs should be purchased and planted in midsummer, either dormant from a specialty dealer or potted up from a nursery. They resent disturbance and drying out.

Bulbs may also be slow to make a floral show until established. One example of the stubbornness of this genus is seen in a late planting of 25 bulbs of *Lycoris chinensis* in fall of 1997. The spring of 1998 showed only three bulbs producing foliage, a sad result. Patiently waiting until spring 1999 resulted in the rewarding appearance of 24 distinct bulbs producing foliage. Even the missing bulb may yet appear! These bulbs have yet to bloom, however, and I think if they had been planted a month or more earlier, this would have been a far showier fall display.

The New Chinese Species

Perhaps the most surprising element of the *Lycoris* of China is the range of flower colors, size, hardiness, and all around good-garden-plant factors. It is somewhat shocking that some of these species have not been standby garden plants, at least as popular as *L. squamigera,* for the last century of gardening. It is near shameful that no one has brought them into wide cultivation earlier; they are that good, that easy, and provide almost a whole new bulb season unto themselves. I hope my efforts will contribute to their accepted use in gardens of all sorts and in many climates.

The Chinese *Lycoris* mostly lack common names in English, so I will suggest some names as I describe the best species. At the top of that list is *Lycoris chinensis,* the golden surprise-lily (photo, p. 121). This species is one of the larger ones, on a par with *L. squamigera.* The large, bold foliage appears in very early spring and is dormant by May. The naked flower scape appears about the same time as that of *L. squamigera,* in July, and each scape has four or five broadly spider-form blooms with ruffled tepals of a bright chrome-yellow to golden orange. Although immediately recognizable as a relative of *L. squamigera,* it is so strongly and brightly colored that it may stop you in your tracks.

This is one of the new species that should be in every garden. It is easy, sturdy, vigorous, beautiful, and totally hardy here. The large bulbs are planted 5–7" deep (to base of bulb). It has almost no pests, other than standard grasshoppers (that eat everything) and opportunistic insects. If the species has a fault, it is the large size of the flower scapes, but this aspect does harmonize well with the similar-size, bright pink flowers of *Lycoris squamigera. Lycoris chinensis* is fertile and produces seed, and so has potential for hybridizing with other species. My simple method of propagation is to allow seeds to fall in place and then scratch them into the soil.

The white surprise-lily is *Lycoris longituba.* This is the Third Musketeer, companion to *L. squamigera* and *L. chinensis.* Similar in size, the form of this species is closer to that of the pink surprise-lily; that is, it has tubular flowers with wide, smooth, overlapping petals remarkably similar to an Easter lily. The flowers are pure white. The flower scape height and form mixes well with the other two large-flowered species, and the colors are remarkably harmonious. It, too, has sturdy spring foliage and has proven absolutely hardy here. Planting is as for the above species.

In addition to the typical and most common white form, *Lycoris longituba* var.

longituba, there is a delicate, pale yellow form, *L. longituba* var. *flava*, that is seen occasionally. It is similar in all aspects except for flower color. Both forms are fertile, seed-producing, diploid taxa.

The three, large-flowered surprise-lilies described above grow very well together in complementary or mixed plantings. The bright pink, rich gold, and pure white flowers are all about the same height. Their horticultural demands are quite similar, and they are all very sturdy, hardy bulbs. Their bloom is **at** a time of year when there is almost no competition for the kind of show these bulbs produce.

Because of their size, these particular species may be difficult to fit into smaller gardens or work into popular pocket gardens—the rock garden and smaller front gardens. They are large and showy enough to warrant a special placement. If you can bear to cut them, they are admirable in a vase or arrangement. If you can't find a way to use them in your garden, try the following species.

Perhaps the best all-round of the new Chinese species is the electric surprise-lily, *Lycoris sprengeri* (photo, p. 123). This species is smaller in all its parts, about half the size of all the above, and suited to even small clumps worked in among *Hosta, Epimedium,* or *Polygonatum*. The spring foliage is both narrower and less lush than that of *L. squamigera,* and the flower scape rarely rises much beyond 18". The size is better able to fit into mini-garden sites.

The flowers are a rich pink, with the outer tips of each tepal electric blue in color. It appears as if tepals have been dipped in day-glow blue ink. Since this, too, is a fertile species, seedlings will differ slightly in the extent of the bright blue edging. I suspect that with much patience one might be able to produce an almost entirely, intensely blue flower color.

The joy of this species is its modest size with major punch. I can't oversell or exaggerate the good qualities of this little bulb. It is suited to the shade garden as a single focal clump or a larger planting; it can also be grown in a rock garden that receives some shade for part of the day; and it is well suited to the average perennial bed or border. This is fertile diploid has already been used in producing some lovely hybrids.

Slightly smaller in size is Hayward's surprise-lily, *Lycoris haywardii*. It is intensely rich rose-pink, but lacks the blue tepal tips of *L. sprengeri*. There are some bluish shades in the tepals. Like the electric surprise-lily, *L. haywardii* (photo, p. 123) is small enough to fit into many garden locations. In mild climates the leaves will appear in fall, but here they usually wait until spring. As in all species, the flowers appear in fall.

The dwarf red surprise-lily, *Lycoris radiata* var. *pumila,* deserves a bit of comment. This is the smallest of the species, with bulbs smaller than golf-ball size, about 1.5" in diameter. The small, red-orange flowers bloom two weeks to 10 days earlier than the triploid form. In the South, where *L. radiata* grows very well and has become naturalized in some places, home gardeners have noticed this fact, as the two forms rarely over-lap in bloom. This dwarf plant is fertile and has been used frequently, bringing its bright colors in to mix with pastel-colored species.

Lycoris radiata var. *pumila* is native to China, introduced to Japan, and still not widely identified or grown. I think this species has the greatest potential for the rock garden due to its small size, free-flowering habit, and brightly colored flowers.

I would say these five species are the best and the basic ones of the new Chinese *Lycoris*, but there are many more that have also come into cultivation which have different impact. I'll mention just a few.

There are a number of yellow *Lycoris*, and they are already mixed up in commerce and in cultivation. Perhaps the best known is also the most tender species of all, *L. aurea*. This species ranges from southern China into Viet Nam and as far west as Myanmar (Burma), and perhaps beyond. It also has the largest foliage of all species, with long, wide, and very succulent leaves. The leaves and scapes can each reach almost a yard in length.

Lycoris aurea is easily damaged by even light frosts. Even in Zones 8 and 9 frost damage can prevent flowering. Flowers are a clean, bright yellow with a typical spider form. This species is also quite variable because of natural, odd chromosomal variants found in the wild.

The second-best-known yellow *Lycoris* is *L. traubii*, which many people believe is simply a smaller form of *L. aurea*; it is obviously closely related. Differing only in fairly minor characters, this species is slightly smaller, more northerly in distribution, and hardier.

Better-known and an excellent choice is the pale yellow surprise-lily, *Lycoris caldwellii*, well known in the literature. It is named for an early proponent and introducer of this genus. The pastel yellow flowers are large in size and have an excellent and pleasing form. It has proven easy and hardy.

Another hardy, yellow-flowered species is the strawflower surprise-lily, *Lycoris straminea*. This species is an oddity in the genus and warrants close inspection. It is not easily confused with any others. The straw-yellow flowers are irregularly covered with fine, red speckles. Hardy here in Kansas City, it is still uncommon in cultivation.

As mentioned above, I think that *Lycoris chinensis* is the *best* of the hardy yellow-flowered species, but the *rarest* of all is *L. anhuiensis*. It is another of the spider-form species that should be quite hardy, originating in east-central China. It is similar to but smaller than *L. longituba*. The only other yellow-flowered taxon is *L. longituba* var. *flava*, the palest yellow of all.

A few other rare species are worth mentioning, as they are sometimes available. *Lycoris houdyshelii* (photo, p. 121) is very similar to *L. radiata* in form of flowers and inflorescence. Although a white form of *L. radiata* has been reported in the literature, I can't help but wonder if it was a case of mistaken identity. Could it have been the white-flowered *L. houdyshelii*? I have found it completely hardy in Kansas City, but it is not as free-blooming as other species, and individual bulbs may just skip a year, failing to bloom or giving too few flowers for an effective display.

One of the more interesting species is *Lycoris incarnata* (photo, p. 122), the candy cane surprise-lily, with large, fragrant flowers striped in white and deep pink. This species has great garden potential, as it is similar in many ways to *L. squamigera*, but with smaller and more interesting flowers. It is very hardy and has a modest display of spring foliage. It deserves to be more widely propagated and grown.

The last Chinese species to mention is *Lycoris shaanxiensis*. Although nearly unknown in cultivation, it promises to be the hardiest of all, as it comes from the more northerly province of Shaanxi. It has spring foliage and white flowers showing distinct pink stripes.

This review does not touch on the Japanese species, which are all more generally in cultivation due to the intense interest of Japanese botanists and gardeners. There are also a few rare species, including at least one not yet in cultivation and a newly named Korean species. The interest in hybridization has brought about a wonderful range of sizes and colors, all in the dawn-to-dusk color range, from pale cream to tangerine, peach, orange, and bicolors.

Yet *Lycoris* in the USA is still known only from one or two species and a pile of older literature. I hope you, the reader, have welcomed the eye-opening potential in this genus. Today it is possible to obtain a number of Japanese species and a few hybrids, but unfortunately these are shipped very late (fatally late?) in the season by traditional bulb dealers. *Lycoris* need some special care their first year.

At least two major commercial nurseries now supply some species as potted bulbs: Plant Delight's Nursery has a large selection, whereas the choice is more modest at Fairweather Gardens. Potted bulbs are established and easily moved any time of the year. The collector will have to go to other specialist importers and growers.

Because some of these little-known surprise-lilies are really exceptional, I can only hope they will be growing in gardens and nurseries near you, and soon.

SOURCES

(Note: Because many of these species are not well known or grown, nursery estimates of hardiness may not completely relate to your conditions. Hardiness in *Lycoris* seems more related to summer heat, winter cold, and proper planting time.)

James Waddick lives and gardens in the St. Louis, Missouri, area. Special garden interests include bearded and species irises.

Telos Rare Bulb, P.O. Box 4978, Arcata, CA 95518.

Plant Delights Nursery, 9241 Sauls Rd., Raleigh, NC 27603, Tel: (919) 772-4794

Fairweather Gardens, P. O. Box 330, Greenwich, NJ 08323, Tel.: (609) 451-6261

Asiatica, P. O. Box 270, Lewisberry, PA 17339, Tel.: (717) 938-8677

Brent and Becky's Bulbs, 7463 Heath Trail, Gloucester, VA 23061, Tel.: (804) 693-3966

Van Bougondien, P. O. Box 1000, Babylon NY 11702-9004. Tel.: 1-800-552-9916

For more information contact: http://www.bulbsociety.com

THE GENUS *ZEPHYRANTHES*

by Bobby J. Ward

The genus *Zephyranthes* has the winsome Latin appellation "flower of the west wind" because of the plant's origin in the Western Hemisphere. Many species of this genus are persuaded to bloom following heavy rains and hence are called rain lilies. *Zephyranthes* is one of two genera referred to as rain lilies; the other, *Habranthus*, was described previously (Chelednik, *Rock Garden Quarterly* 56(4): 307-310).

Rain lilies are members of the Amaryllidaceae, therefore allied to *Crinum*, snowdrops (*Galanthus*), and *Narcissus*, rather than to the true lilies (Liliaceae). They are considered to be the New World botanical analog of the Old World genus *Narcissus*, since they are indigenous to the Western Hemisphere. They are closely akin to *Habranthus*, *Pyrolirion*, and *Haylockia*. There are about 40 species of *Zephyranthes* that range in the United States from Virginia (*Z. atamasco*) southward into Mexico, westward into Arizona and New Mexico (*Z. longifolia*), and beyond to the Caribbean, parts of Central America, Colombia, and Argentina.

A living collection of *Zephyranthes* was amassed at Wake Forest University (North Carolina) beginning in the 1930s, added to over the years, and a monograph of the then-known species was produced in 1973 by Lorraine Spencer. That monograph covers the species of the USA, the West Indies, and the Caribbean fairly well. However, it is weak on the South American and Mexican rain lilies; the latter need considerable taxonomic work.

Rain lilies are diminutive and often ephemeral, thereby earning the moniker fairy lilies. The first rain lily to be described and illustrated was the atamasco lily (*Zephyranthes atamasco*, photo, p.134), also called the Virginian daffodil. John Parkinson, in his *Paradisi in Sole, Paradisus Terrestris* (1629), wrote of "the narcissus of Virginia [which] the Indians do call it Attamusco," and Linneaus in his *Species Plantarum* grouped it with the genera then included in the Amaryllidaceae. However, it was not until 1821 that William Herbert established the name *Zephyranthes* and applied it to the atamasco lily.

My first introduction to *Zephyranthes* was through the atamasco lilies growing along roadsides and ditches

in the coastal plain of northeastern North Carolina. Known to the locals as the wild Easter lily, the atamasco may offer its milk-white flowers at Eastertide, particularly in those years when the spring full moon dictates a late-April Easter. Unlike the vernal-blooming atamasco and two close variants in Florida (*Zephyranthes simpsonii* and *Z. treatiae*), most rain lilies in southern gardens bloom in the summer and early fall. They respond with flushes of blossoms that often repeat after successive storms and tropical hurricanes, perhaps associated with sharp changes in barometric pressure.

Generally rain lilies are easy from seed. Almost all will germinate in a few days after sowing and will produce flowers, usually by the second growing season. Some viability is lost if the seed are not sown immediately after harvesting. Divisions can be taken from the parent bulb of some species. Most grow best in full sun in well-drained soil with a good application of organic material or a slow-release fertilizer. Some naturalize easily, and most tolerate drought. Rain lilies have few disease or pest problems.

I grow some of my rain lilies in pots, where they receive only a few hours per day of direct sun in the summer (they would bloo.n more profusely, if they were exposed to more sun). I relocate them to a protected, south-facing side of the house in the winter, if I am unsure of their tenderness. As I acquired various species and cultivars of rain lilies, I wrongheadedly granted extra water to parched pots of baked rain lilies whenever I watered other nearby perennials, failing to realize that they would flower far better if I let natural rainfall trigger their blossoming.

Zephyranthes candida (photo, p. 135), native to the marshes of the Río de la Plata on the border between Argentina and Uruguay, according to legend played a role in the naming of the river itself. Sebastian Cabot, an Italian cosmographer sailing under the flag of Spain in 1530, mistakenly thought that the glimmering sheen of small white flowers of *Z. candida* he saw from the distance on the river banks were actually silver deposits, and he gave the river the name which translates as "river of silver." *Zephyranthes candida* is one of the hardiest of the rain lilies. In Raleigh (USDA Zone 7) I grow it in heavy clay soil, and it rewards me in late summer and early fall with prolific, clean white clusters of blooms. On cloudy days the flowers remain closed. This species has strong foliage that is almost evergreen. It is easy to grow and has become so widely naturalized in some areas of the South that most southern gardeners assume it is a native plant. Rain lilies are ideal placed near the front of a border where they won't be planted over or lost altogether. Thus I grow *Z. candida* amid *Hedera algeriensis* 'Gloire de Marengo', the rain lily flowers complementing the distinctive, variegated leaves of the ivy.

Zephyranthes grandiflora, a species likely originating in Mexico, is probably the most widely grown rain lily. It was known and cultivated by the Aztecs. As its specific epithet suggests (*grandiflora* means "large flower"), it is one of the prettiest, with exaggerated, funnel-shaped, rose-pink blossoms with whitish throats. Generations of gardeners in the South have admired its opulence, and for many it reigns as the queen of rain lilies. Unfortunately, it is often mislabeled and sold as *Z. rosea*, a smaller and less hardy species.

The first species of rain lily that I grew was *Zephyranthes citrina*, the perianth parts of which are a brilliant, cadmium-yellow (photo, p. 134). It was given to me by a neighbor, and it pro-

duced copious amounts of flat, paper-like, black seeds the first season. Soon I was mailing them to friends in England. One old cultivar, 'Ajax', a presumed hybrid between *Z. citrina* and *Z. candida*, has attractive, pale yellow flowers. It was grown by Elizabeth Lawrence at her garden in Charlotte, where colonies of it are still maintained and shared by the present owner.

There are many other rain lilies to consider growing. *Zephyranthes flavissima*, from South America, has golden yellow flowers and tolerates wet areas and frost. The giant prairie lily has had numerous name changes, but now taxonomists have settled on *Z. drummondii*, although in some circles, it is still known as *Cooperia pedunculata*. It opens its white, fragrant flowers in the afternoon and night, presenting the appearance of the ghosts of white crocuses frosting the landscape. The prairie lily grows naturally in limy, well-drained soils in rugged areas of Texas and Mexico. I have seen *Z. drummondii* growing in Mexican mountains at an elevation of 4,000' tucked in among prickly pear cactus. However, it is equally happy in average garden soils that are well drained. *Zephyranthes chlorosolen* (long known as *Cooperia drummondii*) is a creamy-white-flowered rain lily that blooms in the evening. Other rain lilies available in the trade include *Z. macrosiphon*, with deep-pink flowers (photo, p. 134), and *Zephyranthes* 'Prairie Sunset' (sometimes erroneously sold by nurseries as 'Capricorn', which is a distinct form and rare cultivar). *Zephyranthes jonesii*, possibly a naturally occurring hybrid, is native to coastal Texas and has golden-yellow-colored flowers (photo, p. 134). *Zephyranthes bella* is a diminutive desert species with crocus-like, soft rose blossoms.

In the northern and central states of Mexico, particularly in Nuevo Leon, Tamaulipas, and San Luis Potosí, are centers of distribution for rain lilies. In the rugged sierras, high deserts, and along limy roadsides at lower elevations new species and apparent hybrids of rain lilies have been collected. Thad Howard of Houston began visiting the area in the 1960s, returning with such forms as *Zephyranthes morrisclintii*, a pink-flowering rain lily, and *Z. reginae* (photo, p. 134), or the queen's rain lily, distributed formerly by Howard as Valles yellow rain lily.

In the last decade and a half, John Fairey and Carl Schoenfeld of Peckerwood Gardens and Yucca Do Nursery in Hempstead, Texas, have added to the rain lily collections from Mexico. Among those that have been introduced is *Zephyranthes* sp., termed Labuffarosea, which they found in 1990 in the Mexican state of Tamaulipas in the San Carlos Mountains; the name translates as "the La Buffa pink." The species has many color variations from white to deep pink. At Peckerwood Gardens, Fairey also grows a *Zephyranthes* called Querétaro Yellow, a small, bright yellow rain lily that blooms all summer long; and numerous additional forms whose taxonomy has not yet been sorted out properly. Some of this latter group are referred to as the "*lindleyana* complex," because they at least superficially resemble *Z. lindleyana* but vary considerably in flower size, shape, and color.

Other Mexican taxa include *Zephyranthes chichimeca* (a desert species) and the goblet-shaped, crocus-like *Z. crociflora*, which grows outside the town of Saltillo. *Zephyranthes traubii* (photo, p. 135) is an autumn bloomer in the moist coastal plains near Houston; additionally, a *Z. traubii*-like rain lily extends into eastern Mexico and accepts drought better than its Texan ally. Katherine Clint,

from Texas, collected rain lilies in various areas of Mexico. One form from Hildago, a red to yellow rain lily, was named in her honor, *Z. katherinae* (photo, p. 134).

Rain lilies from the West Indies include *Zephyranthes rosea*, believed to have originated in Cuba; as its name suggests it is a lovely rose-pink. *Zephyranthes insularum* (meaning "from the islands,") refers to a white-flowering relative of *Z. rosea* that was first described from a garden in Key West, Florida.

In some parts of Mexico, rain lilies are referred to as *los mayitos* or *los flores de mayo*, Spanish for "the flowers of May," suggested by their blooming when the late spring rains arrive in Mexico. An older name, *atzacalxóchitl*, derived from native languages, is applied to the rain lilies of southern Mexico near Hidalgo and Oaxaca. Mashed bulbs were said to be used as an unguent to treat facial blemishes by the indigenous peoples.

Reference books suggest that *Zephyranthes* are only hardy to Zone 8. However, the experience of fellow gardeners in North Carolina belies this information. Some grow easily in Zone 6b. They are also worthy candidates for greenhouses or cold frames.

Bobby J. Ward gardens and writes in Raleigh, N.C. He is the author of A Contemplation Upon Flowers–Garden Plants in Myth and Literature *(Timber Press 1999). He is also the co-editor of* A Garden of One's Own, *the writings of Elizabeth Lawrence (UNC Press 1997).*

SOURCES OF RAIN LILIES

Brent and Becky's Bulbs, 7463 Heath Trail, Gloucester, VA 23061. Catalog free.

North American Rock Garden Society (seed only), P.O. Box 67, Millwood, NY 10546. Membership $25/year.

Plant Delights Nursery, 9241 Sauls Road, Raleigh, NC 27603. Catalog price, ten first-class stamps, or a box of chocolates.

We-Du Nurseries, Route 5, Box 724, Marion, NC 28752. Catalog price $2.

Woodlanders, 1128 Colleton Ave., Aiken, SC 29801. Catalog price $2.

Yucca Do Nursery, Rt. 3, Box 104, Hempstead, TX 77445. Catalog price $2.

Calylophus berlandieri, at Lady Bird Johnson Wildflower Center, Austin, Texas (pp. 138–9)

Calylophus hartwegii, Greer Co., Oklahoma (pp. 138–9) photos, James Locklear

Zephyranthes citrina (p. 131)

Zephyranthes jonesii (p. 131)

Zephyranthes macrosiphon (p. 131)

Zephyranthes atamasco (p. 129)

Zephyranthes katherinae (p. 132)

Zephyranthes reginae (p. 131)

Zephyranthes candida (p. 130)

Zephyranthes traubii (p. 132)

Calylophus lavandulifolius, Yuma Co., Colorado, showing wilted flowers with open flowers (p. 138)

Calylophus lavandulifolius, Rooks Co., Kansas photos, James Locklear

RISING STARS
AMONG THE EVENING PRIMROSES

by Jim Locklear and Larry Vickerman

Evening. The time of day when the setting sun and the dusky sky bring a softening to the bustle and turmoil of life. A time to head home and wind down. But while some of us are calling it a day, others are just clocking in. Such creatures are termed vespertine...of the evening. Among them are the evening primroses, a group of plants with flowers that open in the late afternoon and evening and fade away at the coming of dawn.

Although the most familiar of the evening primroses are found within the genus *Oenothera*, a handful of species in the genus *Calylophus* is deserving of increased attention in the horticultural world.

If the name *Calylophus* is unfamiliar to gardeners, it is probably because the six species in the genus were considered part of *Oenothera* until about 20 years ago. These plants occur on the Great Plains and in the southwestern United States—areas that have not received the attention of horticulturists until rather recently—probably also contributing to their relative obscurity.

The taxonomic boundary lines between *Calylophus* and *Oenothera* involve fairly small details of floral morphology, especially characteristics of the stigma. Observant gardeners will notice, however, that by comparison the flowers of *Calylophus* species are rather square in outline. In addition, *Calylophus* species are primarily herbaceous perennials and tend toward shrubbiness, while there are a number of annuals and biennials among the approximately 120 species in the genus *Oenothera*.

The most widespread and familiar member of *Calylophus* is the plains yellow primrose, *C. serrulatus* (photo, p. 124), which occurs throughout the prairies of central North America from Texas into Canada and from the Rocky Mountains east through Iowa into Illinois and Wisconsin. This species was the first of the genus to be described by botanists and was in cultivation at Kew Gardens in England by 1825.

Calylophus serrulatus has an upright, almost shrubby growth habit that immediately separates it in appearance from *Oenothera* species. The wiry stems and small, narrow leaves impart a fine texture to the plant. Although most of its relatives are vespertine, the flowers of *C. serrulatus* actually open in the morning, prompting use of the

name sundrop rather than evening primrose in some references. Generally about an inch across, the clear yellow flowers are produced in great numbers and over a long season, beginning in early summer and continuing sporadically until fall.

There is considerable variation in the height of this species across its range, anywhere from 4–24". The shorter races are found in the drier, more western parts of its distribution. Harlan Hamernik of Nebraska's Bluebird Nursery has selected a dwarf, 6"-tall form to which he has given the name 'Prairie Lode' (photo, p. 124). High Country Gardens of Santa Fe, New Mexico, offers a cutting-propagated dwarf form of similar dimensions.

The taller forms of *Calylophus serrulatus* from the eastern prairies and plains are also attractive plants and probably have the best potential for cultivation in more humid parts of the country. Regardless of geographic origin, the appearance of this plant can be improved by pruning it back to its woody base each spring, a practice that yields a more refined, compact habit.

With its restrained growth habit and long season of bloom, *Calylophus serrulatus* makes an excellent plant for hot, sunny locations. Selections from the drier parts of its range have outstanding potential for waterwise gardens and landscapes. David Salman of High Country Gardens recommends combining *C. serrulatus* with 'Hidcote' lavender and various penstemon species in the garden. Taller forms combine well with purple coneflower (*Echinacea* spp.), purple prairie clover (*Dalea purpurea*), and aster species and cultivars.

The lavender-leaf primrose (*Calylophus lavandulifolius*, photo, p. 136) is another beautiful member of the genus. Although Claude Barr praised it as "a gem of the first water" in his 1986 book, *Jewels of the Plains*, it has only recently become available in the nursery trade. As the name implies, this species has gray-green foliage reminiscent of garden lavender. It has a compact, somewhat matted growth habit in comparison to *C. serrulatus* and seldom exceeds 8" in height. It is vespertine, with mahogany-colored buds opening into 2"-wide flowers in the late afternoon and evening. The flowers are a rich orange-yellow in color and, as an added bonus, fade to an attractive reddish-orange as the sun climbs into the sky the following morning. *Calylophus lavandulifolius* is stunning in full bloom, with individual plants practically disappearing beneath six to eight upward-facing flowers. Peak flowering season is May and June.

With its compact growth habit and refined features, lavender-leaf primrose is a prime candidate for a sunny, dry rock garden. In fact, the improved drainage of a rock garden or raised bed is the best situation in which to cultivate this native of the Great Basin and western plains.

Two other members of this genus, *Calylophus hartwegii* and *C. berlandieri*, occasionally show up in the offerings of nurseries in the southwestern USA. They share many of the horticultural attributes of *C. lavandulifolius* and *C. serrulatus*, except they are generally taller, up to 32" for *C. berlandieri*, and somewhat bushier in growth habit. Both have distributions centered in western Texas.

At Desert Trees Nursery in Tucson, Arizona, *Calylophus hartwegii* (photo, p. 133) is sold under the name of peppersauce primrose, a winsome allusion to the place of its collection in Peppersauce Canyon in Arizona. This vespertine species is used in the landscape as a low (16–20") groundcover

and for mass plantings.

The flowers of Berlandier's sundrop, *Calylophus berlandieri* (photo, p. 133), open in the morning rather than the evening. Certain forms of this species, occurring in south-central Texas, have flowers that feature a deep blue-black color on the inner surface of the floral tube. This attractive species is offered by several native plant nurseries in Texas, usually under the old name, *C. drummondianus*. Native Texas Nursery in Austin offers a cultivar named 'Compact Gold'™, which is described as a low, mounding plant reaching about 12" in height and having grass-like foliage. It blooms in the spring and intermittently through the summer.

Calylophus species can be propagated both by seed and stem cuttings. Good germination can be achieved if seed is cold-moist stratified at 40°F for 45 days. The seed is small and should be covered very lightly with soil or potting medium. Cuttings taken from early May to late June can be rooted in 2–3 weeks. Rooting is improved with a treatment of rooting hormone (3,000 ppm IBA), and by taking a portion of the woody base with each cutting.

Unfortunately, a rather large amount of taxonomic confusion surrounds this small genus in both the botanical and horticultural literature. The names *Calylophus drummondianus*, *C. drummondiana*, and *C. drummondii* occasionally show up in reference books and catalogs, but these entities are no longer considered valid, having been assigned to either *C. serrulatus* or *C. berlandieri*. In addition, *Calylophus* species continue to appear under names within the genus *Oenothera*. Hopefully this disorder will be cleared up as these plants become better known.

Writing in their book *Contemporary Perennials*, published in 1960, Roderick Cumming and Robert Lee described the evening primroses as a "formidable array, a botanical welter, and a genus of much unspoiled charm." The genus *Calylophus* has emerged from this constellation of plants not only as a taxonomic entity, but as a rising star in American horticulture.

Jim Locklear is director of the Nebraska Statewide Arboretum, and Larry Vickerman is director of the Dyck Arboretum of the Plains in Kansas. They are working at both institutions to inspire and encourage the horticultural use of the rich flora of the Great Plains.

CALYLOPHUS SOURCES:

Bluebird Nurseries, PO Box 460, Clarkson, NE 68629. Wholesale only.

Desert Trees Wholesale Nursery, 9559 N. Camino Del Plata, Tucson, AZ 85742

High Country Gardens, 2902 Rufina St., Santa Fe, NM 87505-2929

Native Texas Nursery, 1004 MoPac Circle #101, Austin, TX 78746-6805

Retail Sources for *Calylophus serrulatus* 'Prairie Lode' include: Weston Gardens in Bloom (Ft. Worth, TX); Sandys Plants (Mechanicsville, PA); Sunshine Gardens Nursery (Moab, UT); Longfellow Garden Center (Centertown, MO); Lone Ridge Gardens, (Peterson, MN); Olson's Hillview Greenhouse (Lacrosse, WI); HIgh Plains Natural Garden (Amarillo, TX).

PLANT PLACES

Clark Reservation, Oneida County, New York State

For five years or more Debby Shanahan has been extolling the features of Clark Reservation, just south of Syracuse, and her difficulty in negotiating its spatial dimensions. Her account of guiding Sean Hogan to the location of the hart's-tongue fern in our newsletter was amusing and alluring. Finally Debby got her chance to show this unusual landscape to our chapter members. Unfortunately, I was the only one to arrive at the meeting place at the appointed time. We waited about ten minutes and, when no one else was in view, we—Debby, Steve (naturalist from the nature center), and I—headed off to find, the colony of *Phyllitis* (*Asplenium*) *scolopendrium*. Neither Steve nor I had seen these plants before.

We walked close to the cliff edge, over gaps in the bedrock, skirting *Rhus radicans*, climbing over fallen trees, until we came to a point where two cliffs joined. Then it was down the steep hillside, Debby managing quite well with her foot brace and its clomp, clomp as she walked. The bottom was mucky, so we headed off to the right at the base of the slope, making our way through waist-high vegetation, feeling with our feet where our next step might be. And then again over tree trunks. Finally, Debby spots the first of the hart's-tongue ferns. We pushs on, and there is the whole hillside of clump after clump of ferns with fronds 10-12" tall, some plants with fronds just emerging, some with fronds lying flat, exposing the rows of sporangia. What a magnificent site and sight! After oohing and aahing we proceed to the other side of the creek, stopping to admire a walking fern, *Camptosorus* (*Asplenium*) *rhizophyllus*, growing vertically in moss on the side of a boulder. All around grows the marginal shield fern, *Dryopteris marginalis* and Goldie's fern, *D. goldiana*. Suddenly we come upon a magnificent clump of the glade fern, *Athyrium pycnocarpon*.

Across the creek the habitat changes completely. Now we enter a wooded glen with plant after plant of blue cohosh, *Caulophyllum thalictroides*, a few *Arisaema triphyllum* and *Trillium grandiflorum*, scattered plants of *Smilacina racemosa*, a small clump of *Mitella diphylla* and lots of *Asarum canadensis*, some with leaves as big as dessert plates. We elect to hook up with the lake trail. Turning over a huge slab of wood, Steve finds a spotted salamander and decides to take it back to the nature center. We finally come across maidenhair fern, *Adiantum pedatum*, and a small colony of the oak fern, *Gymnocarpium dryopteris*.

We arrive at the creek flowing out of Green Lake, and there on the opposite bank are grove after grove of flowering fern, also know as royal fern, *Osmunda regalis*, in full "flower." I was sorely tempted to plow through the muck to get a close-up photograph. On the hillside on our right is the most abundant fern on the Reservation, *Cystopteris bulbifera*, the berry-bulblet fern, literally covering the entire hillside. Here we also find *Actaea rubra* and large colonies of *Aralia nudicaulis*, including, at last, a plant with seeds galore. We spot one *Pyrola* and what

appears to be *Panax trifolius*. Taking a low path, we miss the steps up to the top of the cliff. But then we find more walking fern and can feel the cool rush of air out of numerous small caves. Retracing our trail, we locate the ascending trail and begin to climb the 182 steps. I did not count them, but Debby assures us that that is the number the CCC built back in the 1930s.

Finally, back at the top, we get a cool drink of water and learn that someone had arrived, wishing to join us, after we started. But who that was will have to remains unknown, for s/he has yet to reveal an identity. Whoever it was suerely missed a fine fieldtrip!

—William Plummer

Sean Hogan and Murphy's Law in Syracuse

From our adventures at the airport, Sean and I headed out to Labrador Hollow, where I planned for us to spend about 20 minutes on the boardwalk through the wetland, then cross the road to Tinker Falls, where we'd join Paul and climb behind the falls to the whispering rock formation, then hike upstream.

What a joy to explore a familiar place with an enthusiastic visitor! Sean appreciated the feathery *Thuja occidentalis*, the picturesque *Pinus strobus* (dead or alive), the fragrance of *Lindera benzoin* leaves, the taste of *Betula alleghaniensis* twigs, the twisted, spidery blossoms of *Hamamelis virginiana*, and the subtle leaf patterns remaining from the springtime wildflowers growing on hummocks below us. For most of the walk we debated about a twig he had found: what genus, *Viburnum*? Nothing fit until we found the stalked terminal bud. Aha! *Acer spicatum*—I had never even noticed that plant near the boardwalk before.

You can walk around this boardwalk in five minutes, ten minutes if you amble. It takes about 20 minutes with kids, and up to an hour for a botany club. After two hours Paul found us just leaving and reminded us that it was late, so we'd have to rush back!

On Thursday we traded wet and acid for dry and limy and headed off to Clark Reservation. This is the state park that I use to help me understand what a native rock garden should be like in central New York. Its main feature is a plunge basin surrounded by cliffs, formed by a cataract that became inactive toward the end of the last ice age. The fissured limestone and talus slopes contain an abundance of wildflowers and ferns, including the hart's-tongue fern.

Lured by the promise of seeing *Phyllitis scolopendrium*, Sean dismissed my confession of ignorance of most of the other 19 ferns in the park. We would find our way along the abandoned trail, identifying what we could and wondering about the rest. Paul and I had previewed the walk in 40 minutes on Tuesday, but I had no illusions about speed anymore. We soon encountered our first little fern, ebony spleenwort, in a narrow fissure. Later encounters were even larger and more photogenic.

Sean shared my enthusiasm for woodland sedges, especially my two favorites for a shady rock garden: the wide-leafed *Carex plantaginea* and, at the opposite extreme, the thread-leaved *C. eburnea*. If the specimens he will soon receive succeed in his garden, perhaps these two plants will eventually get the attention they merit from gardeners.

We skittered down into the ravine where the hart's-tongue ferns grow. This colony has been observed for over 50 years, advancing and retreating in response

to snow cover (or at least that's one theory). Whatever the effects of the last two winters, one extremely snowy, the other quite mild, the colony is more dense and widespread than I ever remember it. It is truly quite a sight, even without the wildflowers that accent it in the spring.

Continuing along the rest of the route, we identified a handful of other ferns: *Matteuccia struthiopteris, Polystichum acrostichoides, Adiatum pedatum, Osmunda regalis* (high and dry from the drought), and the adorable *Asplenium rhizophyllum* (*Camptosorus r.*). Then came the 187 (or is it 287?) stairs up the face of the cliff—where we emerged at the top only half an hour late.

—Debby Shanahan

BEGINNERS' CORNER

Understanding Plant Names

To the newcomer to rock gardening the use of botanical names can be frightening. "Why can't they all have common names, names anyone can understand?" Unfortunately, many of the plants we try to grow are not native, and it wouldn't really help if the only common names were in Finnish or Argentinian. Also, many of these plants are not common even where they are native.

Until the mid-1600s plant names consisted of several words of Latin that were a brief plant description: "Low plant with long, toothed leaves and fluffy flowers"—that type of thing. It was the Swedish botanist Carl Linn, building on the work of other botanists, who evolved the two-name system that we use today, publishing it in his book *Fundamenta Botanica* in 1736.

Plants are grouped into families, generally on the basis of their flower structure, and most family names end in *aceae*. Within each family, plants are arranged by genus (plural, genera), a group of plants with many common features. Genus names are written in *italics* and start with a capital letter. Within each genus are the individual species that have some feature that makes them different from all the other species in that genus. Their names are also written in *italics*, but starting with a lower-case letter. It is permitted to use an upper-case letter when the specific name is a proper noun, i.e., when the plant is named for a person or place, but most of us opt for the lower case, since it is hard to be certain which names may be capitalized, especially with foreign place names.

Thus *Aquilegia jonesii* and *Aquilegia caerulea* are both easy to recognize as columbines but are obviously different from each other. The genus name is normally written in full the first time, then abbreviated to the initial letter thereafter, as in *A. saximontana*.

In the wild, some species have a variation that differs in some way from the norm. It may be that some plants have white flowers, while most are pink, or that the plants on one side of a single mountain have three leaflets, while all the rest of the species has four. These are known as *subspecies* or *varieties*, and again

the Latin names are written in italics with a lower-case first letter. In general, if there is only a small difference in some plants, they are called a subspecies, while if there is a geographical variation the plants will be classed as varieties. In textbooks and reference books these are normally written as *A. caerulea* ssp. *alba*, or *A. caerulea* var. *triloba.* but in many articles or even plant catalogs you will find them as *A. caerulea alba* or *A.c. triloba.* This is trinomial nomenclature and unacceptable in botanical circles—ever since 1736! Natural varieties and subspecies will come true from seed.

To further complicate things, plants that have arisen in nurseries, either as a result of cross breeding, selection of superior forms from a batch of seedlings or from the wild, or by natural mutation are known as cultivated varieties or cultivars. Their names can be written in two ways. Both are in Roman type, starting with a capital letter. The more common use is to enclosed the name in single quotes, as in *Phlox* 'Crackerjack'. It is also correct to write *Phlox* cv. Crackerjack. There are rules governing what can and can't be used in cultivar names, but unless you are actively breeding new plants, these regulations are unlikely to worry you. Cultivars occasionally come true from seed, but the vast majority are, and should be, propagated vegetatively, by cuttings, division, grafting, etc. to ensure they are exactly like their parent.

Hybrids do occur in nature, but they are much more common in cultivation. A hybrid plant is indicated by placing a multiplication sign between the genus and species names as in *Campanula* x *pseudoreineri.*

—Trevor Cole

PLANTS IN CYBERSPACE

Hidden Web Resources

The Internet has quickly become a rock gardening library. Rock gardeners, horticulturists, botanists, taxonomists have all been creating web pages about plants. Many of these pages have been visited by web spiders that gather up the information and index it. Then web search engines like AltaVista, Google, and a gaggle of other odd names employ the indexes to produce lists of candidate web pages on the topic of choice. Whichever search engine is today's favorite will produce a couple of hundred responses when I ask, *Sempervivum arachnoideum*?

That, of course, is part of the problem. Now I have to wade through two hundred web sites to find my answer, whether it be who's selling, how to grow, what's the habit, or where it's native.

The search engine results are only getting more cumbersome as the volume of data increases. That's why sites that organize the information, sites like Yahoo, are often preferable. Of course, Yahoo is good for travel and computers, but not particularly useful for plants.

Sites that specialize in gardening or horticulture or botany can be very helpful,

sites like Gardenweb or the Internet Directory for Botany. The latter has lots of gardening links. Nevertheless, finding the habitat of the cobweb houseleek is a long row to hoe this way. A more productive approach is often available.

Many newer sites are built on databases. Database sites have one characteristic making them a good fit for a description of *Draba rigida* or the distribution of *Dodecatheon alpinum*. Someone put the database together for a reason, and if your reasons mesh with theirs, you'll get the answer you want a lot faster than wandering around Yahoo-land.

Databases have another, less sanguine, feature: their data is hidden from the search engines. Engines can only see prepared web pages. Database sites, on the other hand, prepare the page in response to your question. Much of the net's information is buried in this way, buried that is, until you ask for it.

As soon as you pose a question—by typing in a word or two—it is open sesame, and their riches spill out, a cornucopia. The horn of plenty has been collected into a web site at: http://www.rockgardener.com/last/resort.cfm where you will find many riches. Here are some of them.

SITES DESCRIBING PLANTS

Calflora

Photos, plant descriptions, habitats, taxonomy of California species, both native and alien. Extensive photo collection. Links to other California resources. Remarkable achievement.

Flora of China

Distribution maps, plant descriptions, habitats, taxonomy for plants of China and SE Asia. Magnificent and incomplete. If the species you are looking for is in one of the 49 families written up, then this link gives everything. If not, use the checklist. The checklist has 30,000 entries, i.e., a 'complete' list, but only limited taxonomic information.

Flora of North America

Drawings, plant descriptions, habitats, taxonomy, the ultimate source for North American plants, but so far including only the ferns, conifers, a few monocots, and the dicot orders Magnoliidae and Hamamelidae. Members of interest to rock gardeners are Ranunculaceae and Papaveraceae. We are not talking peanuts here, even with what is available now.

Harkness Seedlist Handbook

Brief descriptions and origins for 20,000 rock garden plants.

National PLANTS Database

The PLANTS Database includes taxonomy, checklists, identification information, species abstracts, distributional maps, culture and (a few) photos. Impressive results sponsored by the United States Department of Agriculture.

Plants for a Future

The site says, "Plants for a Future is a resource center for rare and unusual plants, particularly those which have edible, medicinal or other uses." Not so

many *rare and unusual* but 7,000 entries, extensive data (culture, plant descriptions, habitats, taxonomy), notably propagation advice, on each. This was my biggest surprise in the search for candidates; there's a great deal here.

SITES MAINLY ABOUT CULTURE

Discussion Archives

Many of the online discussion groups have been talking about rock garden plants—largely about how to grow them—for several years now, so their archives can be a fine resource. Directions to several archival databases are given.

Plant Facts

Photos and cultural info from many Cooperative Extension databases are combined at this Ohio State University site.

Rooting Database

This database from University of California-Davis is a compilation of published experiments in rooting woody plants.

NOMENCLATURE

Flora Europaea

Just taxonomic and distribution data, but this RBG Edinburgh database seems to be comprehensive as to European species. The interface is primitive.

Global Plant Checklist

Sponsored by the International Organization for Plant Information, this is a source for verification of plant names, including 200,000 vascular plants.

Intermountain Flora

Plants of the Great Basin are the focus of the 20,000 records from the Herbarium of the New York Botanical Garden. Images of all the type specimens are being added, but the ones of interest to rock gardeners are currently limited to the *Ericaceae*. Sadly, the *Intermountain Flora* itself is not available.

Plant Name Finder

If you know the common name and want the scientific (or vice versa), this is the place. Common names are, however, English only.

Taxonomic Database

The USDA National Plant Germplasm System has extensive taxonomic and distributional data on 37,000 taxa from around the world. Economic plants are a priority, but there is far more, plus an amazing slew of bureaucratic acronyms.

DIRECTORIES

Barbara Barton's *Gardening by Mail*

Encyclopedia of sources for seeds and plants, supplies and plant societies.

DATABASE OF PLANT DATABASES
A collection of taxonomic databases and herbarium collections, some on the net and some not. If you are searching for a family or genus or geographical area, this is a good starting point.

GLOSSARY OF BOTANICAL TERMS
3700 definitions, comprehensive and cross-linked, from abaxial to zygote.

HORTICULTURAL DICTIONARY
The dictionary contains dibble and 15,000 other gardening terms.

You can reach all of the databases listed here (and more) by starting at http://www.rockgardener.com/last/resort.cfm

—Tom Stuart

Tom Stuart gardens in Croton Falls, NY and builds databases so he can buy seeds.

Musings from a Rock Garden

SEEDLINGS

It usually happens in April. Germination is in full swing, and a rock gardener realizes that pretty soon there will be hundreds of seedlings in pots, frames, and all the other contraptions used for sowing seeds, all waiting for the second fundamental step in plant propagation: transplanting. Although a few general rules for transplanting almost any seedling have been developed and described in the gardening literature, rock garden plants, with their usually small size and relatively slow growth, challenge the beginner as well as the more experienced. Take the first question that will cross your mind when you look at a pot glistening with the first true leaves of two-week-old seedlings: should I pick them now or leave them alone? Obviously, no general answer can be given. It all depends. On what? To start, on the plant species. A studious gardener will put the pot back and depart to search out expert testimony.

Let's skip the frustrating details and assume that a reference exists and is found. Unfortunately, in most cases nothing related to this simple, but fundamental, question is mentioned anywhere, and for a good reason. If the literature were to contain exact directions for handling each plant at every stage of its development, it would triple in size and even then, directions given by a gardener in Scotland wouldn't necessarily be directly applicable to a gardener in

Maryland. With this in mind, our studious gardener becomes less studious, and returns to the seedlings to mull things over. Do the seedlings appear sturdy or weak, are they close together or far apart? Like it or not, a subjective judgment must be made. Strong seedlings growing at some distance from one another are probably ripe for pricking out, but if they seem fragile, very small, or if they are bunched up, it's better to postpone it. In theory, of course, seedlings should not grow close together, because seeds should not have been sown in that fashion in the first place. But how many of us unflaggingly follow this good and oft-repeated rule for sowing seed? Fortunately, a small pair of scissors or fine tweezers and a firm hand can easily thin out a forest of seedlings fairly quickly. And if unwanted plantlets are cut off rather than pulled out, there will be little damage to the remaining ones. Very small and slow-growing seedlings may have to be left undisturbed until the next spring. This is often the best procedure with many species of gentians and, as a result, many people consider growing gentians from seed difficult. However, although the actual growing and maintaining these plants in the rock garden may be a real challenge, keeping their seedlings in a pot a whole year and transplanting them when they are one year old is surprisingly simple. Of course, they must never be allowed to completely dry up, and all weeds, including mosses, must be removed, preferably just when they start to grow. The same is true about many ericaceous plants, certain saxifrages and others with notoriously small seeds and slow seedling growth.

Seedlings that should *never* be transplanted the first year include those of bulbs, corms, and in general, of all plants that show a strong initial growth and then go dormant. Here belong dodecatheons, erythroniums, some lewisias, and many shade-loving plants, e.g., arisaemas, glaucidiums, and trilliums, to mention just a few of those frequently grown. Because some of these may have to be left in their original containers for two years or even longer, weeding becomes an important though laborious necessity.

Let us now turn to the actual process of transplanting. The ground rule here is to avoid any damage to the seedlings' roots, which is as easy to say as it is difficult, or even impossible, to accomplish. Although the basic characteristics of a root system are genetically fixed for each plant, the actual size and shape of any seedling's roots are greatly influenced by many environmental factors including the nature of the growing medium and the size of the container. It is not uncommon to find that a few-millimeters-wide seedling will have 10-cm long, hair-thin roots, some of which may be virtually invisible. How does one keep them intact? Well, frequently, one doesn't, but there are ways to minimize damage. One is to deal with the whole seedlings' container (or with a sizable part of it) rather than tackle individual seedlings. Another is to transplant only when the soil in the container is almost, though not completely, dry. To achieve this almost-dry condition is not difficult with soils or other seed media that are gritty, lose water rapidly, and fall apart when dry. Here the plants' roots are easily liberated by gently shaking and tapping the contents of an upturned container; individual seedlings can then be separated from one another by pulling them carefully apart. Peaty and fibrous seedling media are more difficult to bring to this stage, especially if the seedlings were growing close together.

Once a seedling is liberated from the medium, it should be planted in a new pot as soon as possible. Hair roots of even a small seedling have an incredibly large surface area and can dry up, and die, within minutes, especially in hot or

dry weather. For the same reason, seedlings waiting for transplanting should always be protected from sun and wind.

It is easy to understand why the composition and properties of the medium, in which the new seedling is supposed to grow for the next several weeks or months, are important. Somewhat less clear is the effect of the size of the container. Experience indicates that small seedlings in large pots tend to die more often than those in small pots, possibly because the moisture content of soil in large pots is not easily controlled. During the first few days after transplanting, overwatering is especially dangerous, because it reduces access of a plant's roots to air. Some rock gardeners completely avoid overhead watering of newly planted seedlings by partly submerging the pots in water for one or two hours—a somewhat tedious procedure. If a gritty, rapidly draining planting medium is used, the danger of overwatering can be reduced to a minimum.

Much of the tedium of transplanting can be eliminated by planting seeds individually in small cells. Many different types of plastic containers divided into a varying number of smaller cells are now available on the market; most can be used for planting seeds. Not more than two or three seeds should be planted in each cell. After germination, the entire contents of the cell can be transferred to a larger pot with almost no disturbance to the seedlings' roots. Although this procedure, widely used in commercial horticulture, may sound like a panacea, it isn't without problems. Maintaining just the right amount of moisture in the cells during the critical period of incipient germination, which some seeds of rock garden plants seem to require, is not easy, and the cells take up a considerable amount of space. Nevertheless, for many tap-rooted legumes, e.g., *Astragalus* and *Oxytropis*, and plants with brittle roots, e.g., *Silene hookeri*, the cell procedure gives good results, because seedlings can be transplanted very early, even in their cotyledon stage.

At this point, the reader may have gained the impression that transplanting seedlings is a tricky business that often leads to failure. Fortunately, this is not the case. Most seedlings are sturdy little fellows endowed with an amazing ability to survive and prosper, and a 90% or better survival of transplanted seedlings is not unusual. Some years ago, I set aside a small piece of partly shaded ground to serve as a "seedling cemetery." The soil was mostly crushed stone, and whenever I had an extra seedling that I didn't want to pot, I made a narrow hole in the ground with an old knife, inserted the seedling's roots into it, watered it to close the narrow gap, and forgot all about it. To my unending surprise, many of the seedlings survived and grew, even though they were not regularly watered and cared for. Sometimes, the "cemetery" provided the best, and in a few cases the only, plants for transplanting into the rock garden. Clearly, the irony of this example doesn't invalidate the sound principles of transplanting seedlings, but it indicates a possibility of skipping the potting stage and transferring young seedlings directly into a place in the rock garden. Although the chances of success are in this case rather slim, they do exist, and next time, when you have a few seedlings that you don't want to pot, why not try planting them out?

—Alexej (Sasha) Borkovec

PROPAGATION

Seed Ecstasy

Just the other day I received a letter from a dear friend in North Carolina with whom a delightful exchange of correspondence has been established with a quick notation on the back of the envelope exclaiming, "The hepaticas are blooming!"

What a wonderful feeling such a short statement evoked in me during these all-too-long, dreary January days in Iowa! My mind wandered back to my childhood walks through the deciduous woodlands of the YMCA camp where my parents were the caretakers. My Dad would hold my hand while pointing out each delightful surprise blooming beside the tree trunks and amidst the wet-smelling, fallen leaves. Many a time my parents would have to hunt me down to find me beside one of the many paths, hands filled with small bouquets and pockets yielding special leaves, snail shells (some with snails still in residence) and other treasures, happily covered with dirt, hair decorated with twigs and tangled with the woodland's gifts!

This morning I look across the work table my husband and I share, intimidated and awed by the thousand or so species listed on a paper on the wall, a multitude of packets neatly arranged according to their germination requirements lining the shelves. "How on God's Green Earth can two people possibly start all these?!" I think to myself. "How does my husband remember all these names, where the plants are from, and what it takes to get the seeds to grow?" I wonder.

Every year these questions cross our minds while the multitude of tasks involving our survival face us like a yawning chasm waiting for one misplaced step to claim us in its cold, hard recesses. We become gripped with fear, staving off panic as best we can, as we are all too aware of how deep that chasm is! Yet onward we trudge, our eyes upon the icy path as we begin to actually hold the seeds and trustingly place them into the nurturing soil of plug tray after plug tray.

A metamorphosis of the spirit occurs when holding the basis of life itself enclosed in a seed just wanting to be a plant! From a grandiose sense of power: "It's up to me whether your mysteries shall be allowed to unfold!" (accompanied by a sinister laugh), to a feeling of kindly helpfulness: "So you want to be a plant, eh? We'll see what we can do about that...," even a sense of Motherliness, "Here you go, little guys, all tucked in and cozy." Each seed holds the potential for a multitude of experiences, emotions and planting potential. Encapsulation of germplasm unlock visions of exotic places throughout the world. Who can resist imagining the smell of clear air 11,000' up a mountain in the Tien Shan; misty clouds revealing and hiding peak after peak until forever? Or having finally reached the top of a long and steep incline to behold meadow after meadow unfurling glistening white *Lilium regale*, their trumpets releasing the most intoxicating scent imaginable that rolls over and through the senses with the breeze?

Or even the rocky smells of a small enclave in the hills around Grozny, the distant gunfire reminding one of the urgency of the situation and the need to collect a few seeds of this last remnant of a lovely species lest it become lost to the world.

As our season begins, it's all too easy to lose sight of the magic inherent in each seed to the intimidation of the vast quantity to be started! Yet, we catch ourselves almost cooing over the packets as my husband reads the descriptions, saying each botanical name with affection and checking it off the order list.

A pink *Corydalis?* An alpine *Clematis* that forms a tight, 2' mat? Oh, but how about a pink *Aconitum*? How tall does it get? Where's it from? Trout lilies *en masse*...a veritable cornucopia of *Erythronium* species that challenge us with their reticence to germinate, species peonies thumbing their seed noses at us, daring us to unlock the secret of life encoded in their DNA (we've given up on trying to convince them that we know what we're doing, as they know we've nary a clue.)

Our hearts quicken as our anticipation grows. We eye each plug tray with vigilance and hand mistings and mutterings of hopefulness.

Ah, but the joy of those first cotyledons peeking just above the soil fills the soul! "Life!" is whispered reverently as we gaze at the tiny birthlings unfolding themselves toward the light, "Look, the campanulas have germinated! Say, see the heucheras coming through?"

Though the intensity and long hours exhaust us like parents up every two hours with triplets, and we're usually "biting our own tails" by April and have become blithering grumps, I can't imagine doing it any other way!

In this world of computers and mechanized planting systems we shudder to think of the mindset it takes to treat such wonders of Creation in such a disrespectful manner when we experience in the recesses of our beings the characters and personalities of our plants from birth!

Such childlike exuberance seems to have been lost to many of us over the years, our vision of the excitement of surprise being left to the wayside. Replacing it are concepts of absolute order and normalcy, validated by pretension or grieved in great sadness or, having discovered its loss, exclaimed in rage!

As the cold January day unfolds through the window and the sun slowly starts to glow and dance in the clearest of blue skies I look across the work table with a feeling of satisfaction and write of the passion within that becomes focused upon the very act of life itself. My inspiration is fed by the legacy of a Father holding a little girl's hand in the woods and I remember, with warmth, that the hepaticas are blooming in North Carolina.

—Caroline Bertrand

BOOKS

The Explorer's Garden—Rare and Unusual Perennials, by Daniel J. Hinkley. 1999. Timber Press, Portland, OR, ISBN 0-88192-426-1, 380 pages, color pictures, hardcover, 7.5" x 10.5". $39.95 list; Available from NARGS Book Service to members (national) for $32.

When I considered reviewing Daniel J. Hinkley's *The Explorer's Garden: Rare and Unusual Perennials,* I at first paused and thought: how does one review any of Dan's works? Then I realized that this could possibly be one of the easiest reviews ever written. Indeed, to review a book so meticulously compiled and so competently and wonderfully written is hardly a challenge. No biting criticisms are needed here. Quite simply, this book stands far and away from a largely mediocre and often poorly edited, ever-burgeoning mass of garden-oriented books.

Unlike the multitudes of so-called "plant encyclopedias" flooding today's book markets, *The Explorer's Garden* is organized by grouping botanically related or similarly used garden plants into a manageable 28 chapters. These are amusingly titled: "*Paris* in the Springtime," "Cuckoo for *Cardamine,*" and "Beyond Frilly Filler: The Genus *Thalictrum,*" etc. Preceding these chapters, however, is an all-too-short discussion (only five pages) of vitally important topics such as nomenclature, ethical issues, nativity, and hardiness. Of these, I particularly applaud Dan's tackling the hardiness question, since he at once both dispels the absurdity of utilizing only the USDA or *Sunset* cold hardiness zone maps and intelligently discusses how provenance, microclimate, water, and plant-inherent hardening-off processes contribute to holistic plant hardiness. Finally, readers are exhorted to heed common sense, being reminded that plant nativity or ecology is not necessarily directly related to apparent ranges in physiological tolerance.

The bulk of this book, of course, is devoted to plants. Of particular service to horticulture is the spotlight given to plants which have received little or no recognition anywhere outside of specialty nursery catalogs, botanical journals and monographs, or floras. Thus, readers are delighted with introductions to the hordes of newly discovered species of Chinese *Epimedium,* the outrageous Asian species of *Podophyllum* (a look at Dan's photo of *P. difforme* on p. 117 will make any plant-lover weep), as well as an unending array of exquisite *Arisaema, Asarum,* and the unearthly umbrella-leaved composites, *Syneilesis* and *Ainsliaea.* Even the omnipresent hardy geraniums are treated unconventionally, exposing the reader to new and unfamiliar cultivars.

Three points deserve particular mention. I was especially appreciative of the careful attention given other people involved with introducing, hybridizing, or describing plants that are new to science or are poorly understood scientifically. Thus, we learn about Père David, Paul Perny, Wen-pei Fang, Mikinori Ogisu, Roy Lancaster, Martyn Rix, Sue and Robin White, William Stearn, and Darrel

Probst, all in the context of only one genus—*Epimedium*, of course! A veritable history lesson is provided here. Secondly, Dan carefully discusses nigh-hopelessly confounded plant groups, attempting to alleviate rife confusion among horticulturists and botanists alike (e.g., especially well-done for *Rodgersia*). Lastly, we must all thank Dan for providing basic garden information. After all, not even the much-vaunted *Flora of China* makes note of propagation techniques or garden performance, and certainly no botanical text would ever tell us which plants to group together for maximal design effect.

There are amazingly few nit-picking errors to address in this book, a tribute to author, editor, and publisher alike. For instance, the mention of one native species of *Polygonatum* occurring in the eastern USA is incorrect, in that a second species (*P. pubescens*) also occurs. Also, a sentence alluding to the current opinion of some botanists that *Smilacina* should be lumped into *Maianthemum* might have been warranted. Also, *Uvularia caroliniana* should read *U. carolina.* Although comments such as these may often portray reviewers as a villainous lot, I must point to the paucity of errors and difficulty in finding them encountered by this reviewer.

In short, buy this book for your horticultural library. Buy it for your friends. Buy it for Lynn Harrison's (and Dan's) sumptuous, flawless, and artistic photography. Buy it so Dan can write the follow-up woody plant volume! Most of all, however, buy this book to gain a better understanding of our lone planet's marvelous and awe-inspiring plant diversity and of each constituent species' uniqueness—this all contributing to a constant enrichment of our gardens.

—Todd Lasseigne

Rhododendrons in the Landscape, by Sonja Nelson. 2000. Timber Press, Inc: Portland, OR. 255 pp., 52 color photos, 10 b/w illustrations, 19 tables. Hardcover. ISBN 0-88192-440-7. Price $29.95, plus shipping and handling.

A book like this is far overdue. Sonja Nelson has combined her first-hand knowledge of plants in the genus *Rhododendron* and their culture with many photographs of rhododendron gardens in the United States and abroad. The superb selection of photographs has greatly enhanced and vividly illustrated the text. Nelson has discussed in detail the taxonomy of rhododendrons, as well as conveying cultural advice from the people that maintain the gardens, as well as those that administer them.

The ten chapters cover in detail what every novice and connoisseur should know about creating and maintaining different types of rhododendron gardens and keeping the plants happy. This includes environmental requirements such as soil, moisture, humidity, light, temperature tolerances, as well as suitable companion plants. Also covered are desirable locations, garden designs, compatibility of plants in terms of growth habits, and suggestions for blending flower and foliage colors. The chapters are entitled: The History of Landscaping with Rhododendrons; Designing by Principle; Planning the Landscape; The Woodland Garden; The Rock Garden; The Mixed Border; The Collector's Garden; The Native Plant Garden; The Small Garden; and Special Features.

The chapter on rock gardens is especially good and informative. It also

reminds us that the first concern is not *which rhododendrons* are good for rock gardens but *which rock gardens* are good for rhododendrons. Once the proper environment and location are recommended, Nelson describes soil mixes to use, placement of suitable rocks, and plants to consider. Those of you who have, or can create, the environment and location suitable for rhododendrons should not overlook the opportunity to enjoy more of these plants.

Another feature of the book that I liked was the nineteen tables where she candidly suggested plants to consider for gardens featuring certain basic plant characteristics, gardens for special situations, and some unique species. The tables are entitled: Evergreen rhododendrons with traditionally shaped leaves (elliptic); Evergreen rhododendrons with narrow leaves (lanceolate); Evergreen rhododendrons with egg shaped leaves (obovate or orbiculate); Deciduous rhododendrons; Sun-tolerant rhododendrons; Rhododendrons making single or multiple stemmed trees when mature; Companion plants; Trees; Evergreen azaleas; Rhododendrons with creeping habit; Companion plants: shrubs; Companion plants: herbaceous perennials; Companion plants: ferns and mosses; Vireya rhododendrons; Native North American companions: small trees; Native North American companions: shrubs; Native North American companions: herbaceous perennials; Native North American ericaceous companions; Rhododendrons suitable as single specimens; and Fragrant rhododendrons.

I'm sure the name Sonja Nelson is familiar to most of you, as she is the editor of the Journal of the American Rhododendron Society. She has a degree in English from Smith College and in journalism from Western Washington State College. She hails from Excelsior, Minnesota, is a Master Gardener, and tends her own landscape of rhododendrons near Mount Vernon, Washington.

—Art Dome

Rock Garden Plants: a Color Encyclopedia, by Baldassare Mineo. Photographic assistance by Fritz Kummert. 2000. Timber Press: Portland, OR. 284 pp., 1,350 color plates, 2 maps, 8.5" x 11", Hardcover. ISBN 0-88192-432-6 $59.95.

By now, much of our membership has probably obtained a copy of this long-awaited tome, and many of us have spent long hours scanning the stunning pictures—looking to see what this or that plant ought really to look like, smirking smugly occasionally when we know that WE have a better picture or once had a better color form or specimen. Now that the first flush of excitement has passed, one begins to notice the *lacunae,* or the slight fudging here or there of hardiness zones...we certainly know many plants contained herein, we think ever so confidently.

Surely, a color encyclopaedia serves many purposes: first and foremost it is a guide for beginners. Where else can you find so many wonderful thumbnail photos andso much sound information? Then those further along still need some verification and answers. What about the professionals? The guys that think they know it all? I probably qualify in this last category, and I can say (although a few of my pictures were included; I must come clean), this is an instant classic. It represents a flowering, as it were, of two enormous talents in our art: Baldassare

Mineo, owner of Siskiyou Rare Plant Nursery, and Fritz Kummert, an astonishing horticulturist from central Europe. What this book contains is nothing less than a documentation of their gardens over the past decades. As I look through the pictures I recognize vignettes from Baldassare's private gardens in Medford and glimpses of Kummert's Austrian extravaganza. Of course, there are lots of primulas shot in nature, photos each of them took in other gardens (including my own). Nevertheless, I have no doubt the overwhelming bulk of plants pictured and described herein were grown personally by one or the other of these gentlemen. This provides an integrity lacking in so many other encyclopaedic works that are mere put-together patchworks of a dozen or so professional photographers.

The ascendancy of Great Britain in our art has sometimes obscured the fact that central Europe and the Pacific Northwest are also regions with extremely congenial climates for growing plants, combined with large gardening populations and large horticultural industries. This encyclopaedia will do much to balance the picture, as well as provide a monument of sorts for America's premier mail-order rock garden nursery. We are all gardeners descended from Siskiyou Rare Plant Nursery. Who has not bought plants from them?

Virtually all the classic genera from *Androsace* to *Veronica* have the principal European species pictured and described succinctly (these aregenerally, after all, the most widely cultivated and hardiest forms). Enough Asiatic androsaces and Turkish veronicas are included to do justice to the last few decades of explosive plant introduction. Virtually the same scenario holds for *Campanula, Cyclamen, Clematis, Colchicum,* to mention only the "C's."

My real test for Encyclopaedias is "Do they do justice to the plants I like?" The answer to this is an emphatic "Yes." *Acantholimon, Delosperma, Diascia, Origanum* all receive star billing for the first time—an honor long overdue. Another question to ask: "Is there anything new I can learn here?" *Rock Garden Plants* does well on both counts. Time and again specimens are shown growing better than I can imagine. *Calluna vulgaris* 'Dainty Bess' as I have never seen a heather, captured with the ineffable eye of both gardener and artist. *Thymus broussonettii* is enough to make you eat your heart out. *Hakonechloa macra* 'Aureola' positively glows. And what is this *Crepis aurea*? *Selaginella involvens*? *Ornithogalum oligophyllum*? There are dozens more mystery plants to set you wandering through cyberspace and nurseries for years to come.

The text is delightfully clean and crisp, and the names seem to be very much state of the art and meticulously proofed (let's correct "*Phlox pilosa* ssp. *osarkana* [sic]" (p. 183) in the next edition. *Agave eborispina* (pictured on p. 23) is surely just another form of *Agave parryi*? *Helichrysum scapiforme* is a synonym of the rose-pink *H. ecklonis*—what is described and pictured on page 133 must be *H. marginatum,* a gem of a plant unknown to previous encyclopaedias. *Origanum pulchellum* (p. 170) is none other than *O. libanoticum,* and *Orostachys iwarenge* pictured on the next page is *O. boemeri* (formerly *O. furusei*). And there are a few more peccadilloes that advanced rock gardeners will no doubt pounce upon. But not all that many, really. Something must be said about the USDA zone numbers, but what? Of course, beginners need climatic hints...there must be a better way! Realize that Baldassare errs on the side of caution.

The treatment, when it comes to lesser known genera, is somewhat inconsis-

while *Lesquerella* (one of the most widespread, numerous, and important genera of American plants) is strangely absent. And what about *Castilleja*? I am not alone in growing a half dozen species effortlessly.Of course, finding fault with encyclopaedias, like finding precedent in the Bible, is a game anyone can play. Of those who quibble I ask, "Why haven't you written a book like this then, smarty pants?" Considering the thousands of new plants that have reached our gardens in recent decades, we must regard this as merely the first volley: All you know-it-alls, get off your duffs and get some sequels and supplements coming along! I think you will quickly develop great respect for the book at hand.

—Panayoti Kelaidis

ERRATA

#@!**%$#@!!!

Volume 58(1), Winter 2000.

Cover: The cover of the Winter 2000 issue features *Erigeron purpuratus*, not *Eriophorum*. The latter plant will appear on a later cover.

The correct name for the *Vaccinium* pictured on page 31 is: *Vaccinium vitis-idaea* 'Erntedank'. The name was misspelled in text on p. 33.

The *Allium* pictured on the lower half of p. 16 is *A. cyathophorum* var. *farreri*.

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The registration brochure will be included with the Winter *Quarterly*.

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