

ROCK GARDEN *Quarterly*



Volume 62 Number 3

Summer 2004

Front cover, *Cypripedium parviflorum* (syn. *C. calceolus* subsp. *parviflorum*), the eastern North American representative of this species, in the Minnesota woods. Painting by Diane Crane.

Back cover, *Cypripedium* species in the garden of Darcy Gunnlaugson (see p. XXX). Foreground, *C. macranthos*, Taiwan form; against tree, *C. fasciolatum*; large drift in middle, *C. formosanum*; middle left, *C. macranthos* 'Hotie Atsumorianum'. Photo by the author.

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

ROCK GARDEN

Quarterly

BULLETIN OF THE NORTH AMERICAN ROCK GARDEN SOCIETY

Volume 62 Number 3 Summer 2004

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How to enter the 2004 Photo Contest

This year's prizes for first place in each category are one-year gift memberships in NARGS for the recipient of the winner's choice, and a grand prize of a fine illustrated book. Please include a cover letter with your name, return address, and a list of entries sent. Please ensure that it is easy to match the information on your slides, prints, or digital files with the list!

Each person may enter up to 10 photos per class, as prints, slides, or digital files on CD (**not e-mailed!**). If submitting your entry on CD, please include a list *on paper* with the names of the files for each item. Send all entries to the Editor: Jane McGary, 33993 S.E. Doyle Road, Estacada, OR 97023, USA. The deadline for receipt of entries is **September 1, 2004**.

All materials submitted will be returned by November 2004, except for award-winners to be published in the 2005 volume of the *Rock Garden Quarterly*, which will be returned later. By entering the contest, you grant NARGS the right to publish your photograph one time in the *Rock Garden Quarterly* and to post it on the NARGS website; however, you retain copyright.

Labeling. Write your name on each item sent; for prints, write the information on a paper label in pencil and stick it on the back. Be absolutely sure your *name* is on *every* slide. It is helpful to include your name in the file names of digital images, e.g. "Anderson.Pyrola.asarifolia."

Prints. Home-processed digital prints may not be of sufficient quality to be competitive, despite high-quality original images. Do not send *framed or matted* prints.

Digital images. Be sure that your digital files can be opened in a Windows XP Professional system using Adobe Acrobat, Photoshop, LView Pro, or other Windows application. The best results are obtained with high-resolution ("fine" or "very fine") jpeg or tiff files. Each image must be submitted as a *separate file* with a unique name.

Classes:

Class 1: Portrait of a plant in the wild. Image should be centered on the plant, but extreme close-ups are less desirable than photos showing the entire plant.

Class 2: Natural scene featuring wild plants. The plants should be clearly visible, but this is to be a "scene," not a "portrait"; that is, a broad view of the habitat should be shown.

Class 3: Portrait of a plant in cultivation. Extreme close-ups are less desirable than views of an entire plant. Plants illustrated should be *suitable for rock gardens* in the broadest sense—i.e., small in scale.

Class 4: Rock garden scene, showing both landscape and plants. Vignettes of small areas often are more artistic than a broad view; however, this is not the class for "portraits" of individual plants.

We look forward to seeing your photos!

From the Editor

This issue's cover painting inspired a call for contributions on the genus *Cypripedium*, to which some remarkably knowledgeable growers have responded. Publicizing any orchid as a garden plant is occasion for anxiety because many of the showy species have become endangered in the wild as a result of collecting for sale, as well as by habitat loss. The article by Harold Koopowitz, an international authority on orchid conservation, was written in response to my specific request that this concern be addressed. Nevertheless, the modern propagation techniques described by Milan Sembol in his article promise to make it possible for gardeners to establish hardy orchids without threat to natural populations.

The new look of our back cover, which will now feature color photos, is one change being made in response to a meeting with the NARGS Administrative Committee this winter. We also agreed to reintroduce a feature that was part of the Society's journal for many years, back when this was the *Bulletin of the American Rock Garden Society*: a column of brief contributions collected and organized by the editor. This is an opportunity for everyone to participate more in our journal, especially those who don't wish to write a feature article but have some more compact bits of information to offer their gardening friends.

Contributions to our new and yet unnamed anthology can be anything connected with rock gardening:

- new plants, or observations about familiar ones
- construction and cultivation techniques
- useful products and tools
- control of pests and diseases
- good places to see plants in the wild, especially in North America
- responses to articles

Please send your comments to me by mail or e-mail:

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I look forward to hearing from a great many of you!

Cypripediums in the Garden

Milan Sembol

Translated from Czech by Alexej Borkovec

Although hardy orchids of the genus *Cypripedium* are among the most beautiful of all plants, they are seldom cultivated. The usual reasons for this are the difficulty of procuring them, their relatively high price, and a general belief that they are difficult to grow. Over 25 years of growing cypripediums and pleiones, I have gained some knowledge and experience, which I can now share with other growers.

The majority of the older plants in my collection originated from wild collections, which, prior to the widespread acceptance of the CITES agreements—the international code for the protection of threatened and endangered species—was the commonest, cheapest, and often only way of obtaining these plants. Institution of CITES regulations reinforced the urgency of developing new laboratory methods of propagating orchids, and these techniques were eventually applied to cypripediums. The following paragraphs summarize the results of many years of my attempts and mistakes, but also successes, in this endeavor.

Garden cultivation

These plants typically grow naturally in open mixed forests of pine, larch, birch, ash, oak, spruce, and other trees, mostly at middle to high elevations in North America and Europe, and in open meadows at high elevations (2500–3000 m) in central and northern Asia. The latter habitats feature frequent summer fog, cloudiness, and rain, so that despite the open situation, the amount of direct sunlight is about the same as in light woodland. I would characterize cypripediums as plants that like “moving” sunlight. If this type of exposure cannot be arranged in the garden, I recommend an eastern exposure with sun until mid-morning.

Cypripediums don't seem particularly choosy about soil composition. I have seen them growing in a 20-cm (8-inch) layer of old beech leaves as well as in the middle of a well-used path in an Altai forest, and even in a lava scree in Kamchatka. Nevertheless, I do think that they prefer an airy substrate that falls apart

after being pressed in the palm of the hand. For my pot-grown plants, which are plunged in the garden soil, I combine leafmold from a mixed forest, gritty sand, perlite, and peat moss in approximate proportions of 3:1:1:2. I cover the bottom of each container with a layer of roughly crushed dolomitic limestone; for lime-hating *Cypripedium reginae* (photo, p. 198) and *C. acaule* one can use granite or polystyrene instead. The reaction of the substrate should be mildly acidic; only *C. acaule* requires a pH as low as 5.

In the middle European climate of my home, Ostrava in northern Moravia, Czech Republic, the average yearly precipitation is about 600–700 mm (23.6–27.6 inches); the rainiest months are July and August. Under these conditions, I water only when there has been no rain for at least a week. *Cypripediums* from high mountains of China and the Himalayas where monsoons occur need regular watering until the end of August. For these alpine *cypripediums* and for *C. reginae* I try to find a cool—but not shady—spot in the garden.

It was once believed that *cypripediums* do not tolerate mineral (“chemical”) fertilizers, primarily because these reduce the pH of the soil. However, in accord with other growers, I can state that moderate application of a neutral pH complete fertilizer is beneficial. In the spring, I like to sprinkle the plants with bone or horn meal and apply a softwood mulch, which, upon decomposition, also enriches the soil. I recommend applying mineral fertilizers in soluble form, watering with the solution to prevent accumulation of undissolved particles on top of the soil.

During the growing period, perhaps only *Cypripedium irapeanum* requires particularly high temperatures; *C. segawai* also grows in rather warm areas. Other *cypripediums* prefer cooler locations. *Cypripedium calceolus*, *C. parviflorum* (photo, p. 196), *C. pubescens*, and *C. californicum* tolerate short periods with temperatures around 30°C (86°F); all others that I grow prefer summer temperatures around 25–27°C (77–80°F). Most of them will survive short periods of high temperature, but longer periods may be catastrophic. For example, in 2003, when summer temperatures in Europe exceeded 30°C, a week of such extremes killed almost all plants of *C. lichiangense* grown in the Czech Republic. Apparently healthy, strong plants after one hot day showed nodding, wilted leaves, and in a few days the stems started to rot, requiring intervention with a scalpel. Despite all efforts, most plants in collections and in nurseries died. Only a few growers with gardens at higher elevations reported their losses to have been small.

In central Europe, the first snow usually comes in November and temperatures then drop below freezing. A thaw typically begins around Christmas and lasts until the middle of January, when the snow and frost return. However, another thaw followed by snow and frost may occur. Winter usually departs around the end of February, and in the lowlands, snow flurries and frost return only for a few days. During the past 25 years, these conditions have presented no problems for *C. calceolus*, *C. reginae*, *C. parviflorum*, *C. pubescens*, and *C. acaule*. With other species—such as *C. macranthos* and its varieties, *C. guttatum*, *C. henryi*, *C. flavum*, *C. franchetii*, *C. tibeticum*, *C. corrugatum*, *C. ventricosum*, *C. cordi-*

gerum, and *C. himalaicum* (photos, pp. 194–197)—I observed that they didn't seem to mind frost as much as they did fluctuations in winter temperatures and the snowmelt water that reached the plants' roots and rhizomes.

Like most other growers, I tried to solve these problems by covering the plants with glass after the first frost, but this was far from ideal. Instead of glass, we used plastic materials such as polystyrene, but their white color was unsightly, and the shelter was used as a hiding place by rodents. I came up with a better and cheaper solution: softwood sawdust and shavings. Every fall, I mulch the plants with a 15-cm (6-inch) layer of this mixture, which catches the fall rains and provides sufficient thermal insulation to counteract the repeated freezing and thawing of the soil. Lately I've been experimenting with a variation: in the fall, I use only a 10-cm (4-inch) layer of the mulch, and after the first hard frost, I add another 5–7-cm (2–3-inch) layer. Experience over the past two years indicates that this variation is an improvement.

I have heard that certain species are more frost-hardy than their warm-climate origins would suggest, but none of my friends could confirm this. Therefore, I overwinter *C. japonicum*, *C. formosanum* (photo, p. 193), *C. bardolphii*, *C. fargesii* (photo, p. 195), *C. daliense*, and similar species in a frost-free cellar where the temperatures stay between 1° and 5°C (33–40°F). A few times during the winter, I put some snow on the surface of the containers to keep the soil slightly moist and cool. In the same cellar, I overwinter flasks containing newly sown seed and 1-year-old seedlings, even those of the frost-hardy species.

Propagation

For many years, I and most other growers propagated cypripediums only vegetatively, by dividing the clumps or the rhizomes. Early in the spring, before the buds start to grow, I free the rhizome of soil and cut it with a sharp knife so that the part with the bud is shorter and the one without the bud longer. I coat the wound with a mixture of charcoal dust and broad-spectrum fungicide. After about 30 minutes of drying, I plant both parts in a slightly moist soil mixture. To prevent rotting, I shield the plants from rain for two or three days. The part with a bud blooms and grows normally. With some luck, the other part will form a new bud before winter, and after overwintering it will produce new though somewhat small leaves. This plant will not flower until the next year. Overall, this is a rather slow procedure with a success rate around 50% to 70%, depending on local conditions, the skill of the grower, and the health of the original plants. Clearly, only plants with sufficiently long and healthy rhizomes give satisfactory results.

The division of root clumps or clusters is a similar procedure, except that the clump may be divided into several segments, each with at least one healthy bud. This may yield several growing and blooming progeny from each plant, but the effectiveness of the division method depends on the size of the mother plant, and division can be repeated only once every three or four years.

Sexual reproduction is propagation by means of seed. Orchids have very small seeds. Seeds of other plants are composed of embryos and nutritive substances. After sowing, the embryo begins to grow, and before the first green leaves are formed, it obtains its nourishment from the stored food. The seeds of orchids, however, contain only embryos, which can be seen under magnification. When orchid seeds are sown, there is no ready supply of food. To survive, the seedlings need a food source, which is provided by the mycelia of various monocellular fungi. In forests, we can sometimes see these dense, white fibers in decomposing leaves or conifer needles. From these fibers, the cypripedium embryo extracts nourishment and grows, and after several years, the underground part of the plant is sufficiently strong to push up to the soil surface and form its first green leaves. From this point on, cypripediums don't need symbiosis with fungi and can be freely transplanted.

All this indicates two possible approaches. One is to sow the seeds of cypripediums in nature in locations where wild cypripediums already occur. Apparently the soil there contains the necessary fungi, and so in a few years, we can have naturally grown seedlings. The other approach is to collect suitable soil in a forest, place it on a limestone base, add some more decomposing leaves and needles (larch needles are ideal), and sow the seed into this substrate. If we take good care of this nursery area, keep it constantly moist, and once or twice in a year add some more leaves and needles, we may get some seedlings. However, this may take several years, and success is not guaranteed. Obviously, it makes no sense to sow cypripediums close to plants purchased from a nursery, because these plants were either produced in a laboratory or were imported and thoroughly washed. In either case, fungi are not likely to be available.

Today, orchid propagation in the laboratory is by far the most successful method. The seeds are sown in sterile glasshouses on an agar substrate. The germinating embryo is transplanted into a medium that contains all the necessary nutrients, and the seedlings grow until they are ready to be transplanted to a bed, or better, to a container. Such "flasked" seedlings are sold by firms specializing in the propagation of orchids. Upon request, reputable companies will provide the buyer with directions and advice on how to handle the plants, because substrates and handling differ according to the location and methods of the company. There will be different suggestions for buyers from Greece, Texas, Sweden, or Canada, but I will mention only a few general ones that are valid everywhere.

After removing the plants from the flask, wash them thoroughly with lukewarm water to remove any residual agar, which can rot in the soil and endanger the plants. You can also wash them with a weak, pink solution of potassium permanganate. Take care not to damage the roots, the rhizome, or the bud. Then, plant the rhizome in the recommended substrate. I also recommend covering the surface of the substrate with a thin layer of live sphagnum moss; good growth of the moss signals good conditions for the cypripedium. If such moss is not available, a thin layer of ground dolomitic limestone with particles 3–5 mm in diameter (for instance, fine poultry grit) will do. As a rule, seedlings shouldn't

be planted into open ground where controlling environmental conditions is difficult. The young seedlings were used to a sterile environment with only very gradual changes. Therefore, we should try to approximate this by keeping temperature and humidity changes to a minimum while keeping the substrate slightly moist at all times.

Controlling pests and diseases (especially fungi) is important. I recommend an occasional spray with a broad-spectrum fungicide or the use of different fungicides. The young plants require regular inspection, at least twice a week in good weather but daily in abnormally hot, dry, or rainy conditions. Those who cannot do this are better off buying more mature plants. However, gardeners in cooler and wetter areas that are suitable for growing cypripediums, and those who observe their plants daily, can profitably buy young seedlings in flasks and engage in some experimenting.

This is also a good way to acquire new varieties and hybrids, which enrich this genus with new combinations of colors, sizes, and shapes of flowers and leaves. In my experience, confirmed by other growers, hybrids are frequently easier to grow and prosper better than pure species, which tend to be overly dependent on the specific circumstances of their place of origin. Hybrids also offer new experimental possibilities to growers who want to try hybridizing themselves. Many orchid-growing laboratories are willing to collaborate by sowing the grower's seed and growing the resulting seedlings until they can be transplanted. In offering this service, I always talk first to the grower to determine whether the intended pollination or cross-pollination makes good sense, and then we settle the details of the procedure. After the seeds have germinated, I contact the grower and we plan the next moves. Other orchid-growing companies in the United States, Germany, and the Netherlands have similar services. Besides introducing new varieties, this approach makes available species that were previously collected in the wild, often with considerable ecological damage in developing countries. It is important, however, to discuss the contracted activities in advance, because some flask-grown cypripediums are already abundantly available.

Diseases and pests

I know of no disease likely to destroy colonies of cypripediums. As long as the plants are in a suitable location where the general conditions at least roughly correspond to their natural requirements, the plants prosper and are disease-free. Of course, an occasional year with extreme conditions may cause some damage and increased mortality. I have noticed that some growers, afraid of too much shade, plant their cypripediums in an overly sunny site, where the plants exhibit a light green or even yellowish color and low growth, and where they become prematurely brown and dormant by the end of July. Such symptoms indicate a need to transplant into a location with more shade, because a shortened growing period leads to a weakening of rhizomes and eventual demise. In

young plants that have insufficient nutrient reserves, even one year in excessive sun can be fatal.

Pests are a different problem. Cypripediums are rather soft plants with a large leaf surface. In somewhat shaded areas in the garden, where not many other plants are being grown, they are often the only available food for slugs and snails. If the attack occurs on plants that have unfolded their leaves, it is easily noticed and the pests can be eliminated. However, if it occurs earlier in the season and buds are damaged and consumed, the plant will produce no more growth that year and will live underground on its stored food reserves. In the best scenario, the damaged plant will start growing again next year, but it will be weakened. Seedlings or very young plants will not survive such attacks. Therefore, I recommend the use of slug traps or bait in early spring. In a few cases, I have observed some damage by caterpillars, but that occurred only sporadically.

Another group of pests includes moles and rodents. The main damage they cause is not by consuming roots and rhizomes, but by disturbing the soil and partially lifting the plants out of the ground, which causes drying of roots and general wilting. Against this danger I recommend growing the plants in plunged containers and, if necessary, covering the ground around them with wire screening with a mesh of 12–15 mm (about 1/2 inch). This will protect the plants not only from rodents but also from pets such as cats and dogs.

Tried and recommended species

My garden is situated on the 50th parallel north (the same as Winnipeg, Manitoba, Canada). July temperatures reach 25° to 28°C (78–81°F), and January temperatures fall to –15° to –20°C (5° to –4°F). In winter there are frequent thaws followed by snowless periods and hard frosts. Areas in North America that have reliable snow cover may be more favorable for cypripediums than is central Europe. In my garden, I grow or have grown, the following species (species marked * may require frost-free winter storage as described earlier): *C. acaule*, *C. arietinum*, *C. bardolphii*, *C. calceolus*, *C. candidum*, *C. cordigerum*, *C. daliense**, *C. debile*, *C. fargesii*, *C. farreri*, *C. flavum*, *C. formosanum**, *C. franchetii*, *C. guttatum* subsp. *henryi*, *C. himalaicum*, *C. japonicum**, *C. lentiginosum*, *C. lichiangense*, *C. macranthos* and its varieties, *C. margaritaceum*, *C. micranthum*, *C. palangshanense*, *C. parviflorum*, *C. pubescens*, *C. passerinum*, *C. plectrochilum*, *C. reginae*, *C. smithii*, *C. tibeticum*, *C. wardii*, *C. yatabeanum*, and *C. yunnanense*. I experienced major problems, probably resulting from the wrong pH, only with *C. acaule*.

Protecting cypripediums in the wild

Growers, scientists, and nature lovers everywhere agree that these plants need protection to save them for future generations. Unfortunately, there is no agreement on how to do this. Some scientists and nature lovers who rarely have grown

these plants and who consider them just as botanical entities would like to forbid and punish any trade with them, restricting their cultivation to botanical gardens. These people do not take lessons from the period of Prohibition in the United States, nor from the drug trade. If they were to visit China, they would see families living on two or three dollars a day, and they might then understand that if these people have an opportunity to go to the forest and harvest a few inedible plants, they will sell them to ensure survival for their families. We can't talk to these people about protecting nature while we have houses, cars, and full stomachs. They will act as they do as long as there is opportunity to do so.

Fortunately, however, there is now a unique opportunity to do something realistic to protect orchids: to reproduce them by laboratory methods. If we produce enough of these plants, there will be no need to import them from their natural habitat. The protective activities of conservation organizations, and also of orchid and rock garden clubs, should be directed toward supporting plant propagation laboratories, helping them financially, ensuring the supply of seeds, and publicizing the purpose and nature of their work. People need to know where orchids can be obtained ethically. Finally, if growers are informed about the proper culture of cypripediums, fewer of these plants will die and fewer replacements will be needed. I hope this article serves these purposes.

In conclusion, I would like to thank my friends and growers who, in the past and more recently, helped me with advice, seeds, photographs, and literature references. They are F. W. Case, Carson E. Whitlow, and B. Steele (United States), G. Lumsden (Canada), F. Muick (Austria), W. Frosch and G. Wetzel (Germany), and J. Balaz (Czech Republic).

Milan Sembol, president of the Ostrava Alpine Club in the Czech Republic, is the proprietor of CKS, a company offering a wide range of alpine and bulb seeds as well as orchid plants. He may be contacted at Box 74, Ostrava 8, 70800 Czech Republic, or through his websites, <www.webpark.cz/cks-alpinus> and <www.webpark.cz/cks-Ecypripediums>.

Cypripediums in a Western Woodland

Darcy Gunnlaugson

I live on the southern portion of Vancouver Island in British Columbia, Canada. The climate we experience here is similar to that in Seattle, Washington. Our winters, however, are a bit milder than those of Washington to the south and the nearby coastal B.C. mainland. These areas can receive some snow in winter, whereas we usually do not. Our summers, which are influenced by a rain shadow, are also drier. Thus, cold temperate rains, locally called “monsoons,” are mostly the norm here in the months from mid-October until the end of April. In contrast, the warm season, from May to October, seldom has much rain, except at the spring and the autumn ends of its range. We have on occasion received snow, but it is not long-lasting and is gone in a day or two. Exceptions occur (like “the Blizzard of the Century”), but they are anomalies within what is mostly a mild climate of cool, wet marine winters and moderately warm, dry summers.

It is within those parameters that I grow *Cypripediums*—some in microclimates to suit their tastes, but most in the sunlit openings of my woodland (photos, pp. 193–197 and back cover). This is an entirely atypical climate for a genus that is generally mountain-dwelling with ensured cold and snow cover, or woodland-dwelling with similar winter conditions. In nature, these plants essentially have evolved with a cold, dry dormant period. Where climate shift has occurred, as on Vancouver Island, the native *Cypripedium* species have died out, presumably as a result of the wet winter periods of recent decades; in the latter half of the nineteenth century, they had reliable snow cover and were reported from numerous stations on the island. A wet dormant period is simply a death knell to the rhizome. This is perhaps the single most important piece of information one must remember for the successful cultivation of *cypripediums* in a garden. If snow cannot be expected, then cover them with rain protection in winter. If you are in an area of freezing cold with unreliable snow cover, insulate and then cover them. “No winter wet” is a prerequisite for most species.

I live on two acres in a woodland composed mostly of mixed Douglas fir, (*Pseudotsuga menziesii*), western hemlock (*Tsuga heterophylla*), and western red cedar (the name used for *Thuja plicata* on the Pacific coast). I fenced the entire periphery of this property with two 4-foot courses of stucco wire, strung on 8-

foot treated cedar posts at 12-foot intervals. This investment was to preserve my sanity, for my alpines were being used as appetizers by a deer population that had grown to herd size. Motion-activated lights, when installed, only helped them see their food better at night, and a large Bouvier dog could not dissuade them once they had increased to the point where some could lead him on a fool's chase while others dined at leisure. This fence also actively prevented deer intrusion when I later became interested in cypripediums. I also bait heavily for slugs, as I have many *Calypso bulbosa*, or fairy slipper orchids, cohabiting with me on the acreage, and I sought to protect them early in my evolution here. This protection was already well established for the fairies when the ladies—the lady slipper orchids—came to dwell here. And unlike talking to my plants, talking to the slugs just didn't seem to work, although it was actively pursued as a method for a short time. A large banana slug 3 to 4 inches in length can make rapid work of a fairy or the emerging tip of a lady, so the communication approach was abandoned quite early on in favor of copious baiting.

All of my cypripediums are grown outdoors in the woodland. I have tried various methods, growing media, and beds over the years, and my current modified medium and beds are the result of these trials *for this climate*. Directly planting into the woodland worked only as long as cedar roots did not start competing for summer moisture, and they did that very effectively. I then laid down heavy poly (plastic) film as a liner for the beds, with a perforated drainpipe (covered by rock) piercing the poly for drainage. Because the winters are so wet, I began to amend these moisture-retentive beds (think of a small swimming pool with a drain) with perlite at up to 75% by volume. This worked for a while, but about every three years I found cedar roots had somehow pierced the poly, and so the bed had to be completely redone. I also began covering the cypripediums in winter because the heavy rains made rhizome rot more problematic in moisture-retentive beds, and amending the beds to offset this was a time-consuming job.

Lately, I have employed concrete-lined beds as my method of choice, and this works well. The beds are free-formed by hand and have the necessary perforated drainpipe exiting through the sloping lowest point in the bed. The base is covered with a good layer of lava rock, then a layer of landscape cloth (woven plastic sheet), another layer of lava rock, and a layer of perlite. Over this I pour a mixture of forest-floor soil, perlite, and lava rock. This mixture is quite free-draining, and I hope to be able to use it to grow the plants in full winter exposure again without need for the winter covering I now employ. I also amend this basic mix variously to accommodate the different species and their needs. For example, I add a bit of peat for species like *C. passerinum*, *C. wardii*, *C. acaule*, and *C. candidum*, in the root area only, ensuring that the rhizome is not also covered.

To feed garden cypripediums, any liquid fertilizer can be used two or three times during the growing season at one-half or one-third the manufacturer's recommended strength (the term "orchid fertilizer" only makes it more expensive, not more effective). I have used liquid fish fertilizer, liquid seaweed, liquid 20-20-20, liquid Dynagrow (a hydroponic product), and just about anything else liquid that you can think of, and I've even broadcast granulated 6-8-6 on

the bed of heavy-feeding *C. formosanum* (photo, p. 197). The least expensive, most widely available product is probably tomato fertilizer, which contains everything the cyps need, including trace elements. In addition, I have found that *C. acaule* needs feeding with a solution of cider vinegar and water (2 tablespoons of vinegar per gallon of water) on a regular basis; I grow this species in a pine-needle, peat, and sand medium and top-dress it annually with pine needles.

When I divide or transplant a clump of cyripediums, I do it during the growing season. However, plants available on the market are usually sent only during dormancy, so this has become erroneously considered as the only safe time to transplant or divide them. A healthy dormant rhizome should be hard, not soft, and the roots should be white, not black, with tips intact. The plant feeds itself only through the root tips, so short-rooted dormant plants will come up, try to unfurl, and then immediately rot at the stem and fall over. There is little one can do about this, except perhaps initially planting in an inert, fairly dry mix and hoping for the best. A garden plant divided during the growing season (provided it does not have to travel far) will do much better even if root tips are cut. The foliage is actively feeding the plant at this time, helping to ensure survival.

However, mature divisions are still risky in this temperamental genus; not only can the division be lost, but also the parent. Therefore, I recommend buying laboratory-grown seedlings and performing your trials with them. Often a seedling, if grown well, will outgrow a mature division struggling from shock in a matter of only three years.

The Genus Cyripedium by Phillip Cribb (Timber Press, 1997) is the current bible on this genus. This monograph will certainly be amended and added to at its next printing, but until then it serves as the best reference work available. Cribb presents alternative growing media for these plants, and I suggest that if you find one that works, then to stick to that formula and modify it as required. Knowledgeable growers of cyps nearly all use different media, and use them successfully. They all have the common feature of free drainage, which necessitates watering in summer but helps maintain a "just moist" substrate in dormancy.

I have an automatic irrigation system with mini-emitters to all of my beds, which takes care of the summer watering problem. I can adjust watering time on alternate days from a low of 3 minutes up to 8 minutes; seldom is more required. Checking the tiny emitter heads for blockage and checking the beds for areas that are not being properly irrigated is still crucial, so daily inspection is required. This also brings one's attention to slug damage within the past 12 hours.

This emphasizes the second most important thing about growing cyps. Check on them *often*: you can tell if a plant is unhappy, and then set immediately about discovering why and correcting the problem. Too much moisture or not enough are the usual reasons. Not enough is better than too much, in most cases. Finally, if you know how to commune intuitively with your plants, then employ that talent with these delicate beings. Growing them is akin to having fairies or elves dwelling on your land, and you must understand their language. If you are successful at this, there is no end to the magic they will give you. And then you can forget my advice, because you will have a much better source.

Slipper Orchids and Conservation

Harold Koopowitz

The slipper orchids occupy a small subfamily of the Orchidaceae. They share many floral features and are geographically quite widespread. There are currently five recognized genera: *Cypripedium*, *Mexipedium*, *Paphiopedilum*, *Phragmipedium*, and *Selenipedium*. Of these, *Cypripedium* is the most widespread, ranging from Mexico through North America and then through Europe and into Asia, with a few outliers in tropical Southeast Asia. The tropical genera, with the exception of *Selenipedium*, have almost a cult following among orchid growers. All over the orchid-growing world there are hobby groups devoted exclusively to slipper orchids which gather regularly for meetings and flower shows. Most of these societies give the temperate slipper orchids little attention, but that is changing now that *Cypripedium* hybrids are becoming available and their pot culture is being explored.

Until 1989, the main sources of both *Paphiopedilum* and *Phragmipedium* species were wild collections. It is worth examining this because it lends insight into how one might deal with the situation of *Cypripedium*. There was concern, primarily in Europe, that the trade in wild tropical slipper orchids might be unsustainable. This is similar to current concerns about *Cypripedium*. Unfortunately, these concerns were not based on hard data but rather on the intuition of several "experts." It was thought at the time that certain species—such as *Paphiopedilum delenatii*, *P. druryi*, *P. rothschildianum*, *P. sandermanianum* and a few others—were either already extinct or on the verge of extinction. It was suggested that one species, *Phragmipedium besseae*, might be severely endangered because of trade. In fact, only *Paphiopedilum rothschildianum* seems to have been truly endangered.

During the latter half of the 1980s, a series of very exciting *Paphiopedilum* species were either newly discovered or brought into trade for the first time. Tens of thousands of plants were shipped or smuggled out of China each year. The solution then was to move the entire two genera, *Paphiopedilum* and *Phragmipedium*, onto Appendix I of CITES (Convention on International Trade in Endangered Species). In essence, this banned all trade in all species of those genera, although plants already in cultivation were more or less "grandfathered in." However, banning trade in these two genera did not protect them; it only made them more

desirable and led to extensive worldwide trade in black-market plants. The present situation regarding *Cypripedium* coming out of China is reminiscent of the earlier Chinese trade in *Paphiopedilum*.

It has now been 15 years since *Paphiopedilum* and *Phragmipedium* were “up-listed” to Appendix I. All newly described species since then have entered the black-market trade in quantity, and in some countries a combination of greed and national disinterest have done nothing for the conservation needs of *Paphiopedilum* species. Many of the newly discovered species have already been “collected out.” Uplisting did not help them; instead it evoked enormous interest in all *Paphiopedilum* and *Phragmipedium* species, even those of little horticultural value. With the exception of *Phragmipedium besseae*, interest in the other species of that genus had been minimal, but now they were highly sought after—a classic case of forbidden fruit being the sweetest. There was no original need to uplist that genus, and in fact, further exploration in Ecuador revealed *P. besseae* to be plentiful and common. In the case of the Chinese *Paphiopedilum* species, after legal export ceased the plants continued to be collected, but they were then diverted to the internal pot-plant markets of China itself. Uplisting did nothing for their conservation except to pay more bureaucrats. It is thus unlikely that uplisting cypripediums will protect them; it will only make them more desirable.

The first question to ask is, “How much of the trade in wild plants is sustainable?” The answer depends on how big the source population is, what volume of material is being removed each year, and what the natural replacement rate is. A yearly trade in 10,000 plants from a population of 10 million is not as threatening as the removal of 50 plants from a population of 500. In nearly all cases, we have relatively little hard data on population sizes, except for those rare species known from only a few localities. Thus, Uttar Pradesh state of India lists *Cypripedium cordigerum*, *C. elegans*, and *C. himalaicum* among their threatened flora based on those species’ rarity. But a species that is rare in one part of the world, it can nevertheless also be widespread. *Cypripedium cordigerum* also occurs in Pakistan, Nepal, Bhutan, and Tibet, and in fact all three species mentioned are equally widespread.

There was an attempt to uplist all of *Cypripedium* onto CITES Appendix I some years ago, but that attempt failed. Once again, it was based on incomplete data and poorly formulated assumptions about trade. If plants are moved with the correct documentation, then the number of individual plants of a particular species exported/imported is recorded. However, a single original large clump of a plant of *Cypripedium macranthos* can be divided into as many as 10 individual pieces for export. Often the parts exported only have a single eye. Each then becomes a single plant for record-keeping purposes. This, therefore, produces faulty data.

Cypripedium is already listed on CITES Appendix 2, which does not ban trade but mandates that permits are required and records be kept of all legal international trade in all members of this genus. This includes numbers of plants of each species shipped, and both exporting and importing countries. The data are collated by TRAFFIC, an arm of the IUCN and the World Conservation Moni-

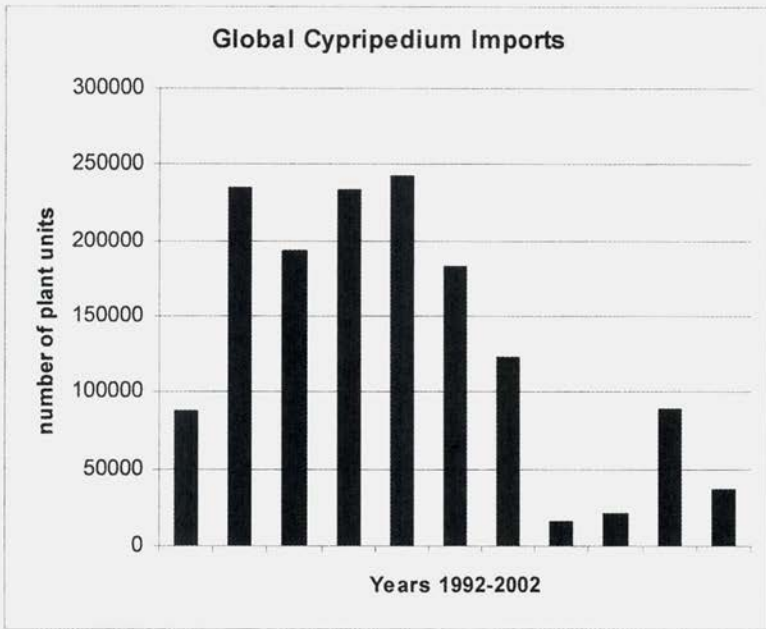


Fig. 1. This covers all *Cypripedium* species and all countries. Data for constructing this and other figures were supplied by the World Conservation Monitoring Centre.

toring Centre. Examination of these data reveals several interesting features. The major exporting countries tend to be China, Taiwan, and North Korea. The total global trade in all *Cypripedium* species during the years 1992 to 2002 is given in Figure 1. Note that for much of this period more than 100,000 plant units were imported by all countries annually, and that for three of the years the numbers approached nearly a quarter of a million plant units. We have no idea what the real numbers of plants are. One quarter million units might represent only 25,000 actual plants. We also do not know whether all or some of these are plants collected from the wild, or whether they are truly artificially propagated orchids. We have no idea whether these levels are sustainable. It is interesting that the global levels of importation dropped drastically around 1998 and have not returned to the earlier levels. The reasons for this downturn are not clear at this time.

Over 90 percent of the imports went to one destination, Japan (Fig. 2). As far as the rest of the world is concerned, there are only modest levels of importation, which one would think was not threatening to the plants in the wild.

Where do the cypripediums in the world trade originate? The major exporting area is Taiwan (Fig. 3). But where do those plants originate—from wild areas of the island itself, from cultivated and artificially propagated plants, or from the Chinese mainland? I have visited nurseries in Taiwan where thousands upon

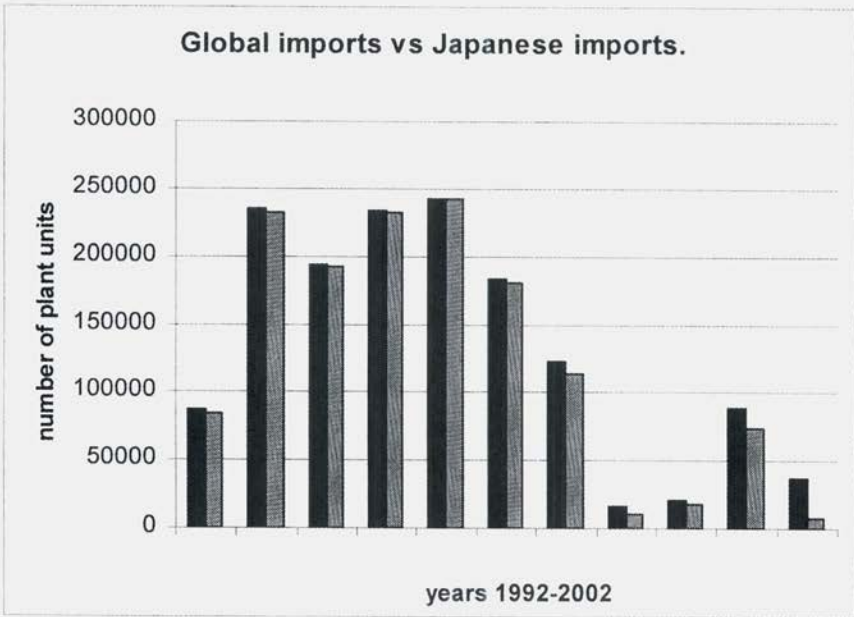


Fig. 2. Global importations for all species of *Cyripedium* in black, and those of Japan in gray. Note the abrupt drop in trade during 1999.

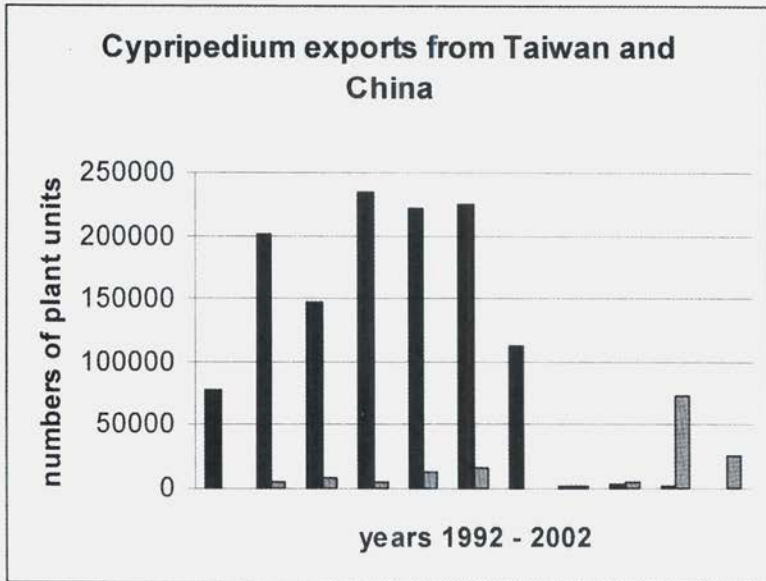


Fig. 3. The *Cyripedium* export market is dominated by a single source, Taiwan. Reported exports from Taiwan in black, reported exports from China in gray.

thousands of cypripediums were being grown, and I must admit they were being grown very well, but trade between China and Taiwan is not well monitored, and Taiwan is not listed as a major importer—or even as an importer at all—despite the fact that Taiwan sells Chinese species. Among the main species that Taiwan exports are *C. formosanum*, *C. franchettii*, *C. henryi*, *C. himalaicum*, *C. japonicum*, and *C. margaritaceum*. Despite increasing exportation from China in recent years, most of those are merely listed as *C. spp.* With a few exceptions, such as *C. calceolus*, we have no idea what they really are.

The number of temperate ladyslippers exported from the United States is quite modest. During the 11-year period under review, the highest number of plants was 4,320 in the year 2000. Some years saw virtually no exports. Another country that exports is North Korea, with a high of 38,000 in 1994.

What does this mean for the plant enthusiast in the United States? First of all, our native species are usually protected where they occur. Second, much of the old trade in cheap field-dug ladyslippers that were promoted in fairly sleazy advertisements has gone away, and levels of trade now are probably not damaging. Third, truly artificial propagation from seed does occur increasingly, and those efforts should be encouraged.

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Olympus and Parnassus

Robin Magowan

If you ask a plant taxonomist, “What is your favorite country?” chances are the reply will be “Greece.” One can see why: Greece boasts a flora almost as extensive as that of the rest of Europe together. The intensely folded, mountain-chopped terrain, with its isolated microclimates, colliding ranges, and separate islands, has furthered great plant diversity, as has the brittle, porous limestone out of which the mountains are largely composed. Like many other limestone dwellers, the Greeks invented stories about their gods to explain these striking geologic configurations. The climatic forces that carved the rocks into spectacular shapes and even more spectacular myths have likewise given rise to a world-class assortment of alpine plants.

The difference between Greek gods and mortals lay in one thing only—the Olympian nectar on which the immortals feasted. (Remember poor Persephone, consigned to the underworld for eating a mere five of its pomegranate seeds.) We gardeners are certainly not gods, but we share with the gods a belief in plants as agents of transformation. Even if the nectar we drink is merely a visual one, it still gets us down on our knees. And the experience can be enough to make one curious about the Olympian flora: What were the plants whose juices composed these life-giving nectar cocktails?

This curiosity led me and my wife, Juliet, to join Michael and Maria Galetti and the Czech plant explorers Josef and Jarmila Halda on a two-week trip to Olympus and Parnassus in early summer. Maria had organized the trip to collect seeds for her plant nursery, Alpines Mont Echo in Sutton, Quebec; the Haldas were veterans of Olympus, having visited it no fewer than 25 times.

After flying into Thessaloniki, we began our plant exploring at the foot of Olympus. Its peaks, even on clear mid-June days, were barely visible through a screen of haze and mist. At a little over 9000 feet (2917 m), they are not all that high, but Olympus is the tallest of Greek mountains, and extensive enough to be home to 1500 species of vascular plants. The throne from which Zeus hurled his lightning bolts rises practically out of the sea, and its steepness goes a long way toward explaining why Olympus wasn't climbed until the beginning of the twentieth century. Even today access is somewhat restricted, with a 140-bed refuge

(Spilios Agapitos) at 2200 meters and two smaller refuges several hundred meters higher. Hiking to the first refuge from the parking lot at Prionia (1100 m) can take anything between the three and a half hours the guide book listed and the seven it took my wife and me. (We were carrying unnecessarily heavy packs. The refuge is so well equipped that all you need is a raincoat, a decent sweater, a change of socks, and toiletries.)

The climb itself was not easy. Many uneven steps, roots, and boulders had to be negotiated, and our large packs proved a hindrance. But whatever my shoulders were experiencing was eased by the enchantment we were passing through. On the abode of the gods one can't walk more than a few feet without feeling their flowery presences—a beauty far surpassing any other mountain I've known.

The keynote was struck at the bridge just beyond the Prionia parking lot. Several sizable blue-gray rocks sat where they had fallen in the chasm-bound torrent of the Enipeas River, draped in black lichens and a mass of *Geranium macrorrhizum*. As we walked through the forest of Crimean pine (*Pinus nigra* subsp. *palasiana*) and fir (*Abies borisii-regis*), we were struck by the enormous ornamentation of plant life growing all over the haphazardly strewn boulders: violet and white spurred *Aquilegia amaliae*, gray mats of *Sedum dasyphyllum*, carpets of *Arctostaphylos uva-ursi*, bluish *Edraianthus graminifolius*, marble-leaved *Cyclamen bederifolium*, pink *Colchicum doerfleri*, brownish-yellow *Fritillaria messanensis*, silver *Achillea ageratifolia*, the yellows of *Iris reichenbachii*, *Primula veris*, *Genista radiata*, and the glorious orange-red *Lilium chalcedonicum*. But we were too late in the season for most of the orchids, other than *Dactylorhiza sambucina* and such saprophytic oddities as *Neottia nidus-avis*, the bird's-nest orchid, in its apricot form.

Ancient storytellers marveled at the great weight of the rocks which the mountain's first inhabitants, the Titans, hurled about, but they omitted the obvious skill with which each shot-putter selected his target, before the ferns, bulbs, and plants of the forest clothed it. On Olympus, such connections are unavoidable, as you chug along accompanied by the ringing of cuckoos and golden orioles and the glittering river sounds of Enipeas below.

A half-hour or so along the trail, in the deep southeast-facing shadow of a series of enormous boulders and ledges, we were overcome by the spectral hues of a great colony of *Jankaea heldreichii* several feet above us (along with a clump of the rare white form), growing together with purple *Saxifraga grisebachii*, and on the wetter rocks pink *Pinguicula hirtiflora*. The startling glow these 4-inch-tall *Jankaea* give off comes from something crystalline in the violet-blue petals. This was the only site where we found Olympus's most renowned endemic, but since a single seed capsule contains a thousand wind-blown possibilities, there is little cause for concern about its survival. Halda has encountered them as late as mid-August blooming on higher cliffs.

As we rose through the forested elevations, Crimean pine gave way to pyramidal-crowned *Pinus heldreichii* presiding over an understory of common boxwood. Higher still, on the shaded western side of a beech wood, came a carpet of daphne, mainly *Daphne laureola*, but also *D. oleoides* and a few *D. mezereum*. Soon thereafter we encountered two flaxes: the yellow *Linum elegans* and the lavender

L. hirsutum subsp. *spathulatum*. A stream of *Iberis sempervirens* flooded the trail at our feet. Scattered about, though not in the quantities we would meet higher, were two saxifrages: *S. sempervivum* with reddish nodding plumes, and the white bouquets of *S. scardica*, sometimes intermingled with the needle-leaved pin-cushions of bright reddish-pink *Dianthus haematocalyx*.

By now the afternoon was sufficiently advanced that, around a bend of the trail, my wife and I were surprised to see Josef and Michael, who had walked down from the refuge to spur the stragglers along. Josef had a whole taxonomy at the ready. Can a name be a breath of light? The pinks we had been noticing, tucked into the ledges, were not a dianthus, he informed us, but a woody viola, the long-lived *Viola delphinantha* (photo, p. 202). "*Dactylorhiza sambucina!*" Josef called, pointing out a yellow-throated beauty peeping from under a trailside shrub. There were pink-throated orchids too, along with white *Dianthus minutiflorus* and yellow *Hypericum olympicum*. By now we could make out the silhouette of the Spilios Agapitos refuge, a mere two gullies away, perched high on a spur of rock like a hermitage in a Chinese scroll: a steep enough ascent, which included the brief traverse of a snowfield, but we managed it as Josef paved the way with taxonomic details of subspecies and clarifications of doubtful appellations.

The refuge that greeted us after several hours of steady climbing looked less like a hermitage than an ark the Flood had cast up. Its vast deck commanded about 270° of mountain vistas, and within, wood fires warmed two comfortable dining rooms. Supplies—food and drink, and fuel for the generator—had been hauled up by sure-footed mules. The refuge itself was spare, well-equipped, and elegant, though running on cold water only, the fabulous Olympus snowmelt. Along with good heavy blankets, we were issued slippers to keep the stone floors unmarked by our boots, which we left at the door.

The next morning we rose early to a near-windless clarity. The cockscomb of the Mytikas summit awaited us, a 700-meter vertical climb neither very long nor demanding, but we still had to get there before the rising mist obscured everything, as usually happens around noon.

The path that snaked up toward the timberline from the refuge traversed a flora mainly composed of taprooted meadow specialists: *Viola graeca*; large but compact *Oxytropis campestris*; and an abundance of pale yellow-flowered *Potentilla speciosa* mixed in with the more appropriately Olympian *Potentilla deorum*, a compact, pinkish-flowered species sporting intense silvery foliage. Here and there we found, spread out like a starfish within a moisture-free north-facing boulder cavity and not yet open, another famous endemic, *Campanula oreadum*.

Once past the tree line, we found ourselves in a vast bowl sparsely dotted with a considerable variety of domes, cushions, and hummock plants, each striking its own subtle variation off the soft blue-gray of the surrounding rubble. The great master of contrasts was *Alyssum handelii* with its blue-gray leaves and yellow flowers. The two potentillas were everywhere, interspersed with clumps of white woolly *Hieracium pannosum*, sprightly *Achillea ambrosiaca*, several helianthemums, and, creeping out of the ledges, mats of *Thymus boissieri* together with a white-pink viola, the tall red-stemmed *V. tricolor* subsp. *macedonica*. Out in the open,

tucked among the flagstones, were the minute grayish-white *Paronychia rechingeri* and *Cardamine carnosia*, a white-flowered endemic much sought after by the locals for the arugula-like taste of its tiny leaves.

Just as one must be down on one's knees to take in the gems of a rock garden, so can one feel all too humanly enormous among such diminutive plants. That may be why the chance to rest on a projecting boulder so comforted me; I became part of the same plane as the surrounding plant life. Sitting there, I began to appreciate the intelligence of the plant adaptations. Their elemental adversary is neither the rain nor the snow, but the incessant wind that with each upward step becomes more pronounced. Plants have little choice but to hunker down and fluff themselves out in their best sweater as buns.

Walking in the mountains, I can resist—barely—the impulse to weed. But I still remain a helpless aesthete. Soft blue-gray mounds of *Aubrieta gracilis*, each about the size of a salad plate, lay scattered about among the marble slabs that give the first of the seven Olympic peaks its name, Skolio or “steps.” But among all these lilac-violet combinations, which was the most subtly hued? What most astounded me was the different ways they had taken possession of their crevices. It's that variety of lodging which, as gardeners, we can reproduce.

The plant-and-flagstone landscape became more layered as we climbed, the plants never more than a foot or two high, but parceled out in giant 20- to 30-foot squares. Some slabs had already shattered, and tucked deep into these brittle strata we came upon two stunning gems: *Arabis bryoides* and the white-flowered glandular *Saxifraga spruneri* (photo, p. 205).

By now we were shrouded in mist and, down the mountain, the Thunderer was in full-throated cry. Juliet, who had remained at the refuge taking photographs, remembers the extraordinary velocity of the mist rushing up the valley from the Aegean, and the Chinese paintings the mist drew. For much of the morning, every spur of the Mytikas crest had stood out in distinct detail, even the white bell tower of Profitis Ilias on its last right-hand crag. Suddenly, the summit was obscured by fast-moving mist—nothing remained visible, not even a ravine. Then just as abruptly, it would clear enough to admit the profile of a ridge, a spur of the cockscomb. It was, she said, as if the summit of the gods was intent on drawing up every vapor of the now invisible Aegean to compose the afternoon's thunderstorm.

For us climbers, as we traversed the Skala's back ridge, the mist was more problematic. Unable to see farther than half a meter, we decided to forgo the invitation of the red wooden arrow pointing into the void towards the Mytikas summit and its two chimney-dwellers, the yellowish *Saxifraga moschata* and yet another blue-gray-leaved endemic, *Omphalodes luciliae*, with unearthly sky-blue flowers.

As we chomped on our sandwiches in the gloom, Josef recalled the time he had camped with Jarmila on this very site only to awaken and find a foot of new-fallen snow. When dry, the summit marble is firm underfoot, but in the wet and on a trail obscured by drifts, they had a hazardous descent.

On the abyss side of the ridge, as we descended we spotted our first clumps of another high-altitude endemic, the tiny dark-blue *Veronica thessalica* (photo,

p. 203). The sight on the hill slope of a little colony of *Ranunculus spruneranus* reminded Josef of the snowmelt buttercup *R. brevifolius*, and down we plunged toward a far snowfield. On the way we passed numerous mats of *Veronica thessalica*, some gnarled enough to be centuries old. "Exquisite!" Maria said, as she spent the last of her film on one and then another lapis-lazuli configuration; but I'd rather play host to *Ranunculus brevifolius* with its small rounded blue-gray leaves and cheerful yellow flowers.

In the grass at the edge of a second snowfield we came upon another moraine community: white *Cerastium theophrastii*, tiny white *Arenaria conferta*, two euphorbias—the tiny yellow *Euphorbia herniariifolia* and the not much bigger *E. capitulata*—white fragrant *Galium degenii*, violet *Linaria alpina*, silky-haired dwarf *Artemisia eriantha*, slender, graceful, white-flowered *Saxifraga glabella*, lavender *Viola striis-notata* (photo, p. 202). But it was a corydalis, *C. parnassica*, that absorbed us. Its hooded pale mauve flowers were nothing exceptional, but the way they projected from their coral-red stems and contrasting blue-green lobes made for a harlequin effect.

These snowmelt delicacies paled before the vision—not too strong a term—that met us over the next ridge: a series of tiny dells adorned with the blues of a Persian miniature. The dominant tones came from the great drifts of *Gentiana verna* subsp. *balcanica* and its blue-black cousin, *G. pontica*. Among them and a sprinkling of buttercups glistened the bluish pompons of *Globularia meridionalis* and a beguiling forget-me-not, *Myosotis suaveolens*, the gray-green of its leaves setting off the pale blue flowers. How, I asked, could we explain such a wealth of acid-loving plants on a limestone mountain? Grasses, Halda replied, can add humus to the soil fairly quickly, producing the peat-like conditions spring gentians require.

AFTER MOUNT OLYMPUS, what might serve as an encore? "Parnassus," Josef suggested, offering us a somewhat drier, more typically Mediterranean flora. I can only mention in passing the wild thundering downpours of the Thessalian plain through which we drove, the vibrant city of Larissa where we spent the night, and the following day's drive past Thermopylae along the route Apollo took on his return to Delphi. (Among those caught in his wake was the laurel-changed Daphne.) But I do want to mention the picnics in honor of Apollo and the Muses the Haldas contrived to put together out of the spacious trunk of their Skoda: smoked cheese and string cheese from Slovakia, savory sausages and a wonderfully succulent thick-cut ham, to which the Galettis added local salad greens, tomatoes, apricots and cherries, all washed down with delicious retsina (a real improvement over the turpentine-flavored plonk of my youthful sojourns in the Greek islands).

After the first picnic, consumed in the Delphic garden of the poet Angelos Sikelianos, we failed, upon waking later in the afternoon, to find *Daphne jasminea* despite considerable stumbling about in its thorny cliffside habitat. Is it to be found only above the ancient stadium at Delphi?

Next day, driving from the spider's nest of Arachova toward the Gerontovrachos summit, we had better luck. Unlike Olympus, Parnassus has undergone

development for skiing and one can drive to an area not far from the summit, while botanizing along the road.

Greece is home to half the world's species of *Campanula*, and we found, pinned against the roadside cliffs, two furry crinkled ones—*C. andrewsii* and *C. radicata*, some flowers a glowing, almost eerie blue. Billowing in perpendicular clumps from the rock faces was the pink birdhead, *Pterocephalus parnassii*. Above the road, a pretty vetch, *Astragalus angustifolius* (photo, p. 205), dominated the meadows with its several-meter-wide cushions of icy white flowers. Dotted about were two daisies, *Anthemis cupaniana* and *A. delphinensis*, only slightly less winsome than *A. cretica*. In the same vicinity we discovered two species of *Polygala*: *P. minuta*, a very pretty purple flower, and the deliciously sparkling blue-and-white *P. amara*. Just as desirable was an endemic campanula relative, *Edraianthus parnassicus*, as radiant as *E. pumilio*. Completing the carpet, along with *Edraianthus graminifolius* and the yellow-flowering *Achillea holosericea*, were the two white-starred lookalikes, *Minuartia stellata* and *Moebringia muscosa*. *Dianthus carthusianorum* proved to be the only pink still in bloom: too straggly for the garden, but the lovely indented fan-winged flowers did a lot to bring to life a dry field.

As the road climbed toward the ski lift, the roadside verbascums craned their monstrous wooly gray-leaved necks like something antediluvian. Most are too large or invasive to attempt in the garden, but what about the golden-spined foot-and-a-half tall *Verbascum thapsus*?

We parked our cars by the deserted ski lift. The entire mountainside was ours, except for a mixed flock of goats and sheep descending swift as a cloud over the rocks, supervised by two silent, almost invisible dogs. That's Greece in a way, a dance of blinding abstraction and sharp specifics, light being the abstraction while the specifics occur in the shadowed realm where everything lives.

With a big T-bar defacing it, the Gerontovrachos summit lacks the almost Oriental beauty of Olympus. But the floral variety, as one scampers from one overgrown boulder to the next, defies description. Behind most writing lies the conviction that one can make something of one's experience. But what if it's too multifarious, a virtual prism of effects, all the more bewildering when you have never encountered anything like it? With a camera in hand, or a seed envelope, you can pick and choose, this form and not that. But I have just my pen, my notecards, and with each few feet that I climb the profusion changes. Then, as the names start to repeat, I begin to understand how the flower palette takes its cue from the rocks setting it off.

Where the limestone is a soft blue-gray on Olympus, here it is stark white, thinly veined with black lichen. (*Parnassias apollo*, a gray-and-white butterfly with black wingspots, sums it up perfectly.) It is a highly porous limestone, almost as pitted as the "philosopher's stones" of a Chinese garden. Plants twist and gnarl themselves into it, mounding up in layered wreaths. The great beauties of the upper mountain—*Asperula boissieri*, *Lamium garganicum*, and the prostrate cherry *Prunus prostrata*—all share the same scheme of gray upon green, with contrasting pink flowers.

Asperula boissieri (photo, p. 204) forms a mat about as tiny as mats get, and it can look quite ordinary until it gathers itself in a gray-upon-green ribbon around

a startlingly white rock. Add pink cross-shaped flowers and you have a gem. Each ribbon differs in the way it hugs and virtually caresses a crevice.

Lamium garganicum (photo, p. 204) does not enjoy good press: too coarse, too large, one is told, for the garden. At first I was inclined to agree, but the more I saw of it, the more its slightly mottled grays-into-greens smoldering with pink possessed me, until I ended up convinced it was the prettiest plant on the mountain. As for the unaccountably overlooked *Prunus prostrata* (p. 203), it is a gorgeous little shrub, infinitely superior to the Alpenrose (*Rhododendron ferrugineum*), and the more rose-red forms are worth seeking out.

The higher I climbed, the more I admired the opportunism of plants, their considerable ingenuity in finding crevices. Some, like the wonderfully fragrant *Galium scabrifolium*, were almost too small to see, until through the hand lens opened a vista of purple and white flowers arranged in a forest of undersea-like stalks, each with a sunlit yellow eye. How about that for a trough! *Myosotis sylvatica* subsp. *cyanea*, found in boggy dells all over the mountain, while not quite as dainty is almost as desirable. A lot more pervasive is the tiny snow-in-summer, *Cerastium candidissimum*. It's not quite what one wants in a meadow tapestry, but *Linaria peloponnesiaca*, demure and yellow-flowered, certainly is, along with perhaps the best in a gorgeous genus, *Erodium chrysanthum*, a small hypnotic beauty. I'd add the dense-cushioned, silvery-leaved *Convolvulus boissieri*, a beautiful plant with large, almost stalkless funnel-shaped pink flowers, and the refreshingly fragrant *Valeriana pontica*, with its clusters of pink flowers waving on tall stems. The well-named *Anthyllis pulchella*, with gorgeous pink flowers, was peeping out near the top of the ski slope.

Even higher, toward the edge of the snowfields among a colony of lilac-purple *Crocus sieberi* with deep sunlit yellow throats, we came upon the red stalks, brightly contrasting green basal leaves, and dull hooded flowers of *Corydalis solida*. Striking up through the snow was *Scilla bifolia*, with brown stalks bearing brilliant dark-blue flowers. The bears of Parnassus clearly had a yen for the bulbs of *Ornithogalum nanum*. From the evidence of their digging, it looked as if the first thing they did upon waking from their dens under 8 to 15 meters of snow was to rush out and start collecting. A gastronomic necessity? A hallucinogen? It might bear checking out.

How growable is any of this visual nectar? Judging by the Ontario chapter's seedlist, *Alyssum handellii* (photo, p. 202) and *Verbascum blattaria* especially, I'd hazard that, with snow cover and perfect drainage, one might succeed. On Olympus it rains almost every midday in June, but the ground is so porous the water instantly vanishes. This would suggest tubing of the sort Harry Jans has pioneered to create a moraine in which the heat of the day draws up the water to a plant's feet. A tightly creviced ascending bank might do as much, and without having to call in the plumber because a trowel has pierced the tubing. Parnassus, on the other hand, was cloudy but considerably drier, more Colorado-like.

There remains, for some of us, the obstacle of the summer mugs. Accommodating Zeus is one thing, but placating a *Jankaea* may require the zephyrs of the St. Lawrence and Frank Cabot's garden "Quatre Vents" ("Four Winds").

As for flower hunting, there are no summer-operating chair lifts in Greece. You must climb to find the best flowers. Greek mountain roads are wider, however, than those in the Dolomites, and far less congested; it is easy enough to pull over and peer, and you do not have to look out for the kamikaze motorcyclists of Alto Adige hurtling down the center line of a narrow road's hairpin turns. Fortunately for monoglot travelers, the Greek way of handling tourism on a personal scale has spurred the acquisition of English there. As for the food, America is not the only country to have undergone a culinary revolution in the past thirty years.

AFTER PARNASSUS, the Haldas returned to the Czech Republic, while we headed northwest with the Galettis for more seed collecting, past the cliff monasteries of Meteora and the stone town of Metsovo into the Pindus Mountains near the Albanian border. It will be interesting to learn what the 2003 AGS expedition led by John Richards, which traversed Epirus at the same time, discovered. Judging from the clumps of *Ramonda serbica* that Maria Galetti crawled out on a rock overhanging a several-hundred-foot drop to photograph, the Vikos Gorge and the Zagoria region surrounding it should rate a trip all their own.

The intricate, dry-stacked stone walls of Arachova, Metsovo, and Zagorian villages such as Mikro Papigo and Megalo Papigo are themselves well-populated vertical rock gardens, in addition to being beautiful. Numerous species of *Campánula*, for example, may be found near one another in the rock walls that terrace steep village streets. According to the local newspaper, the city of Thessaloniki, upon finding that several hundred rare plant species once native to the city had sought refuge in the old eleventh-century Byzantine walls, canceled plans to demolish those walls. Perhaps Greek masonry, both ancient and modern, deserves to be the object of a future botanizing trip.

Robin Magowan gardens in northwestern Connecticut. His collection of travel writings, published as *Improbable Journeys* in 2002 by Northwestern University Press, concludes with the essay on the evolution of his rock garden that first appeared in the *Rock Garden Quarterly*.

The Alaska Rock Garden Society's China Expedition

Jaime Rodriguez

In 1998 the fledgling Alaska Rock Garden Society, a NARGS chapter, made the bold decision to mount a seed-collecting expedition to China in the year 2000. Plant collector Dan Hinkley of Heronswood Nursery, lecturing here, had been asked if he ever collected at high elevations. He replied, "Why should I? My nursery is zone 8, and most of my customers are in temperate climates." We realized that to find new plants for high-latitude Alaskan gardens, we would probably have to collect them ourselves. Moreover, many of the great plant-collecting expeditions of the past brought their bounty back to England, where, if a plant didn't thrive, it was labeled "difficult" or "impossible to grow," yet when some such plants, notably *Meconopsis* species, made it to Alaska, they grew quite readily. Retracing the paths of early expeditions might reintroduce some of their finds to a climate where they would flourish. Knowing that we needed someone with experience to lead our expedition, we asked Dan, and he agreed to be our guide.

Ten chapter members were chosen for the team: Stan Ashmore, Ed Buyarski, Teena Garay, Kate Gordon (who had to resign at the last moment), Grant Matheke, Peggy Pletcher, Jaime Rodriguez, Charles Utermohle, Toby Wheeler, and Rhonda Williams. Dan Hinkley acted as our liaison with the Kunming Botanic Garden, which sponsors many plant-oriented tours in northwestern China. Its executive director, Guan Kaiyun (author of *Highland Flowers of Yunnan*), helped us obtain a formal invitation from the national government, and we obtained visas from the Chinese Embassy in San Francisco so that we could book our flight. We arranged for import permits from USDA/APHIS, the U.S. government agency controlling plant importation, while Kunming handled the paperwork requirements with the Chinese government. To cover the estimated \$50,000 cost of the expedition, each team member purchased his or her plane tickets, about \$2000 apiece; we raised about \$20,000 by selling seed shares; and we obtained the remaining \$10,000 through a grant from NARGS and fund-raising garden tours in Anchorage, Wasilla, and Willow, Alaska.

We arrived in Kowloon on September 14. I went to see the series of gardens in Kowloon Park, where I saw "house plants" (from my perspective) used in outdoor bedding. The park's Chinese Garden has interesting buildings and walk-

ways where people exercise, and a pond garden with beautiful ducks and swans, and amazing golden dragonflies hovering above the water.

On September 15 we were off to Kunming, not without some problems at the airport—Southern China Air had canceled our reservations because we did not reconfirm 72 hours before flying. However, we all got seats in the end. When we landed in Kunming, Guan was waiting for us. We sent most of our luggage ahead to Zhongdian in a van, and then flew there on September 17.

We visited the Kunming Botanical Garden (KBG) on September 16: an enormous layout on 600 hectares, about 6000 feet (1850 m) above sea level, planted mostly with species from warm temperate or even tropical climates. For instance, the KBG is studying and hybridizing begonias, of which they have more than 300 species, and several of their hybrids will soon be released by a Japanese wholesale grower. We collected a few seeds at the garden—spruce, juniper, *Berberis*, and a nice ornamental grass. After lunch at a hot springs resort, we drove to the Western Hills and took a chair lift to a summit, identifying many choice plants as we rode up. We had two hours to collect as we walked back down, scrambling over limestone formations when we left the path, and getting tangled in roses or pyracanthas. Of the 18 species collected here, we know some will be hardy, because they already grow in Alaska. We found *Thalictrum delavayi*, some attractive roses, and several *Codonopsis* species—one with white trumpet flowers, and one like a big blue morning glory.

Over dinner, we discussed a system for centralizing our daily collections so they could be numbered, recorded, and cleaned. Whoever had the single room would be that night's organizing center, and whoever made collections that day would bring them to his or her room. I got the computer set up, and Charles acted as recorder while I assigned accession numbers to the collections, writing the numbers on the bags or envelopes. Other members cleaned seeds, and prepared herbarium specimens.

We rose very early on September 17 for our flight to Zhongdian with our hosts, Guan Kaiyun and Lü. At the airport in Zhongdian we met Zhou and the bus driver, known as Boss Sun. The landscape around Zhongdian (3300-3500 m, or 11,500-12,000 feet) looked remarkably like Alaska. The fields were filled with interesting plant material. Acres of *Euphorbia* in fall color spread a wonderful red across the hills, and the seed heads of primulas and other treasures were everywhere. The hills were calling.

After breakfast, we changed into gear for collecting in the rain at Shudu Lake. I spent the better part of the morning trying to get the G.P.S. (global positioning system) device to work, finally succeeding with Charles's help. Our game plan was to drive until someone saw something interesting and shouted "Stop!" At our first stop, about 5 kilometers outside Zhongdian, Dan saw the red berries of *Triosteum* (photo, p. 200) and asked us to look for *Saussurea stella* (photo, p. 201), which he had seen earlier in the trip being sold as a dried medicinal herb. We scattered over the hillside, and I was quickly rewarded with a zip-lock bag full of *Triosteum* seeds and another full of the red pods of *Podophyllum hexandrum*. Stan called me over to see a charming pink orchid and a huge patch of *Saussurea*. Ed

was excited about two species of *Primula*, *P. poissonii* and *P. secundiflora*. All too soon, we heard the whistle calling us back to the bus. There we labeled the bags with what names we could and passed them to Charles. We kept all collections from a single location in one large bag for later assignment of accession numbers. We had collected almost 60 items in those 20 minutes.

The road to Shudu Lake, mostly dirt, was very narrow, and we often passed yaks standing in the middle, and local women with colorful head wraps. We stopped several times before reaching the lake, and each site delivered new treasures. At one bathroom stop, my short hike looking for privacy disclosed the lovely *Impatiens subecalcarata*, growing in deep shade under an eroded bank in the wet ground beside a small runoff stream. A sunbeam shining through the leaves of a maple that draped over the bank lit up the large pink flowers like lanterns. There were a few seedpods, which exploded as I grabbed them.

We were beginning to feel the elevation, and by the time we arrived at the lodge at Shudu Lake, most of us were hungry. The wait for lunch was longer than expected because they had to catch lunch in the lake first, so several of us made short forays. Two flower color forms of a tiny anemone became decoration on the knee-high lunch table, along with a lovely miniature pink geranium. The long wait left us with only one hour for collecting, but we made the most of it.

We stopped a few more times on the way back to the hotel. There we began work on the collections, assigning numbers and consolidating collections from each stop, and distributing the juicier fruits for cleaning. After dinner, everyone worked on cleaning. It was clear that a successful day of collecting, or several in a row, could produce to a huge backlog. I wished I had brought a large metal bowl, pie plate, and sieve set, as well as a large, collapsible camping cooler for storing collections, and a cane for grabbing seedheads on high branches and climbers. Some of the seed was so wet it might take more than one day to dry; some was not ripe but should ripen.

I woke on September 18 at 4:30 a.m., freezing cold with a headache and gasping in the thin air. After picking up a local guide, we drove over some very rugged country roads through small farming communities, admiring various styles of wattle fencing, some elaborately braided. The monsoon had been hard on the road. Just as Teena was proposing a bet on when we'd get stuck, we arrived at a flat, high alpine meadow. We were able to collect a decent amount of seed, including the bright red *Euphorbia*, as we hiked toward a canyon. We were free to roam, with instructions to be back at the starting point at 5 p.m. Soon we were spread out along the trail in groups of two or three.

Occasionally some passing locals greeted us, some pulling carts, others using various motorized vehicles from large trucks to small tractors to transport bins full of greenery, with people hanging off the sides. Yaks were everywhere, and much desirable plant material was heavily grazed. Each of us found some treasure to collect. Individual excitement at the diversity played against curiosity about what others were finding. It was common to feel that "everyone else is finding the good stuff," but in fact, each person brought back items that no one else even saw.

I soon found my first *Meconopsis horridula*, paying a blood price for it scrambling through a rose thicket, and species of *Rodgersia*, *Sorbus*, and *Cypripedium*, the last growing in very rich, damp humus in dappled to deep shade. Rhonda and I got to a large scree fall covered with a pretty dwarf *Thalictrum* with glaucous, lacy leaves. I found a trail that led up the mountainside, and odd-looking seeds that turned out to be *Morina*. I followed the trail, harvesting seed as I climbed, and before I knew it I was halfway up the mountain. As I was picking some acorns, a local woman was startled to see me as she barreled around a corner of the trail. After recovering from her surprise, she watched me curiously and pointed to some acorns I had missed before waving goodbye. While I was at the summit, it snowed for about 15 minutes, so I got down much faster than I had expected. At the rendezvous, I sorted my collections and still had an hour to collect on the valley floor. As I went toward the opposite mountain face, three curious, enthusiastic boys joined me. As soon as they saw me collect a specific kind of seed, they scrambled to bring me handfuls of it. If they saw a flower or seed, they pointed it out to me to ask if it was valuable. I was surprised to see one boy munching on a red *Podophyllum* pod and tasted one myself. No wonder they're called "May apples"—it was delicious. I gave the boys the roll of crackers from my lunch, and we were all pleased. Eventually we worked up to the hill, and the boys were adamant that I go no farther, making gestures like fangs and claws and gripping their necks, as though something on that hill would eat me. I decided to trust the locals.

A moment later we were joined by the group of our Chinese hosts, Lü, Zhou, Sun, and the local guide. They helped me identify most of what I had collected before it started raining hard. My three young friends waved us over to a rough lean-to wrapped in plastic sheeting. A wall divided the structure into two sections, with two baby yaks and some chicks and ducklings on one side, and on the other side a room with benches along the walls that obviously served as beds. There was a fire with a large kettle of noxious-looking stew suspended over it. The woman inside, a farmer whose face showed her years of working outdoors, was preparing this food for the baby yaks. We sheltered with the family until the bus arrived, and the rest of the team, soaking wet.

Back at the hotel, the real work began. After a huge day of collecting, most of us weren't finished with our tasks until 10 or 11 p.m., with a break for a feast at a restaurant.

We spent September 19 driving to Haba Shan, stopping and collecting en route—a few stops, but very productive. It was maddening to see so many beautiful gentians in full bloom, and none in seed. On the 20th, we were off for several days of adventure along the Sichuan border and on Big Snow Mountain. At our first lunch stop in the village of Gezi, Bleddyn found two choice *Clematis*, shrubby purple *C. ranunculoides* and climbing yellow *C. rehderiana*. The flower shapes are identical: thimble-sized bells with recurved petals.

After lunch we got to our rustic lodgings (no electricity) at Biyung Gorge, also known as Weng Shui ("Old Water") and more recently dubbed Shangri-La Gorge. Several of us made a faux pas by wandering down an obvious trail. We

should have paid admission, since this is an official park, and there is a fee for hiking past the gate. The mountains here at the gorge are amazing. Limestone formations rise out of the hills, making a canyon with 2000-foot vertical cliffs. Only a tiny slice of sky is visible from the bottom of the gorge, where the hotel is situated.

September 21 saw us on the bus early for the ride to Big Snow Mountain Pass. There we climbed the west face, working from about 10 a.m. until 3 p.m. The scenery was majestic. Off to the north were the sharp, snowy teeth of the mountains on the border with Tibet, as beautiful as the mountains of Alaska, but shining white limestone. It was interesting to see how the rhododendrons grew only on north slopes, where there must be more moisture. Their thickets reminded me of the alder thickets in Alaska that harbor bears, but the only wildlife I saw was yaks. Common plants were *Meconopsis horridula* and *M. integrifolia*, dwarf alpine *Codonopsis*, *Incarvillea*, and several *Anemone* species.

We were all exhausted as we drove down the mountain to our lodging at the infamous Roadhouse 80, a rundown complex used by road maintenance workers. Our home for the night would be simple rooms, one for the men and one for the women. Stan and I chose to sleep on a pile of wood chips in a small side room. The small staff, however, prepared a true Sichuan feast for dinner. After dinner we worked until it got too dark. Bleddyn somehow found the energy to walk down the creek behind the roadhouse and came back with a tall seed stalk of *Notholirion*, a small genus of lily relatives with monocarpic bulbs.

It was raining as we arose September 22, feeling pretty ragged. We drove back to the summit early, but dense fog made us change our plans. We would collect on the east face until noon, then go back to Shangri-La Gorge, collecting on the way. We started up the mountain at 9 a.m. and quickly began collecting a very different group of plants from those of the previous day: little saxifrages and *Hypericum*, a small *Euphorbia*, *Sedum*, *Rhodiola*, a lovely tiny *Primula*, *Saussurea*, *Eriophorum*, *Phlomis*, and many other choice alpiners. The natural rock garden was exquisite. My personal goal was *Rheum nobile*. We got high enough to find fields of it, but the yaks had got there first, and there was not a flower stalk in sight.

We made the 23rd an elective day. Some of us hiked the gorge trail, while others stayed in and worked on seeds. The trail is breathtaking, the gorge similar to the Grand Canyon but narrower—just 50 feet across in some places. Precarious wooden bridges cross and recross the river. The trail holds many plant treasures, including alpine ferns, yellow *Impatiens*, several salvias, and the gesneriad *Coral-lodiscus*. I liked a strange *Geranium* species with reflexed flowers like a shooting star. We also found a nice *Salvia* species, yellow and pink *Impatiens*, and a climbing *Aconitum*.

We drove back to Zhongdian on September 24 and found ourselves with a dilemma. Zhou had learned that a new law had been passed, outlawing seed collecting at the next planned stop on our itinerary. We had to decide whether to go north anyway and risk having the entire collection seized, or to change our plans. We agreed to make day trips out of Zhongdian instead of risking the collection.

Stan was especially disappointed because we would miss seeing *Meconopsis speciosa*.

Our first day trip out of Zhongdian, on the 25th, was collecting at Tianchi Lake (3735 m). The beautiful lake was small enough that we could walk all the way around it as we collected. Large rhododendrons circled it, and close to the water's edge we saw the leaves of *Rheum alexandrae*, similar to *R. nobile* but easier to grow. The first patch was a completely yak-grazed, but eventually we found untouched fields of it with enormous amounts of seed. There were also some seedheads of a huge *Arisaema*, standing upright in the forest like red knobby clubs. I found a patch of what looked like a primula but wasn't; we identified it as a species of *Omphalogramma*.

That evening we held a group meeting to discuss our work so far and fine-tune our system. We had all been working very hard, with everyone doing a great job. Rhonda and Teena had gone over the collection so far and could advise us what we needed more of, and what to pass up now, no matter how tempting. We should now ask our hosts, or our top botanists Dan or Bleddyn, whether a specific plant was different from what we had already. We also had to learn to recognize all the *Pedicularis* species—common in alpine areas, and unlikely to grow in gardens because of their semiparasitic ways—and walk on by. As we relaxed our collecting pace, we could take more time to look for different and tinier plants, and even to kick back and do a little sight-seeing.

We hoped to get the bulk of our seed processed before we got back to Kunming. It was pointed out that we needed to clean it only well enough to get it into the United States. People who hated cleaning a particular kind of seed could “trade” with someone else. For example, I don't mind cleaning squished berries, but don't hand me a conifer cone; Stan hates saxifrages and salvias. We were told not to worry about unidentified plants, since it was possible that we might have found something new and undocumented. We'd let the local botanists sort them out.

We were warned to use discretion on the trip back to Kunming, especially going through Lijiang and Dali. That is where other parties have had trouble, having collections seized by local authorities who don't accept permits from the national government.

Our Chinese hosts made arrangements for Ed, Stan, and me to make a special trip on the 26th to Red Mountain, or Hong Shan, at 4400 meters the highest elevation of the trip. The rest of the team collected at Napa Hai. We took a Jeep on a bumpy, winding mountain road through forests and meadows. We saw much *Gentiana atuntsiensis*, mostly in bloom but with plenty of seed too. Our local guide/driver and our hosts disagreed on which fork to take in a small village; we eventually ended up on the one pointed out by an elderly local woman, unlikely though it appeared. We made our way through one hairpin turn after another, past the bamboo water pipes serving the copper mine from which the mountain gets its name. I was still on my mission to find *Rheum nobile*, and this was probably my last chance. Stan decided to climb the peak to the right. I spotted a scree to the left side that looked likely for the rheum. Ed was



Cyripedium formosanum in the garden of Darcy Gunnlaugson (p. 171; photos, D. Gunnlaugson)





A related group of Himalayan *Cypripedium* subspecies whose taxonomy is not well established (p. 165). Above left, *C. tibeticum* subsp. *tibeticum*; above right, a *tibeticum* subspecies near *C. froeschii* (photos, D. Gunnlaugson). Below, *C. tibeticum* subsp. *corrugatum* (p. 165; photo, M. Sembol).





Above left, *Cypripedium tibeticum* subsp. *corrugatum* (p. 165); above right, *C. farreri* (p. 169; photos, M. Sembol).

Below left, *Cypripedium fasciolatum* (photo, Kiyoshi Oikawa); below right, *C. fargesii* (D. Gunnlaugson).





Above left, *Cypripedium flavum*, pale form; above right, the tiny species *C. fasciculatum* (photos, D. Gunnlaugson).

Cypripedium parviflorum subsp. *parviflorum* (p. 165; photo, D. Gunnlaugson).





Cypripedium sichuanense (p. 173; photo, D. Gunnlaugson).

Cypripedium montanum in the mountains of Oregon (p. 218; photo, Loren Russell).





Cypripedium reginae (p. 165). Above, the typical color form in the garden of Harvey Wrightman (photo, H. Wrightman); below, a wild population of white-flowering plants growing in a rich fen in southern Vermont (photo, Don Avery).





Cypripedium guttatum (p. 215) inhabits both sides of the Bering Strait. Above, an Alaskan population (photo, Frank Pratt); below, the species in Kamchatka (photo, Milan Sembol).





This photo of *Cypripedium kentuckiense* (p. 217) by Jim McClements received second prize in class 3 of the 2003 Photo Contest.

Triosteum himalaicum photographed by Jaime Rodriguez during the Alaska chapter's China seed expedition (p. 188).





Two Chinese gentians were in flower during seed-collecting season: left, *Gentiana georgei*; right, *Gentiana arethusae* (photos, J. Rodriguez).

Saussurea stella (p. 188) and a cushion-forming *Arenaria* species seen by the China expedition.





Plants of Olympus and Parnassus: left, *Alyssum handelii* (p. 185); right, *Myosotis baumgarteniana* (photos, Maria Galletti).

Two violets of the Greek mountains: left, *Viola delphinantha* (p. 181); right, *Viola striis-notata* (p. 183).





Prunus prostrata creeps among the rocks of Mount Olympus (p. 185; photos, M. Galletti).

Left, *Veronica thessalica* (p. 182); right, *Corydalis glauca*.





Crevice-dwellers of Olympus and Parnassus include *Campanula saxatilis* (above left), *Lamium garganicum* (above right, p. 185), and *Asperula boissieri* (below, p. 184). (Photos, M. Galletti)





Saxifraga spruneri (above, p. 182) and *Astragalus angustifolius* (below, p. 184) find footholds on Greek mountains. (Photos, M. Galletti)





This photograph of the colossal alpine bromeliad *Puya raimondii* (p. 218), taken by Yoko Arakawa near Comanche, Bolivia, was awarded second prize in class 1 of the 2003 Photo Contest.



The remarkable foliage and spring flowers of *Cardamine californica* var. *sinuata* growing in Gualala, coastal northern California (p. 220; photos, Norm Jensen).





Cold-hardy cacti bring color to the dry summer garden (p. 223): above, *Opuntia polyacantha* subsp. *juniperina*; below, *Escobaria echinus*. (Photos, Marilyn Raff)



already scrambling up to the right, chortling over the primulas. A few feet from the Jeep was *Bergenia atropurpurea* alongside the road. The alpine meadow was full of low-growing wonders for the rock garden, including a *Minuartia* forming meter-wide cushions like giant green puffballs. Ed was gleeful over a minuscule mat-forming primula with individual rosettes no bigger than one's little fingernail. It was painstaking to collect the seed, but we got plenty. I found a *Saussurea* species different from the ones we'd already collected, growing in crevices under boulders, making 18-inch (45-cm) mounds of attractive foliage, with seedheads like large thistles. I scrambled for the top among rhododendrons while Zhou and Lü headed toward scree on the backside of the slope, toward what appeared to be rosettes of *Rheum nobile* leaves. I could see some rosettes on the scree slope facing the Jeep, so I headed over there, scrambling over bread-loaf-sized rocks. The scree was made up of chunks of granite about the size of ping-pong balls. There were several beautiful rosettes of *R. nobile*, and three wind-stripped scapes with not a seed on them. At first disappointed, I then thought to look at the base of the stalks, and was able to collect about 100 seeds from the crevices, as well as a few sprouted seedlings. I was a happy camper; I could go home now.

The trip of the 27th took the whole team collecting near Napa Hai. At the end of the rainy season, the water level was at its highest; the lake was perfectly calm, mirroring the mountains on the opposite shore. From the road above, we could see giant carp swimming, bright orange like goldfish and perhaps 2 meters long. We were getting tired by now, and ready to watch the fish for a few minutes.

We drove to Lijiang on the 28th, not making many collecting stops, though at one we found lots of *Nomocharis*, the lovely spotted "lilies." Lijiang is a charming old city, but we were aware that we had to be more discreet with the seed drying here. The hotel maids have been known to cause trouble, reporting botanical collectors to the local authorities, who have made arrests and imposed large fines as well as confiscating collections, whether or not the foreigners have permission from higher-level authorities.

I remember nothing about Snow Pine Village except driving through it on September 29. I was completely exhausted from the climb up Jade Dragon Mountain, home of the world's lowest-latitude glacier. The trail started from a resort and headed across meadows of *Hypericum* shrubs. A barefoot local guide led us, making the steep climb amazingly fast. We crossed a couple of good-sized streams and climbed through bamboo thickets. About halfway up, I found an incredible arisaema—trifoliolate, with a leaf span of over 2 feet (60 cm), and a stalk only 12–18 inches (30–45 cm) tall, with an enormous seedhead. In a broad meadow I encountered locals harvesting lily bulbs, mushrooms, and medicinal plants. Just as I was ready to call it quits, a ledge caught Ed's curiosity. Too tired to follow, I watched him climb to it. When he got there, he found a small quantity of *Paeonia delavayi* seeds on extremely dwarf plants, "tree peonies" only 6–8 inches (15–20 cm) tall. The adrenaline from finding the peony gave us enough energy to try for another 100 feet of elevation, passing many *Roscoea* plants, from which we collected seed on the way back.

I took September 30 off from collecting to stay in Lijiang and process seeds. We discussed the possible need to split the team, with a few volunteers staying in Kunming to finish cleaning seeds instead of visiting the famous Stone Forest. The trip had been successful beyond our greatest expectations, with more than 900 collections already.

Jianchuan, where we spent October 1, is a small town in the Cangshan Mountains west of Lijiang, inhabited mostly by the Bai people. October 2 saw our final major collection stop, Ninety-Nine Dragon Pools. It was raining. The road got muddier, bumpier, and narrower the higher we climbed, and eventually Boss Sun said we should go no further. We were only a few yards from the bus when someone gave a shout. There was *meconopsis* everywhere, growing practically in a fast-moving stream, with rosettes unlike any we had seen. I spent a half-hour looking for *meconopsis* seed before heading down the road. Back at the bus, growing like a groundcover near the road's edge, was a tiny *Corydalis* species with cream-colored flowers and lots of seed. On the road back, Zhou told us we should stop only if someone saw something extremely interesting. Five minutes later, I shouted "Stop!" The groans of protest quickly died at the sight of a magnificent small *Sorbus*, a perfectly formed mountain ash tree with dark maroon fall color and glorious pink berries.

October 3 saw us in the ancient walled city of Dali, visiting such attractions as the Three Pagodas, a Buddhist shrine that survived the Cultural Revolution and is being restored. On the 4th we drove back to Kunming, descending rapidly into near-tropical weather and flora. The city hotel felt like opulent luxury compared to our rustic lodges. It was wonderful to feel clean and comfortable again.

Guan suggested that it would be best to carry the seeds in our suitcases back to Hong Kong and mail them to the U.S. from there. We finished cleaning seeds and secured the collection for travel, then enjoyed a special farewell banquet with our Chinese hosts and their families.

Leaving mainland China to return to Hong Kong was mercifully uneventful, and we all passed through customs without incident. On October 8 we sealed the collection, made sure the paperwork was in order, and mailed it off to the USDA inspection center in Seattle. It was out of our hands, and we could play tourist.

Most of us left Hong Kong together, but in Tokyo my path diverged from those of my companions. They all flew to Seattle, but I was traveling through my old home town of Minneapolis and then to Anchorage. I had 13 live plants ready for inspection, but my import permit listed Seattle as the port of entry. Not surprisingly, the Minneapolis customs agents were confused by my package; everything was in order, but they wouldn't just wave me through. Instead, they walked me to the Federal Express counter and let me ship the plants to the Seattle inspection center. The most valuable ones to me were the *meconopsis* from 99 dragon pools, the *Rheum nobile* seedlings, and a variegated raspberry that Dan found and gave me. I wondered if they would survive the extra stress.

My travels were soon over, but the work didn't stop. Our box of seeds arrived in Alaska just one day after we did. Now came the daunting task of filling all the seed share orders, done mostly by Rhonda Williams at Recluse Gardens, her

nursery, with help from half a dozen volunteers. It took nearly two weeks of 8-hour days to get all the seeds packaged and mailed. Everyone involved gained new respect for the people who handle the NARGS Seed Exchange.

This expedition made approximately 950 collections in 78 genera. Twenty-six accessions were complete unknowns, and an additional seventeen were identified only by family. During the distribution, several recording errors were discovered in the field notes or on the seed packages themselves. Every attempt was made to correct these errors, but it became clear that some collections were mysteries. These were isolated and not distributed in the shares. Local growers were given the opportunity to try the mystery accessions, with a careful eye to quarantine anything that looked potentially invasive. We needed a better way to track the distribution of the seeds and communicate with those who received them about their success in growing and in identification of plants. This is especially important for those accessions that were completely unidentified. This was a scientific shortcoming of our effort, and some plants that have never been described before may remain undescribed for now.

Since our China expedition, Alaska has had three very mild winters with little snow cover. The first growing season after the expedition saw great enthusiasm from the local chapter. We have no way of knowing exactly how many accessions are surviving in Alaska. Plants that failed miserably in one garden appear to be thriving in another only a few miles away—wonderful news, unless your garden is the one where the plant died.

Verna Pratt in Anchorage writes in this connection: “My first definitive actions were destroying #559 *Nepeta* sp., #597 *Geranium* sp., and #212 *Silene* sp. because all were unattractive and weedy. I had several primroses do well, including *Primula geraniifolia*, *P. sikkimensis*, and *P. poissonii*. All of the *Meconopsis* species did well, although I’m still waiting for *M. integrifolia* to bloom. *Rheum alexandrae* and *R. delavayi* did fine. We’re still waiting for a small *Potentilla* to flower, and I suspect that #511 *Rhodiola* sp. may become a spreader. #392 *Leontopodium palibinianum* is nice, but I think my favorite is an *Incarvillea* species; no luck identifying it yet, but it is gorgeous—it looks like *I. zhongdianensis*, but the leaves are not pinately divided.”

The winter of 2004 is a real Alaskan one with high snowfall and weeks of bitter cold, which will test whether the goal of bringing home many new hardy perennials for Alaskan gardens has been achieved. It was particularly gratifying to see many second-generation seeds from our collections in the NARGS Seed Exchange list from the 2003 season. By most accounts, the Alaska Rock Garden Society China Expedition was a smashing success.

Jaime Rodriguez lives and gardens in south central Alaska, inland from Anchorage, where he also enjoys photographing wild plants and collecting seeds.

Counsel of Perfection

Robert Nold

I knew that my new berm was finished when I stepped back and took a good look at it and said to myself, "That's just about the dumbest thing I've ever seen."

It was hideous. It sort of rose up, then tapered off, then sloped, then rose again, then came to an abrupt end in a tangle of dead branches and weeds and a pile of rocks of I didn't know what to do with, so that it looked like I had started with a berm and had deserted it halfway through the project, encumbered with unshakable horror at the loathsome creation before me.

I couldn't imagine what people would think of my new berm, so, for the rest of the season, I pretended to be off somewhere in the Himalaya, meditating on the nature of berms and the verbal injustice done to imperfect ones. It takes an awful lot of brain power to decide whether a rock garden should be naturalistic, or semi-naturalistic, or just whatever the hell you want it to be, worrying all the while about what people will say if you have a naturalistic garden and they like only semi-naturalistic ones. It takes even more brain power to convince yourself that the comments of other people don't matter.

There was a problem with the rocks. They weren't the same kind of rocks as those on the other side of the path from the berm, so there was a certain clash, you might say, a mineral dissonance, that would be the first thing visitors would notice after they recovered from the shock of seeing the berm. They might not say anything directly to me, but I could already imagine the shocked whispers at cocktail parties I wasn't invited to, like, "Oh, my God, he used . . . two kinds of rocks."

And even worse, the rocks weren't the fashionable Lithuanian malignite that everybody who was anybody was using to construct their rock gardens. They were sandstone, and they were flat. I thought they looked round when I picked them out, but they turned out to be flat.

There was also a slight problem with the number of plants I had ordered to plant in the berm. Apparently, considering how many plants I had just put in, the berm must have been about six hundred times larger in my mind's eye when I was filling out the order forms. Probably most of the plants would die within two weeks anyway, but they looked pretty silly now.

Meanwhile, warding off the criticisms of the neat freaks among potential visitors, I had taken care of the weeds by smothering them with an overturned wheelbarrow, and I had placed the rest of the rocks in a heap, slightly off to one side, to mimic the spontaneous orogeny one always observes under birch trees.

The first visitor, in fact, was the man who delivered the pea gravel desperately needed to finish off this marvel of design. When he wasn't put off by my suggestion that the pea gravel was intended for the biggest chickens he'd ever seen, I let him take a look at the back yard. Since he was wearing a baseball cap, I put one on too. We glanced briefly at the mutant berm and then strolled through the rest of the garden.

I thought I had done well to grow, or at least attempt to grow, all the alpine plants requisite to a garden that aspires to a certain seriousness of purpose, and elsewhere to cultivate a number of the most fashionable perennials, even occasionally forming an artistic combination or two, just to show I was thoroughly up on the latest garden rules. I have no doubt there were a thousand plants the gravel man had never seen, but they didn't seem to impress him.

When you let people look at your garden, the first thing you have to accept is that they will see it the way they want to see it, and no amount of babbling on your part will change that interpretation. Rock gardeners who are obsessed with construction will see only the rockscapes. Rock gardeners who are obsessed with growing only the most difficult plants will see the androsaces, douglasias, gentians, eritrichiums, cassiopes, and nothing else (and often they won't even care what the garden looks like—my kind of people). Perennial gardeners will want to see if your garden looks like every other perennial garden. Lawn fanciers will look at the lawn and nothing else. Beginners will see . . . well, I don't know what it is that beginners see, since they're at once the most and least impressionable of visitors.

My visitor, who said nice things about this and that, finally stopped in the middle of the rock garden, pushed his cap back slightly (I did the same), and said, "You know what this garden needs now?"

"No," I said. "What does it need now?"

"A railroad."

I threw my cap on the ground and walked into the house.

Bob and Cindy Nold's garden in the Denver suburbs includes berms, pools, perennials, trees, eritrichiums, dogs, sculpture, and no railroad. He is the author of *Penstemons* (Timber Press, 1999) and *Columbines* (Timber Press, 2003), as well as many articles that have appeared in this journal.

Plant Portraits

Cypripedium reginae

HARVEY WRIGHTMAN, Kerwood, Ontario

One of the perverse delights of rock gardening is the way we tramp through the territory of others—few single-genus obsessives here, for all plants are beautiful to us. Although I don't grow many orchids, those native to North America, and especially those that tolerate the heat and humidity of the East and Midwest, are fair game for me.

There is little argument that *Cypripedium reginae* (photos, p. 198) is the most beautiful North American slipper orchid, and one of the finest temperate-climate species. I've grown it off and on for 40 years. In southern Ontario, it waits for the soil to warm in mid-May and then rapidly produces stout stalks 40–60 cm (15–24 inches) tall, sometimes reaching one meter (3 feet). Each stem bears one to three flowers: flat, pure white petals and pouches of rosy red, almost too heavy for the scape to carry. We have a robust stock colony to propagate from, and the sight of it in full bloom, usually the first week in July, is much anticipated.

Cypripedium reginae ranges from the Atlantic coast to the Mississippi River; south to North Carolina and north to the southerly portion of the boreal forest. Around Sault Ste. Marie, Michigan, it is so abundant that it is sold as a cut flower at roadside stands. How can it survive so widely, even with assaults like that? The answer lies in the ability of the species to exploit habitat disturbance, even to the point of dependence on disturbance. As Fred Case once said to me, "Nature is messy." Thus, we often find elegant and unusual specimens in slide areas, road cuts, or even dump sites. *C. reginae* favors wet, open sites with limestone-derived soils. It will grow on sphagnum, but only over a limestone substrate. In cultivation a bit of lime should be provided, but it needn't be much. One local grower who propagates a stock in an artificial bog of peat moss and rainwater says that enough lime is provided by the dust that blows in on windy days (southern Ontario has largely lime-based soils).

In nature, open cedar (i.e., *Thuja occidentalis*) swamps that are not too acid are this orchid's favorite habitat. As the trees mature and shade increases, the orchid

population may move to a new site through seeding. Sometimes it persists if a natural event reduces the canopy; this may happen through heavy browsing by deer, and the deer's trampling also is beneficial to the orchids. The seeds of *C. reginae* need a period of total darkness to germinate, and this takes place when the seed is buried 3 to 5 cm deep, so deer wandering about do an excellent job of planting it.

Growing this orchid in gardens in suitable climates is relatively simple because it is so adaptable. The pictured plant is in our crevice garden on a northeast face, quite bright with some dappled sunlight. I suspect that the silty sand soil base of the garden supplies enough moisture to sustain the plant. There is however, little room for it to expand—not an ideal site, but it shows the strength of the plant and its determination to endure. We fertilize it sparingly with a 20-8-20 (high nitrate) liquid fertilizer, but always at a low rate (less than 100 parts per million N) and diluted in rainwater. Too much fertilizer applied at once kills the mycorrhizal fungi the cypripedium depends on to absorb nutrients from the soil.

If watered correctly, the leaves will remain and feed the plant until frost withers them. After flowering, the plant concentrates on producing new roots. In nature, this can lead to huge root masses. The newer roots actually grow over the older ones, which then cease to produce stem shoots. Instead, they maintain a few main connections to the new roots and feed the whole plant. Eventually the older roots are buried too deeply and disappear altogether. You can lift such a clump and separate the old from the new, replanting all the pieces at the normal soil depth, which is rather shallow. Dormant, secondary eyes on the old roots will then activate, and thus the old mass is rescued. Division can be done in late fall, or in early spring before top growth emerges. I prefer spring division.

Seed is another method of increase, and fortunately this is one of the easiest cypripediums to germinate and grow; however, sterile culture is required (see Milan Sembol's article in this issue). If you're a gardener new to growing cypripediums, you're well advised to buy the largest specimen you can find, as the larger root mass makes for an easier transplant.

This plant that anyone will enjoy wants only a bit of attention—clean water and an annual top-dressing of forest duff. Given that, it will repay you with many years of a spectacle that will make garden writers drop to their knees and sing with delight.

Cypripedium guttatum

DOUG TRYCK, Anchorage, Alaska

Alaska is blessed with many orchid species—according to some sources, more than thirty. I've never counted them, but in my wanderings, I always seem to come across a couple. Perhaps my favorite genus among them is *Cypripedium*. Alaska has four or five species, depending upon what reference you consult: *C. montanum*, *C. passerinum*, *C. parviflorum*, *C. guttatum*, and *C. yatabeanum*, with

the last considered by some authors as a subspecies of *C. guttatum*; I regard it here as *C. guttatum* subsp. *yatabeanum* (photos, p. 199).

Cypripedium guttatum is a low-growing orchid with two nearly opposite leaves, shiny on the upper surface and somewhat hairy underneath. The leaves are usually 2–3 inches (5–7.5 cm) long and about 1 inch (2.5 cm) wide. The pair of leaves is placed about halfway up the 6-inch (15-cm) flower stalk. The solitary flower is quite showy: white with purple blotches in *C. guttatum*, and including some yellow in subsp. *yatabeanum*. This species is usually found in loose colonies from a dozen to literally thousands of plants. It is stoloniferous, so it is interesting to see the different clones in large colonies. Its spreading habit may be good for single clones but bad for reproduction, as I rarely see any seed on wild plants. (A preference for the option of vegetative over sexual reproduction is not uncommon in plants of the far north, where harsh conditions may prevent fertilization and/or seedling growth in many years.)

Some of the most spectacular colonies are in the Matanuska River drainage, where I've seen whole hillsides in bloom with orchids in late June and early July. They are never very common, but are frequently encountered.

This orchid has an interesting distribution. It is found from from eastern Europe through Asia along both sides of the 60th parallel, eastward to the Kamchatka Peninsula, then south to northeastern China, Korea, and the Japanese island of Hokkaido. It then shows up in the Himalayas. In North America, it occurs from south central Alaska, then extends northeast along the Alaska Range and Yukon River drainage into northern Canada. Subspecies *yatabeanum* is found from Japan through the Aleutians, on Alaska's Kodiak Island, and in south central Alaska. The two subspecies meet in my home area, Anchorage, resulting in some interesting introgression.

Like many other orchids, these cypripediums tend to grow where people want to live. There used to be sizable colonies within Anchorage, especially in the southwestern part of the urban area in wetlands. However, pressure to develop subdivisions finally caught up to them, and the area is now built over. A number of members of the gardening community, including myself, were lucky enough to rescue plants before the area was completely changed. In my garden, *Cypripedium guttatum* has thrived. Always remember, though, that orchids are best appreciated where they're found naturally, since many of them languish and die in cultivation.

Cypripedium californicum

DICK CAVENDER, Sherwood, Oregon

Here in the Pacific Northwest we are fortunate to have one of the prime areas for interesting rock garden plants: the Siskiyou Mountains of southwestern Oregon and northwestern California. The Siskiyoues are home to several of our most treasured beauties, such as *Lewisia cotyledon* and *Kalmiopsis leachiana*. Another

treasure found there, but not common in gardens, is *Cypripedium californicum*, the California lady's slipper.

Cypripedium californicum is among the smallest-flowered species of the genus and is the most limited in distribution. It is usually found growing beside creeks or in running water in boggy areas on hillsides, often in the company of the insectivorous pitcher plant *Darlingtonia californica* and the western azalea, *Rhododendron occidentale*. Fresh running water is the key factor in these habitats. Stunted Jeffrey pine (*Pinus jeffreyi*) and incense cedar (*Calocedrus decurrens*) provide filtered shade. This orchid inhabits a wide elevational range, from 150 to 6500 feet (50–2000 m) and generally grows on serpentine (ultramafic, high in magnesium and iron) soils. I have found it near O'Brien along the West Fork of the Illinois River, on Iron Mountain between Agness and Powers, and at Hunter Creek Bog east of Gold Beach, all sites in Oregon but widely separated. A geological map is useful in finding good search areas, since *C. californicum* is considered an indicator plant for serpentine soils. It may benefit from the addition of magnesium to its growing medium, although I have not done this.

In the wild, *C. californicum* forms clumps from 20 to 45 inches (50–120 cm) tall. Each stem has 5 to 10 leaves 2–5 inches (5–12.5 cm) long and 3/4–2 inches (2–6 cm) wide. The flowers on one stem open at about the same time but increase in size with age and range from 4 to 12 in number. The slippers are white and the petals and sepals yellow-green. My garden plants have not exceeded 12 inches in height but have flowered every year and produce fertile seed. Although said to be one of the most difficult species in cultivation, *C. californicum* has grown well here in a mound of sandy loam in full sun for about six years. My plants are irrigated every fourth day during our dry summers by an automatic system. The clump has increased nicely. It is certainly a little gem, and one you won't find offered at the local garden center.

Sources:

Spangle Creek Labs, 21950 County Road 445, Bovey, MN 55709, USA, Phone: (218)-247-0245 <carolscl@uslink.net>

Fraser's Thimble Farm, 175 Arbutus Rd., Salt Spring Island, BC V8K 1A3, Canada, www.thimblefarms.com, thimble@saltspring.com

Red's Rhodies, 15920 SW Oberst Lane, Sherwood, OR 97140, www.hardy-orchids.com, red@hardy-orchids.com

Cypripedium kentuckiense and *C. montanum*

Compiled by the Editor

Two widely separated American *Cypripedium* species are the subjects of illustrations on pp. 197 and 200. Jim McClements took the digital photograph of *C. kentuckiense* in his Delaware woodland garden, having received a start of the plant from John Lonsdale, who grows it near Philadelphia, Pennsylvania. According to

Philip E. Keenan in the fascinating book *Wild Orchids across North America* (Timber Press, 1998), this is a plant of “mostly wooded floodplains, marshes, and seeps from Kentucky to Arkansas,” distinguished from *C. parviflorum* by its “size, shape, and pale pouch color.” Gardeners in the Northeast report that it is one of the easier species to establish.

Loren Russell photographed *Cypripedium montanum* in the Aldrich Mountains, southwest of John Day in central Oregon. The illustrated plants were “locally abundant on east and northeast slopes in selectively logged, mesic mixed conifer forest around 5600 feet elevation. On the ground there was abundant large woody debris from past logging and a thick humus layer. Cyps grew both in open areas with lupines and other forbs, and in darker spots with few other flowering plants.” He notes, “*C. montanum* used to be scattered through much of Oregon, including low elevations in the Coast Range. Cyps now survive pretty much where people don’t go, and I think it’s very clear that forest practices and digging account for decline throughout the region.” Its habitats, usually in coniferous woodland, are quite varied in terms of sun exposure and moisture over its range, which extends from southernmost Alaska to northern California, and east to Alberta and Wyoming. I have seen it grown well in Portland, Oregon, among rhododendrons on a fast-draining soil.

Puya raimondii

YOKO ARAKAWA, Kennett Square, Pennsylvania

The plants of high alpine regions are typically low in stature, but *Puya raimondii* (photo, p. 206) is a representative of the “alpine megaflores,” an evolutionary development especially notable in the high mountains of South America and East Africa. It produces the largest inflorescence in the world and is one of the most spectacular plants of the South American Andes. Endemic to certain areas in Bolivia and Peru, it belongs to a subfamily of the Pitcairnoideae and is one of about 185 species of *Puya*.

Puya raimondii Harms was first described in 1894, under the name *Pourretia gigantea*, by the Italian scientist Antonio Raimondi, who had observed it in Peru in 1874. In 1928, H. Harms in Germany investigated the genus *Pourretia* and renamed this species *Puya raimondii*.

This plant grows at high elevations—approximately 12,500 to 13,700 feet (3800–4200 m)—on the rocky, sloping terrain of the Puna (Andean steppe grassland), where winter low temperatures can approach 14°F (–10°C). Annual precipitation does not exceed 30 inches (760 mm) and occurs during spring and summer, with autumn and winter almost totally dry except for a few snowstorms. The acid soil ranges from clay to sand, with a pH of no more than 6.5. *Puya raimondii* is a terrestrial bromeliad with a well-developed root system and does not produce any offsets, so propagation is only by seed.

A young plant forms a rosette up to 10–13 feet (3–4 m) across. The yucca-like leaves are supported by a trunk 20–24 inches (50–60 cm) in diameter. The leaves are about 6 inches (15 cm) wide, with many large veins; their margins are armed with hooked spines that point in several directions. Jean Dorst reports that the bodies of as many as ten small birds may be found impaled upon the spines of a single plant of *P. raimondii*, victims of too hasty a takeoff or return, perhaps to avoid a bird of prey. When I observed these plants near Comanche, Bolivia, a dove was nesting in a *Puya*. It may have been the safest refuge from birds of prey for the dove, because it did not move even when I got very close to it.

The flowering of *Puya raimondii* is a passage into extraordinary beauty. The flower stalk begins to grow in May, extending rapidly (5–7 m) in a few months. It reaches up to 32 feet (10 m) in height and 20 inches (50 cm) in diameter and bears 8000 to 10,000 individual flowers from October into December. The flowers are white to light yellow, turning purplish as they wither. They contain sweet nectar, which attracts pollinating birds, particularly the Andean bare-faced dove (*Cymnopedica ceciliae*), several species of sparrows, other passerine birds, and the giant hummingbird (*Patagonia gigas*). The flowers are also pollinated by moths. A plant can produce hundreds of thousands of seeds, but only a limited number germinate during the following wet season. The plants die after flowering. The small winged seeds are reported to remain capable of germinating for six months.

Legend has it that plant takes 150 years to flower, but more recent estimates reduce the time for maturity to between 80 and 100 years. In cultivation, *Puya raimondii* flowered in 1986, 28 years after planting, at the University of California, Berkeley Botanical Garden.

Puya plays an important part in the cultural life of the Aymara and Quechua Indians. A popular activity during the feast of San Juan on the night of June 24 is hiking to the nearest *Puya* colony and setting fire to the plants like big torches. This occurs before the seeds have been disseminated, so this ritual leads to the extinction of many colonies and may eventually threaten the survival of the species. In addition, *Puya raimondii* is used in many ways by native people. They cut it for kindling or thatching and to make low fences around their houses. The cooked leaf juices are used as a medicine for fevers and an aid in childbirth. The root was used to treat worms in domestic animals. The tender leaf shoots are prepared as a salad. The fresh leaves serve as fodder for donkeys, cows, and pigs. The dried leaves and stems are gathered for fuel. The roots are harvested by women to make combs.

This is definitely not a plant for most home gardens, but it is worth going to see it in the wild and witness its once-in-a-lifetime bloom.

Acknowledgment

I would like to thank to Jane McGary and James Sutton, who helped me translate German and Spanish articles.

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Cardamine californica

MARY SUE ITTNER, Gualala, California

In coastal Northern California where I live, each winter I look forward to seeing the first flowers in the wild and in my garden. The subject of this portrait is one of my favorite native plants for the garden, although I rarely see it used locally except in "natural gardens" that are not planted.

Cardamine californica (formerly called *Dentaria californica*) has many common names: milkmaids, toothwort, lady's smocks, pepper-root, and rain bells. This member of the mustard family (Brassicaceae) is a common inhabitant of shaded, often moist areas from San Diego County north through the Coast Ranges to southwestern Oregon. Sometimes you see it on mossy banks or on the forest edge, but I have also seen it growing in grassy areas. It starts blooming in late winter and may continue into April or May in various habitats.

One of its distinctive characteristics is that it has different rhizome leaves and stem leaves (photos, p. 207). It is deciduous in summer, and the first leaves that come up after the rains start in fall are the heart-shaped or round rhizome leaves. In some varieties there is only one such leaf that hugs the ground. Later, an unbranched flowering stalk 7 to 15 inches (17-35 cm) tall appears, sometimes at a distance from the rhizome leaf. The leaves of this stem are deeply lobed, often divided into 3 to 5 lance-shaped or ovate segments. Flower color ranges from pure white to light pink to rose.

I have found *Cardamine californica* easy to grow from seed, once I realized that my young plants had not died but had just gone dormant for the summer. A small tuber is formed, eventually multiplying into a colony, so that a leaf can appear some distance away from where you planted it. (The tubers are edible raw, added to salads. They aren't very big, however, and you would need to sacrifice quite a few to get much to taste.) Plants often bloom the first year from seed. Where I have planted mine, they do not get summer water, but they are in a shady area that does not dry out immediately, and we get a fair amount of winter rain (50-60 inches in most years). Planted in a more open area, they might appreciate some irrigation in summer. I can grow this them under my redwood trees (*Sequoia sempervirens*) without extra fertilizer or attention, another reason this plant is a winner.

I have grown several forms, mostly from seed I collected while out hiking. There is a lot of variation in the local populations, making certain identification from a key very challenging. One variety, *Cardamine californica* var. *integrifolia*, grows in wet, grassy areas and has bright green leaves and white flowers—arresting from a distance when the white flowers appear in a mass. I tried it in my garden, but it has dwindled.

The variety that has survived for many years in my garden, expanding nicely, was grown from seed shared by a friend who discovered it growing on her property. We keyed it out as *Cardamine californica* var. *sinuata*. This variety is very common in our area, where most populations have leaves that are green above and purple below. Her population, though, has beautifully variegated purple and gray-green leaves. The underside is all purple. Since every leaf has a different pattern, it would be worth growing just for the leaves alone. The pink flowers are a bonus. The variegated pattern occurs in the seedlings grown from seed of this population, but not in those from populations with plain leaves. Every year I watch for the leaves to appear after it starts raining, usually in December. I am thrilled to see those wonderful variegated leaves with the promise of spring and pink flowers to follow.

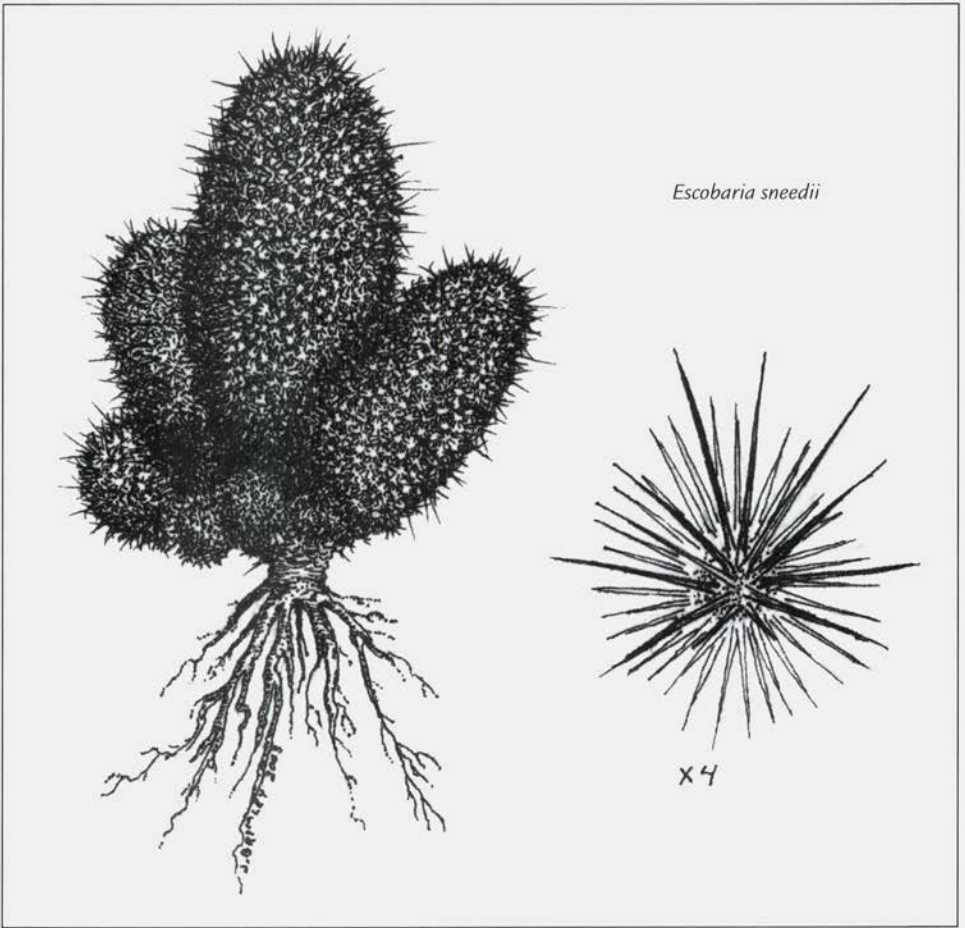
Escobaria sneedii

JEFF BRIMLEY, Bountiful, Utah

Over the years I have tried growing many different plants, with varying degrees of success. Some have proven very hardy, some hopelessly not. Two of my successes have been the small cacti *Escobaria sneedii* subsp. *sneedii* and *E. sneedii* subsp. *lei*. These two little gems have been a joy to grow, even though they are so small they are often missed by visitors.

I purchased *E. sneedii* subsp. *sneedii* and various other seedlings from Mesa Garden, a Utah nursery, in 1998. When the small white box arrived, I opened it up. Inside, wrapped in newspaper, was a tiny, white-spined ball with roots, only about 4 mm (1/4 inch) in diameter. My first response was, "I paid \$2.50 for this?" However, I found a sunny spot in the garden and planted it, hoping it wouldn't get lost in the rock mulch or blown away. To my astonishment, it grew and flowered the next year.

Escobaria sneedii subsp. *sneedii* is clump-forming. Each new head comes up from the base of the plant, starting out at only 1 or 2 mm and maturing to about 2.5 to 3 cm (about 1 inch) in diameter. They grow to about 8 cm (3 inches) tall after three to five years. The clump I have is about 14 cm (5.5 inches) across with 40 or more heads of various sizes. Each mature head has tubercles (the protrusions from which the spines emerge) 2 mm long, with six to nine central spines about 5 mm long, white tipped in pink. There are in addition 25 to 30 radial spines, 4–6 mm long. This mass of tiny spines hides the plant's body.



In late spring, very tiny flower buds appear, only 1–2 mm in diameter; you may need a magnifying glass and knee pads to inspect them. The flower opens to 1 cm (3/8 inch) across, with white to pale pink petals with pink margins. If they are pollinated, greenish-pink fruit will form holding small brown seeds.

Escobaria sneedii subsp. *leei* is very similar to the other subspecies. The main difference I have noticed is flower color, which is brownish pink or bronze. The heads also seem smaller than those of subsp. *sneedii*, but this may be because my specimen isn't mature.

These little plants are native to New Mexico and west Texas, growing in limestone hills and grasslands at 4200–5500 feet (1300–1700 m). Both subspecies are on the U.S. Endangered Species List and are classified as threatened species in New Mexico. The two subspecies are victims of over-collecting by rare plant

fanciers, and also of loss of habitat. However, they are readily propagated from cultivated specimens by seed or offsets, and I recommend both as gems for the dry rock garden.

Sources

Mesa Gardens, <www.mesagarden.com> Seeds and plants.

High Country Gardens <highcountrygardens.com> Plants.

Opuntia polyacantha var. *juniperina* and *Escobaria echinus*

MARILYN RAFF, Denver, Colorado

No one can call me a huge cactus fan. I have fewer than a dozen, among cactus aficionados barely a drop in the bucket. In spite of often-menacing thorns, I'm attracted to their flowers and to the diverse textures of their pads and branches. For over a decade, without any attention from me, *Opuntia polyacantha* var. *juniperina* (photo, p. 208) has produced dozens of cup-shaped, silky smooth red flowers. The large pads remind me of a beaver's tail clothed with a multitude of deadly spines. I started with one lonely pad; now more than a dozen weave in and out along a rock wall. At times parts of the cactus have looked a bit tattered. When this happens, I gingerly dig up a few pieces and poke them into other bone-dry section of my garden. Thus, I've built up a nice collection, which in summertime offers blotches of red here and there.

I know most cacti bloom in June, so when I perused my flagstone path during a sizzling hot August day, I was delightfully surprised to see a cactus blooming. More surprising (in my case) was that it was labeled, and that the label was not broken, faded, or torn out by birds, critters, or young kids! The subject, *Escobaria echinus* (photo, p. 208), is planted in a round trough, a bit bigger than a basketball sliced in half, among many *Sempervivum arachnoideum* (cobweb houseleek). I added this spherical cactus three or four years ago, attracted to its studied array of lacy spines and its appearance that contrasts with my opuntia. *Escobaria* bloomed in August, rather than its normal season in June, because that was when it finally matured.

Its first four flowers lasted about a week, resembling a corsage nestled near the crown. The blossoms are pale yellow, more than an inch across, turning luminous ivory when struck by sunlight. Toward the center is a sizable dab of reddish orange.

There are about 17 species of *Escobaria*, native to low-lying semidesert and arid lands in parts of the United States, northern Mexico, and Cuba. In semi-arid gardens like mine, *Escobaria echinus* can grow in the open in full sun, or in a trough. Avoid constant wetness in winter. Even after it sat under four feet of snow in a March blizzard, my cactus still bloomed. Occasionally in summer it receives a little water from a nearby sprinkler. Sharp drainage is a must, in poor to moderately fertile soils. A typical gravelly rock-garden mixture is ideal.

Books

Both: A Portrait in Two Parts, by Douglas Crase. New York: Pantheon, 2004. ISBN 0-375-42266-8. 310 pp., b&w photos throughout, index, bibliography. Hardback, \$24. Available from NARGS Book Service.

Reviewed by BOBBY J. WARD, Raleigh, North Carolina

In 1974, the American Rock Garden Society (predecessor to NARGS) jointly honored Dwight Ripley and Rupert Barneby with the Marcel Le Piniec Award, the society's national award for botanical explorations that enlarge the knowledge of rock garden plants and increase horticultural material available for gardens. In the write-up of the award in the *ARGS Bulletin* (June 1974), Lincoln Foster noted that the two men had formed an ideal symbiosis through their 48 years of association until Ripley's death in December 1973 (Barneby lived until December 2000). Their partnered lives blended the worlds of botany, art, music, and literature, and they are chronicled in *Both: A Portrait in Two Parts*.

Ripley was born in London in 1908, son of an Anglo-Irish mother and a wealthy American father; Dwight's cousin was the renowned S. Dillon Ripley of the Smithsonian. Barneby was born in 1911 at Trewyn in the Black Mountains of Wales. In 1925 they met as schoolboys at Harrow and became infatuated with each other. Alarm bells went off immediately at Harrow, Crase writes—not because of the scandalous romance itself, but because Ripley was not English. They continued their relationship while Ripley attended Oxford and Barneby, Cambridge.

Barneby was impressed by Ripley's knowledge of the Latin names of plants, and soon they shared a passion for botany and gardening. They made early collecting trips together to Spain and North Africa, and later to Mexico. In 1938 they moved to Beverly Hills, California, where they had opportunities to greatly expand their botanical interests in the western states and Mexico. They soon began publishing articles in the *Proceedings of the California Academy of Sciences*.

Barneby and Ripley moved to New York in 1943, apparently to be near the herbarium at the New York Botanical Garden, but they made frequent trips back west, both together and separately. In New York, the two joined a postwar artistic circle as Ripley began patronizing fledgling artists (the pair were early collec-

tors and promoters of Jackson Pollock and Joan Miró). Ripley funded the establishment of Tibor de Nagy Art Gallery and had one-man shows there. They became friends with W. H. Auden, Aldous Huxley, Peggy Guggenheim, William Burroughs, John Cage, Ned Rorem, Larry Rivers, and other artistic glitterati of the 1950s.

The depth of their botanical knowledge was all the more remarkable because Ripley and Barneby were self-taught, not professionally trained botanists. Between them they were able to read at least 30 languages. Ripley was a published poet and artist (some of his drawings appear in *Both*, including a whimsical dust-jacket illustration of Barneby with a flowerpot of *Primula* growing out of his hat).

Though *Both* largely chronicles the pair's involvement in the arts and literary scene, it is not lacking in botanical information. There is mention of Jim and Jenny Archibald, Arrowhead Alpines, and Margaret Williams (all on a single page). There is much information on western U.S. plant collecting, including a journal entry by Barneby of their joint discovery of *Astragalus pterocarpus* near Battle Mountain, Nevada, where holding the living plant is described as a "supreme moment." In a letter, Walter Ingwersen wishes Ripley luck on a collection trip to Texas. There is elegant prose, such as what Barneby wrote when they discovered *Marina scopae* (Fabaceae) in bloom in Oaxaca, Mexico, in 1966: "By day a dowdy weed, [it] is transformed by early morning into a thing of beauty. Shafts of oblique sunlight then illuminate the panicle into a tangle of lustrous red branchlets along which are strung innumerable small but vivid flowers of glowing magenta-purple."

Both provides evidence of Barneby's immense scholarship as a botanist. He was associated with the New York Botanical Garden for 50 years, specializing in western U.S. flora and becoming an expert in the Leguminosae (bean family) and Menispermaceae (moonseed family). He published, according to Crase, 7676 pages of articles and monographs in 263 items, probably more than any other botanist of the 20th century. His most famous work was the *Atlas of North American Astragalus* (1964). Barneby was the publishing author of 2562 taxa (species, subspecies, and varieties), including many mimosas and cassias; he discovered five dozen new species, and is honored with 25 species and four genera named for him. The first plant Barneby named was a plant they found at Yucca Flat, Nevada in 1941: a parsley-like member of the Apiaceae, *Cymopterus ripleyi*.

According to Crase, Ripley had his first rock garden at "The Spinney," his home in Sussex, where he and Barneby, while still students at Harrow, collected, identified, and made herbarium specimens of 1138 plants and, in 1939, published *A List of Plants Cultivated at The Spinney, Waldron, Sussex*. Ripley was a member of the Alpine Garden Society even before moving to the U.S., and he contributed 19 articles to the society's *Quarterly Bulletin*, primarily on native flora of Nevada, Colorado, Utah, and Oregon, and earlier on flora of the Mediterranean and Spain. Six species of plants are named for him, including *Astragalus ripleyi*. Ripley and Barneby built rock gardens at their homes in Dutchess County, New York, near Wappingers Falls, and later at Greenport, Long Island. Photographs and descriptions of the gardens are included in this book. Between them, they

wrote seven articles for the *Bulletin of the American Rock Garden Society*, most in the early 1950s.

This biography is organized in two parts, covering Barneby first (the author became friends with him in 1975). The second part covers Ripley, whom Crase never met. There is unavoidable overlap, often resulting in a nonlinear narrative of their entwined lives. As a result, basic facts at times have to be ferreted out. There are 32 pages of wonderfully informative endnotes, but no note numbers in the text itself alerting the reader that they have been provided. More of a problem are the excessively long paragraphs throughout, often a page or more without a breather. Even Ripley's death is hidden on the third page of a four-page paragraph. A firm editor would have modified this annoying habit of the author.

Ripley and Barneby are recognized giants in the botanical world of the 20th century, and their botanical skills have been widely touted. *Both* illuminates these achievements and provides a full portrait of the social and artistic circles these two men inhabited.

A Painter's Year in the Forests of Bhutan, by A. K. Hellum. University of Hawai'i Press/University of Alberta Press, 2001. ISBN 0824824865. Paperback, \$40.95 (remainders from Amazon at \$15.92).

Reviewed by LEO SMIT, Mt. Uniacke, Nova Scotia

This interesting and thought-provoking book came to me as a gift about two years ago, and although it is not the sort of book I would buy for myself, I have been glad to have it. The author was in Bhutan for two years from mid-1988, working under contract through an international aid agency on a forest management project based in Thimphu. The watercolor paintings collected in his book were undertaken as a vehicle for meditation during weekends rather than as an ends in themselves—but certainly at no apparent cost to artistry or accuracy.

The paintings are nicely executed and well reproduced. Hellum's style is clear and pleasing, with good detail. The text makes for enjoyable browsing at any time of the year, but especially by the fireside in winter. Some of the plants portrayed are old friends in the West, while others are seldom seen outside Bhutan. The text is the warp that ties the paintings together. Each painting or set of a few paintings is accompanied by a page or two of description about how it came to be painted or some other anecdotal detail.

Describing the general content of the text is not straightforward. As the objective of the paintings would suggest, there is an air of spirituality about some of the writing, on the surface simple and accessible reading but often with a depth beyond the mere words. It also discloses a wry sense of humor which I found quite enjoyable and appropriate. Some of the little stories are along the lines of a travelogue, describing scenery and peoples. Most are discussions or observations of cultural impressions, anecdotes of Hellum's daily life with the people of Bhutan and vignettes of cultural encounters, glimpses, and enlightenments.

Botanical observations are not lacking but are almost incidental in some instances, occurring as bits of botanical trivia, interesting for all that.

The only thing I find lacking is a good map or set of maps on which all the place names mentioned, especially the passes, can be found. The one map in the book is good as far as it goes but needs more detail.

Beyond English Literature

JANE MCGARY

The arrival on my desk of a recent German book, Martin Haberer's *Der neue Steingarten: Gestaltung, Anlage, Pflege* [*The New Rock Garden: Design, Construction, Maintenance*] (Ulmer, 2003; ISBN 3-8001-4173-6), prompted me to ask correspondents on the Internet rock garden forum about good rock gardening literature in languages other than English. Although German is not one of my better languages—the dictionary is at my left hand at all times—I've long cherished Fritz Kummert's *Pflanzen für das Alpenhaus* [*Plants for the Alpine House*] (Ulmer, 1989; ISBN 3-8001-6337-3) for its excellent descriptions of frame and alpine house designs and for its unusual plant list, where one can often find genera and species not covered in other manuals of alpinism.

Those responding to my query generally believe that most of the non-English literature on our avocation is in German or Czech. Dieter Zschummel of Leipzig recommends an Ulmer series on specific genera, particularly Klaus Kaiser's *Anemonen* (1995). He writes that the best older work in German is *Die Kulturpraxis der Alpenpflanzen* [*The Cultivation of Alpine Plants*] by Erich Wocke (Paul Parey Verlag, Berlin, 3rd ed. 1940), which includes not only descriptions of many good plants but also advice on rock garden construction. Zschummel notes, "Of course this book is old and many names have changed, but it is something like 'Farret' for the Germans."

Recently an article by Wiert Nieumann of Utrecht, the Netherlands, on his innovative rock gardening appeared in these pages. His book *Rotstuinen* (Antwerp: Zorner & Kuening, no date given; ISBN 90-210-0084-9) is recommended by Bob Nold: "brilliant, fantastic designs; show the tufa lumps on sticks to perennials gardeners who talk about form, texture, and color, and watch them keel over."

Daniela Goll, who gardens near Paris, writes, "When I started rock gardening, the only available literature in France was for the rawest beginners—and full of bad ideas, too. When I moved a little higher, trying to identify plants in the Alps, the only French book I found was *Flore des montagnes* by Fritsch, Boutevin, et al., of medium quality and interest. The ones I bought to carry around with me were translations: *Mountain Flowers* by W. Lippert (from German), and the best, Christopher Grey-Wilson's *Collins Pocket Guide to Alpine Flowers of Britain and Europe*; along with some regional flora booklets by Paula Kohlhaupt (Italian). As to rock gardening, Fritz Köhlein's *Rockery Plants* (from German) is a very good book everybody bought. . . . Ninety-five percent of my gardening library is in

English. But then, perhaps I didn't look well enough, long enough (that famous Gallic shrug)."

Frances Howey of London, Ontario, mentions *Flore des Alpes* by L. and E. Schroter (Zurich: Albert Raustein, no date reported), "a lovely little book with descriptions in German, French, and English . . . bought in Zurich shortly after the end of the second World War." These older books often have great charm, but plant names may have changed in the intervening years.

The Czech Republic with its famed cohort of expert alpine gardeners has produced a body of literature little known to the rest of us. Josef Niederle of Brno in that country recommends Albert Pilát's *Atlas alpinek*, Pilát and Deyl's *Alpinky*, and *Skalka ozdoba zahrady* by Kotek, Nejtř, and Vanek. Niederle seconds the good opinion of Wocke's *Kulturpraxis der Alpenpflanzen* and also mentions a German book, *Stauden*, by Seyffert. (The European habit of suppressing first names of authors is evident here, sorry.) Bob Nold admires, though he admits he cannot read, *Skalky a jejich stavba* [*Rock Gardens and Their Construction*] (Prague: AGEM, 1992).

I asked specifically about plant guides for Mexico, but heard only from Andrew Osyany, an Ontarian who likes to visit the Sonoran Desert. He reports Oscar Sanchez Sanchez's *La Flora del Valle de Mexico* (1968, repr. 1984; ISBN 968-420-082-2).

Rock gardeners planning trips to Chile and Argentina often rely on John Watson's excellent articles in the *Bulletin of the Alpine Garden Society* and the *AGS Encyclopaedia of Alpines*, but they also want local plant guides. I have not seen any recent useful publications for Argentina, but wild plant enthusiasts in Chile have produced a small but solid bibliography. Best known is the series "Flora Silvestre de Chile" ["Wild Flora of Chile"], compiled by the leading Chilean botanist Adriana Hoffmann J. and co-authors and published by the press of Fundación Claudio Gay, Santiago: *Flora Silvestre de Chile: Zona Austral* [*Southern Zone*] (1982); *Zona Central* (1978, several later editions); *Cactaceas en la flora silvestre de Chile* (1989); and *Plantas altoandinas en la flora silvestre de Chile* [*High alpine plants*] (1998). Although annoyingly organized by flower color in some cases (*Plantas altoandinas* is by family and genus, though), these sturdy paperbacks are well indexed and fully illustrated with color paintings. The Spanish of the descriptions should not be hard to decipher for a non-speaker with a decent knowledge of botany. On a recent visit to Chile's northern zone I purchased *Flores del Desierto de Chile/Wildflowers of the Chilean Desert*, by Sebastián Teillier A., Herman Depeda F., and Patricia García V. (Marisa Cuneo Ediciones, Casilla 276, Valdivia, Chile, 1998; ISBN 856-7173-22-2). It is bilingual Spanish and English and has good color photos, but botanical information is given in an annoying, complex iconographic code, probably for the convenience of users who know neither language; nevertheless, I found it indispensable.

My newest acquisition in this line is a two-volume set, *Flora nativa de valor ornamental: Identificación y propagación, Chile, Zona Sur* [*Native plants of ornamental value: Identification and propagation, Chile, Southern Zone*], by Paulina Riedemann and Gustavo Aldunate (Editorial Andres Bello, Carmen 8, 4th floor, Santiago;

2003; ISBN 956-13-1826-1). The authors previously published a similarly titled single volume, *Zona Centro* (2001), which I hope to acquire as well. The Southern Zone is fairly moist and cool and has fewer high alpine areas than the rest of Chile, so the larger first volume of this set includes many trees and shrubs suitable for cultivation in the milder parts of North America, as well as climbers, perennials, bulbs, hardy bromeliads, and a large group of ferns. The plants are grouped by form; common names are used but botanical names are also provided, and the index is good. Each plant has a color photo, range and habitat, moderately technical description, and information on garden uses, cultivation, propagation, conservation status, and "where to see it." The remarks on propagation reflect obvious practical knowledge, especially about growing from seed. The smaller companion volume (the two come in a heavy plastic case), subtitled *Rutas y senderos* [*Roads and trails*], will be seized upon with cries of joy by botanical travelers, because it describes about 50 hiking trails and car routes of great botanical interest, including access information—even whether an ordinary car can manage the road—plant lists (common names), length in kilometers and time (probably not counting photo stops!), and difficulty of trails. Illustrations include photos of scenes and plants as well as schematic detail maps. I must add that I had an awful time acquiring these books, since the publisher required me to wire-transfer payment in advance, but it was well worth the hassle, so let us hope that the NARGS Book Service can be persuaded to stock them.



NARGS COMING EVENTS

Annual Meeting: July 14-17, 2005, "Newfoundland and Labrador: Rock Garden of the North Atlantic." Host: Newfoundland Chapter, Holiday Inn, St. John's, Newfoundland. Registrar: Bodil Larsen, 141 Lower Rd., Outer Cove, NL A1K 4B7, Canada; <blarsen@mun.ca>; info: <http://www.nfldrockgardensociety.homestead.com/Introduction.html>

Eastern Winter Study Weekend: January 28-30, 2005, "Ontario-Multicultural." Host: Ontario Chapter, Toronto Airport Marriott, Toronto, Ontario. Registrar: Norm & Lynne Limpert, RR #1, Acton ONT L7J 2L7, Canada; (905) 878-1243; <limps@sympatico.ca>

Western Winter Study Weekend: February 25-27, 2005, Host: Northwestern Chapter, Everett, Washington. Registrar: Alice Lauber, 18904 45th Pl. NE, Lake Forest Park, WA 98155; <aelauber@juno.com>

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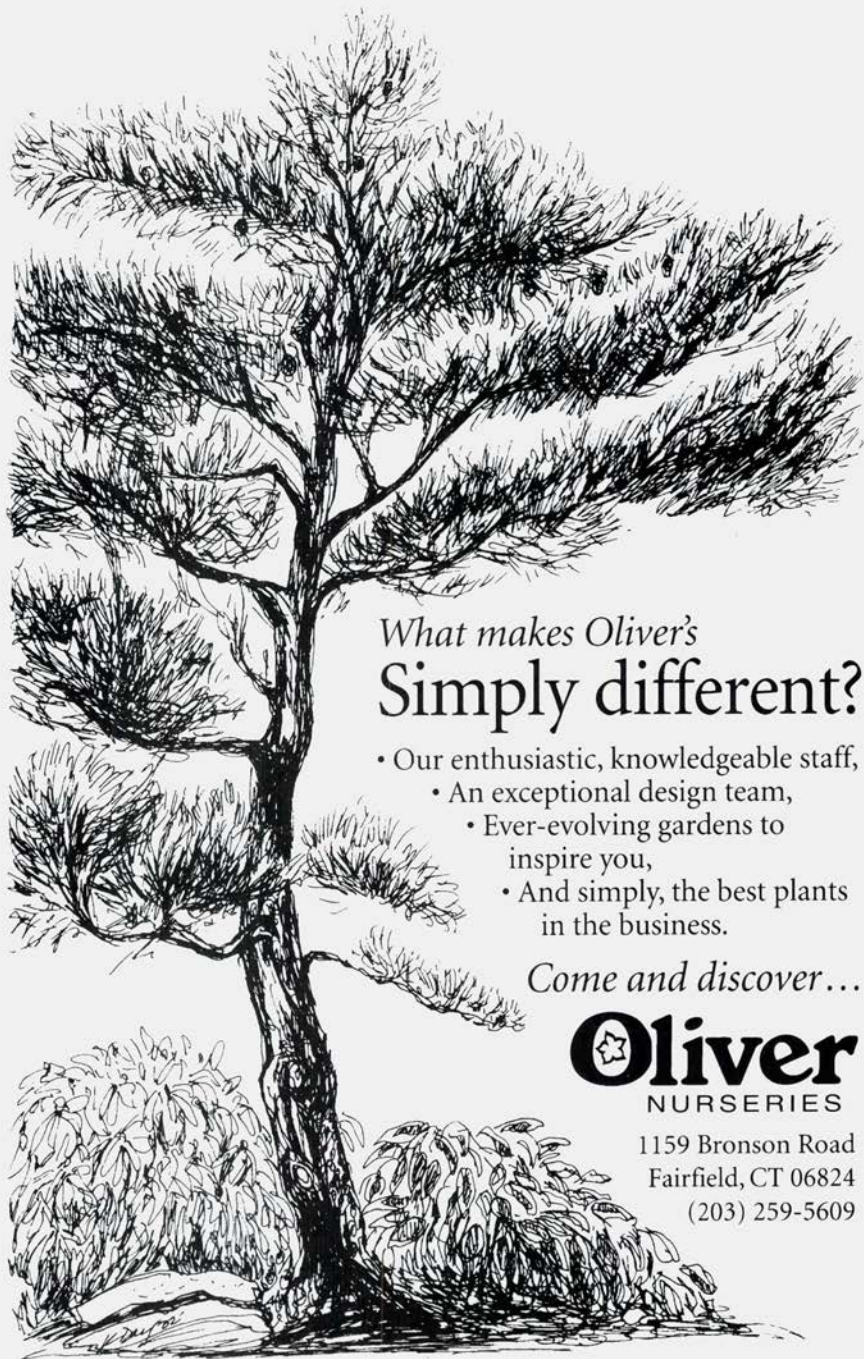
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ROCK GARDEN QUARTERLY (ISSN 1081-0765; USPS no. 0072-960) is published in January, April, July, and October by the North American Rock Garden Society, a tax-exempt, non-profit organization incorporated under the laws of the State of New Jersey. Submission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

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