Bulletin of the
American Rock Garden Society

Volume 51 Number 3 Summer 1993

Cover: Wild hybrid of *Trillium erectum* x *flexipes*,
near Ann Arbor, Michigan, often mistaken for *T. undulatum*
by Jill S. Buck of Westminster, Colorado, from photo by F. W. Case, Jr.

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Features

Departments

Trillium flexipes

Trillium erectum and Its Hybrids

by Frederick W. Case, Jr. & Roberta Case

Until 1962, no one, to my knowledge, had reported the existence of hybrids in the genus *Trillium*. At that time, George Burrows and we postulated the existence of wild hybrids based upon occurrence of peculiar trilliums in southeastern Michigan. Botanist O. A. Farwell had described several "forms" of the local but widespread *Trillium flexipes* Raf. (also known by the botanically illegitimate names *T. declinatum* [Gray] Gleason, and *T. gleasonii* Fernald). While typical *T. flexipes* is white-flowered (photo, p. 198), Farwell's *forma billingtonii* has white petals, but each with a distinct, dark reddish-brown blotch at the base, superficially similar to the pattern in *Trillium undulatum*. In *forma walpoleii* Farwell, the entire petal is a dusky buff, tan-red, or reddish color.

In mapping the distribution of the species and forms for our 1962 paper, Burrows and I noticed that Farwell's strange color forms occurred in Michigan only in those counties where the range of *T. flexipes* overlapped that of the wake robin, *T. erectum* L., a dark red-maroon-flowered species of acid upland or cedar swamp borders (photo, p. 199). Our field work established that the Farwell forms grew mostly where stream flood plains interlaced with acid uplands, bringing the two species close enough together that bees could cross-pollinate them. We concluded that these "forms" were actually hybrids, and that some of the darker and more unusual forms were backcrosses.

Subsequently, we have hand-pollinated selected typical white-flowered plants of *T. flexipes* with typical red-flowered *T. erectum* and produced offspring with color patterns identical to those of the putative wild hybrids, thus confirming that these beautiful forms were, indeed, hybrids.

Not all trilliums will hybridize. *Trillium grandiflorum*, one of the showiest and most popular species, apparently will not cross with any of the other species. On the other hand, evidence here in our garden and in our field studies across the southeastern United States indicates that a large and closely related group of trilliums whose flowers are all pedunculate (borne on short stems), including *T. flexipes*, *T. erectum*, *T. erectum* ssp. *sulcatum*, *T. cernuum*, *T. simile*, *T. rugelii*, and *T.*

vaseyi, may all interbreed. Most of the known hybrid populations, however, involve forms of the species *T. flexipes* crossing with *T. erectum*. Fortunately, these parents produce some fine offspring.

Trillium flexipes Raf., *T. erectum* L. and Their Hybrids

Trillium flexipes, a robust, pedunculate trillium, occurs naturally from Minnesota and Missouri east to southern New York, and southward, mostly west of the Appalachians, into Alabama and northern Georgia. It varies considerably within that range from having strongly nodding, even recurved, peduncles bearing the flowers below the leaves to rigidly erect and outfacing blooms. Petals range from occasionally thin to usually heavy-textured, and from narrowly lanceolate to broadly ovate. In most forms the color is ivory-white. Some forms bear delightfully scented flowers, the fragrance suggesting old garden roses. Flowers last about two weeks, long for a trillium. The ovary is white or flecked pink and pyramidal in shape. It ripens into a reddish-pink berry as big as a crabapple with a fruity fragrance.

Trillium flexipes grows mostly on neutral or slightly basic soils over limestone, or on stream flood plains, or at the bases of hills. Often confused with the northern nodding trillium, *T. cernuum* L., *T. flexipes* has larger leaves more rhombic in shape, larger, heavier-textured flowers usually less nodding, and large, yellow anthers with almost no filament stalk. Although superficially similar, nodding trillium has thin-textured, smaller flowers, nearly always recurved below the smaller leaves, and the stamen consists of a purplish anther and filament, about equal to each other in length. Nodding trillium grows in cool soils of bogs, stream banks and far northern woodlands, usually in slightly acid soils. It can be miffy in cultivation. From a horticultural standpoint, *T. flexipes* is clearly the more desirable species.

Trillium erectum, red trillium or wake robin, has flowers typically deep maroon-red, fading to dull purple-red with age. In northern races the petals are lanceolate-ovate, somewhat twisted, and heavy textured. The ovary is round, low-ridged, and nearly always dark purple-red to reddish-black. Flowers carry a faint fetid scent of wet dog. On maturity, the ovary remains relatively small and rounded, not pyramidal. Leaves are rhombic. The plant naturally tends to form clumps (photo, p. 199). In northern forms, the flowers, despite the name, are rarely erect: typically, the rather long peduncle (flower stalk) leans or dangles, displaying the flowers toward the side or the ground. Anyone doing extensive field work or visiting habitats over this species' vast range (uplands from Newfoundland to Georgia, the Cumberland Plateau, and locally in Ontario and Michigan) soon comes across color variants. In any given region it is possible to find individual plants with soft chartreuse-yellow, white, or rose-pink flowers among the deep maroon-red ones. The color situation in these parents and hybrids is complex and produces some highly significant variations of interest to wildflower and rock gardeners. Let's look further at these plants.

Color in *Trillium*

Coloring in flower petals is produced either by cell sap pigments, vacuolar pigments (in the vacuoles or internal storage chambers of the cell), or discrete cell organelles termed plastids that contain characteristic pigments. Exact tone of some of these pigments changes at different acidity or alkalinity levels (pH) in the cell. All these factors appear to be controlled by genes, and

combinations of all may control color in a single flower petal. To a lesser degree, color may be affected by environmental factors, such as light intensity and temperature during bud development, or by soil pH.

What we see as the maroon-red petals of *T. erectum*, *if we correctly interpret what we see,* is actually the result of a series of pigment and plastid overlays of various colors and of cell pH, each controlled by a different gene. Together, these produce the deep red color. If deletion mutations occur, one or more colors could be dropped, or cell chemistry altered, resulting in the various color forms and tones occasionally found. But coloring is still more complicated.

Many insects see mostly reflected ultraviolet light wavelengths that are largely invisible to humans. What we see and what the insect sees are quite different. Ultraviolet (UV) photography has shown that many flowers that appear to us to be unicolored actually absorb and reflect UV light in patterns, forming guidelines or targets visible to insects. These draw the pollinators into critical areas of a blossom where they may effect a transfer of pollen. Such a situation apparently exists in the group of species related to *T. erectum* and *T. flexipes*. Indeed, in one southern variety of the red trillium, T. *erectum* var. *sulcatum* (or *T. sulcatum* Patrick), one can often observe a faint, slightly darker bull's eye pattern in the center of the flower. Position and shape of the pattern is genetically fixed.

When hybrids occur between the two species, genetic materials controlling dominance and recessiveness of pattern and petal color from each parent are recombined. Genetic phenomena such as chromosome crossovers and inversions occasionally produce drastic changes. The result is that the central target area or bull's eye, formerly indistinguishable to our eyes, may be linked with a visible pigment in the hybrid, producing flowers with centers the dark color of *T. erectum* against white backgrounds the color of *T. flexipes* (photos, p. 202). Or if the *T. erectum* parent is itself a color form or mutant, then hybrids of varying tones appear. We have plants with white petals and pale green centers, and others with dark red centers (photo, p. 200, 203, 204). Backcrossing to either parent or crossing two hybrids results in a myriad of varied patterns and shades (photo, p. 200).

One type of hybrid, fairly common here, reverses the color pattern: instead of the petal base being dark, it is white, and the distal portion of the petal is dark, resulting in dark flowers with a light bull's eye center, very dramatic (photos, p. 202).

Some plants have produced a color break similar to that of some picotéed tuberous begonias, with the petal margins colored darkly and flecks of color scattered across the face of an otherwise pale petal (photo, pp. 200, 203). The effect is dramatic and lovely and does not appear to result from a disease such as color break virus as in Rembrandt tulips, nor from mycoplasma organisms, as in the green and white mottled *T. grandiflorum*. This picotée and another clone, a bright rose color, bear stiffly erect flowers and possess a strong clumping habit (photos, p. 204). The clumps are eye-catching in the garden.

The finest putative hybrid we have seen, a wild plant from Tennessee, is soft butter-yellow, with a deep maroon petal base and dark maroon lines radiating to form a subdued sunburst out toward the petal tip (photo, p. 200). The flower is erect and well displayed.

Both *T. flexipes* and *T. erectum* have vast geographic ranges. Within

those ranges exist many color forms, flower forms, and probably physiological forms of varying hardiness and temperament. If one deliberately sets out to produce garden hybrids, one should select the parents carefully. In *T. flexipes*, we have seen the best varieties in Kentucky, near Louisville. Here, plants tend to bear their flowers on stiffly erect peduncles held well above the leaves (photos, p. 198). Flower petals are ivory-white, beautifully embossed with faint veining, and the flowers face outward (photos, p. 198). Petal shape varies from fairly narrow to broadly ovate. Wide-petaled forms should be selected, given that they also possess heavy texture and good carriage, as parents for maximum garden display.

Trillium erectum varies considerably. Northern forms tend to send their peduncles out laterally, not displaying the flower to good advantage. Many forms have one or more petals elongated and twisted. In northeastern areas of lower Michigan a form with very small, narrow-petaled flowers occurs. Color over most of the range is maroon-red to purplish, fading to lighter purple with age. But the southern *T. erectum* var. *sulcatum*, a very vigorous, erect-flowered form with broad, flat petals, makes an ideal parent (photo, p. 197). Not only does it bear its flowers conspicuously, it also has deeper red, sometimes almost black-red color and well-rounded petals on a flat, out-facing flower. Equally important, the yellow colors that together with reds make up its deep color, when appearing separately in mutant forms, seem to be clear and deep (photo, p. 197), more desirable in a breeding program. We have several mutants that are soft, clear butter-yellows and one that is a clear, deeper yellow of great beauty.

Both *T. erectum* and variety *sulcatum* are vigorous plants that produce multiple stems and form clumps, *T. erectum* being the fastest grower. This habit makes these species ideal for use as parents to produce showy garden subjects.

Where *T. erectum* and *T. flexipes* ranges meet today or have in the fairly recent past, numerous hybrid swarms occur. We have seen active hybrid swarms in Michigan, Ohio, Kentucky, and Tennessee, and have obtained a number of outstanding forms, either mutants or hybrids, from these areas in the past. It is notable that the incidence of apparent mutants seems to increase where the two species occur together. Many of these "mutants" may really be complex hybrids.

In our woodland garden, we grow not only *T. flexipes* and *T. erectum* and their hybrids and mutants, but also several closely related species in whose wild populations we have seen evidence of hybridization. The result is that we have found fine hybrids, whose ancestry possibly involves more than two parent species, appearing spontaneously in our own garden. Because we have assembled many forms of each species, we also have some inferior hybrids appearing here occasionally.

Hybridizing Trilliums

We believe there is potential for garden plants of great horticultural merit in trillium hybrids, for there are many outstanding and lovely wild hybrids and chance hybrids in our garden. We have covered, emasculated, and hand-pollinated selected plants, and the first of the resultant seedlings have bloomed. As always, when superior parents are used, superior offspring result. Recently, Roberta has made a number of hand-pollinated crosses using carefully selected parents, and we await our results. Unfortunately, trillium seedlings mature slowly, and require 4-7 years to first flowering, even with

care and fertilizers. It is a slow process. Still, each year a few new and delightful surprises appear in our woods or beds.

We have not devoted as much time to controlled hybridization as we should have, but we have made a start and intend to continue. We are now investigating the use of the following as parents, to produce larger, showier flowers: *T. vaseyi*, a gigantic-flowered, nodding, dark red species; *T. simile*, possibly the best potential parent in this group of related species, which bears enormous, heavy-textured, ivory-white, erect, wide-petalled flowers; strongly fragrant, cupped-shaped forms of *T. flexipes* from northern Alabama; and *T. erectum* and hybrids.

Trillium rugellii, a nodding trillium of the Southern Appalachians and Great Smoky Mts., readily hybridizes with *T. vaseyi* and *T. erectum*, and produces some lovely rose-colored and bicolored hybrids. However, its very short peduncle and nodding habit bear the flowers deep under the leaves, making them essentially invisible. Whether it has useful parental qualities in advanced hybrids we do not know.

Others have expressed interest in working with this group, and we urge that they do. For best results, one ought to develop a carefully planned program with definite goals in breeding. We suggest that parents be selected at least for the qualities in Figure 1.

Disease

Some gardeners have become much excited over green striping, semi-doubling, and various anomalous flower shapes accompanied by greening that sometimes occur in *T. grandiflorum*. Occasionally, high prices are paid for such plants. This is unfortunate, for these changes are the result of a disease produced by the presence of mycoplasma organisms. Mycoplasmas also produce aster yellows disease, a similar condition in other plants, and are responsible for petal distortion and lumping in parrot tulips. Probably vectored by leaf hoppers, mycoplasmas produce bizarre results. In *T. erectum*, the petals enlarge, thicken, distort, and take on a coloration and texture like a soiled brown paper bag—a disaster! Do not grow the diseased green trilliums near any other desirable trilliums.

All trilliums are highly susceptible to botrytis fungus of the leaves. In some years, almost all plants, garden or wild in our area, are cut down by the fungus, considerably weakening them

Figure 1

Desirable Qualities in Garden Trilliums

1. Good floral display: erect flower carriage with outfacing or upfacing blooms.
2. Clear colors, with smooth pigment distribution, not the granular colors sometimes found in *T. erectum* forms.
3. Variety in color pattern of bull's eye, veining, edging.
4. Clumping habit, with many offsets: larger clumps make better garden displays and faster propagation makes clones available sooner.
5. Disease resistance.

and reducing blooms the following year. Fungicides will control the blight. Avoid growing lilies near trilliums to reduce the problem, as lilies, especially non-native ones, are strong carriers of the fungus. Although we have not seen evidence of such, trilliums could well be susceptible to lily viruses, too.

Sessile Trillium Hybrids

Little has been written of hybrids among the trilliums whose flowers are sessile (borne directly on the leaves). We have seen obvious hybrids in southern Kentucky between *T. luteum* (Muhl.) Harbison and *T. cuneatum* Raf. We have seen outstanding color forms that we presume to be hybrids between *T. albidum* Freeman and *T. chloropetalum* (Torrey) Howell in the San Francisco Bay area of California. Other hybrids among sessile species may occur, and controlled hybrid crosses might be made. Unfortunately, the close similarity of coloring and petal carriage in nearly all species may limit variety and garden importance of hybrids of sessile species. Nevertheless, nothing ventured, nothing gained.

The mutant and hybrid pedunculate trilliums make superior garden subjects, greatly increasing the variety of garden plants available, and thus adding much interest to the border or woodland garden. Those who see them desire them. Unfortunately, propagation is necessarily slow at present. Tissue culture of mature plants is not now satisfactory, owing to the presence of soil fungi in the rhizomes. *In vitro*, these multiply unchecked and destroy the trillium tissues being cultured. If that problem can be overcome, then some of the finer hybrids can be made available to all. In the meantime, it is best to obtain hybrid seed, produce one's own, or if lucky, obtain divisions of rhizomes of selected clones. Controlled crossing of compatible pedunculate trilliums offers a rich opportunity to enhance the beauty and variety of these cherished wildflowers in our gardens .

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Frederick and Roberta Case have a large garden near Saginaw, Michigan, where they grow many choice plants.

Vegetative Propagation of *Trillium chloropetalum*

by Margery Edgren

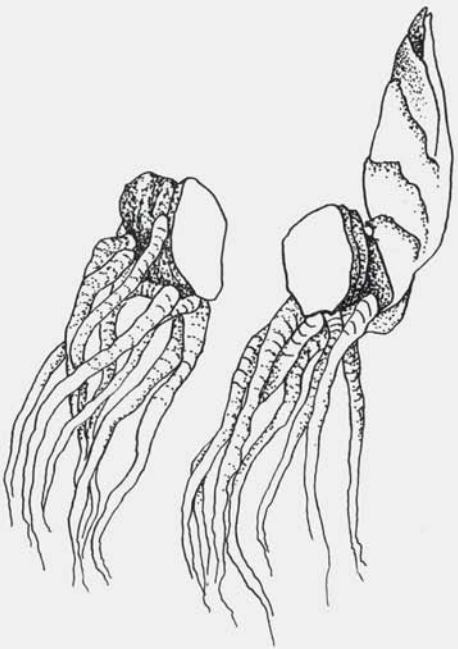
Trillium chloropetalum is a coveted accent for woodland gardens with its crisp, sessile flowers and handsome leaves, often mottled in attractive patterns. The lush vigor of the mature plant, either in its native western habitat or growing well established in woodland garden settings, belies its inevitably slow development from seed to flower. Seedlings develop gradually to flowering size in about nine years. In addition, seed production both in the wild and in cultivation may be poor over a succession of years. In addition to the difficulty of obtaining fresh seeds, this species has well documented delays in seed germination. It is not surprising that propagators look with hope to vegetative propagation, not only for the production of selected forms, but for more ordinary individuals of the species as well.

There are various references in the literature to inducing extra shoots on *Trillium* by wounding the fleshy rootstock near the base of the main shoot. After new shoots are well developed, they can be removed from the original plant and grown on as individual divisions. An excellent description of the technique by Frederick W. Case, Jr. appeared in *Fine Gardening* magazine for July/August 1988. The following variations have been developed in an attempt to produce more shoots faster than with the usual treatment.

Mature plants eight or nine years old are selected. At the very start of the growing season, before development of the new leaves, the bare rhizome is divided in two by a traverse cut across the center of the rootstock (see Fig. 1). The front section contains the growing shoot and all the new roots for support of the plant in the next season and grows on well after cutting. This main shoot shows some loss of vigor initially, but several have been cut so far and all have grown well afterwards.

The back portion without any shoot may have some old roots, but they are probably not functional and eventually deteriorate. They may be removed or left on to anchor the rhizome at planting. The cut surface of the shootless piece is cleaned with 70% rubbing alcohol. A commercial preparation called Keiki Grow is then smeared over the cut surface. This product is a lanolin paste containing cytokinin, a plant

Fig. 1.
Transverse cut divides the rootstock of *T. chloropetalum*. The front section is planted to grow on normally, while the back section is treated to produce new plantlets



growth hormone. It is used by orchid growers to encourage formation of keikis (new plantlets) on *Phalaenopsis*. The paste is stiff when cold and spreads much better at room temperature (around 70°F) than when cool. It does not stick well to moist tissue, so the cut surface may need to be blotted and cleaned more than once with alcohol to be dry enough for the paste to adhere.

After treatment, plant each section of rhizome just at the surface of a clean, fast-draining medium moistened with a hydroponic fertilizer. One application of a dilute solution of an ordinary liquid fertilizer would also suffice. The upper surface of the rhizome and the cut surface should remain exposed for observation. The whole pot is covered with a plastic bag to keep humidity high and then placed under fluorescent light. The plant needs a long, 16-hour day; cool white tubes produce an even light of low intensity, providing a stable environment. Use a household refrigerator to provide a cool, short, 8-hour night, keeping the plastic bag in place over the pot. Mist the rootstock lightly with water each day, and then turn the covering bag inside out to remove condensation.

After a few weeks, ridges of callus appear along the upper front edge of the cut surface and along the old leaf scars farther back. After the ridge is well developed, it is sprayed every two weeks with giberellic acid in an aqueous solution of 100 parts per million (#100). The ridge tissue differentiates into shoots. The trick is to get the shoots to develop before the rootstock rots. Giberellic acid helps speed up the process, making it possible within one growing season rather than two. The number of applications required may be variable, and treatment can be discontinued after leaf-like shoots develop. These tiny, elongate, strap-like leaves are somewhat reminiscent of first-year seedlings (see Fig. 2). Without treatment, the ridge of tissue with its rudimentary shoot nodes must be subjected to a cold-dormant season of about three months to induce growth of leaves. This is time-consuming and involves increased risk of failure.

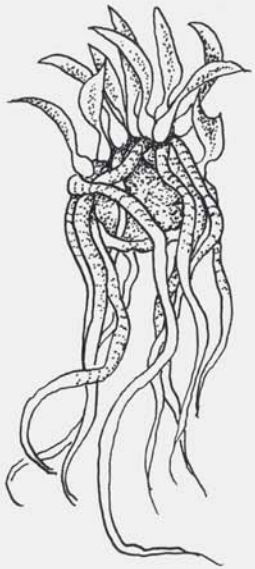
After the shoots are growing well, roots begin to develop at the bases of the new shoots (see Fig. 2), not from the old rootstock, which will eventually deteriorate and leave the little plantlets on their own. The roots start spontaneously without any special treatment and may appear on a few new shoots from four to seven months after the rootstock was cut. They may begin growing during the giberellic acid treatment or after it has been discontinued. After development of the roots, growth slows, and a cold-dormant period is necessary to stimulate a new season of growth. Remove the rootstock from the pot, wash, and package it bare-root on moist paper toweling in a plastic sandwich bag. The bag must be tightly closed, either stapled shut against a stiff data card, or sealed with a zip closure. Place the package in the refrigerator for three months. Then replant the rootstock to continue growth. During the second season, little leaves and their tiny new rootstocks cover the top of the old rhizome and their roots envelop it (see Fig. 3).

A three-month cold treatment is usually sufficient to stimulate new growth. Then they are planted and placed under cool white fluorescent light on a long, 16-hour day followed by an 8-hour cold night. For the nighttime hours the whole pot is covered with a plastic bag and placed inside the refrigerator. After about two months, the growing season can be finished off with a month of continuous light, for a total of three months of active growth. In this manner two seasons can be condensed into one year. Longer growing seasons of four-six months during the early stages did not seem to promote bigger rootstocks, and the three-month growing period followed by three months dormant and cold seemed to produce the most vigorous growth.

Unfortunately, production can hardly be called rapid. Seven seasons after treatment was begun the eleven individuals from the best rhizome are healthy with fat rootstocks about 1" in length but have not yet flowered, although some have more than one leafstalk.

Fig. 2.
Section of rootstock removed from the main plant, then treated with cytokinin and giberellic acid. Development of leafy shoots is followed by growth of new roots.

Fig. 3.
Tiny new rootstocks with their own shoots and roots growing on the old section of rhizome



In an effort to speed propagation, a trial has been run with Keiki Grow application on a wound near the end of the intact rhizome without removing the primary shoot. The surface was superficially scraped in a narrow band across the top from one side to the other, then treated. In this case, small nodes were formed without initial development of an undifferentiated callus ridge. These appeared in two rows across the rootstock, one on either edge of the treated area (see Fig. 4). The best rootstock had eight nodes on one plant. By the time they were formed, the main shoot had died back. Application of #10 giberellic acid weekly to differentiate shoots on the new nodes stimulated growth of the dormant main shoot for the next season as shown in the drawing.

With this "piggyback" version of propagation, it is hoped that support by the main shoot may promote faster development of the new plantlets and prevent deterioration of the original rhizome, as eventually occurred with the severed piece. Investigation of this possibility continues. Unless development of offsets is much faster, it will hardly compensate for the disadvantage of keeping the main shoot involved in a single propagation pot for several years. Any effort at propagating this handsome *Trillium* gives one a healthy respect for the value of large wild populations and the time it has taken to produce them.

Drawings by Nancy Baron

Margery Edgren lives and gardens near Woodside, California,

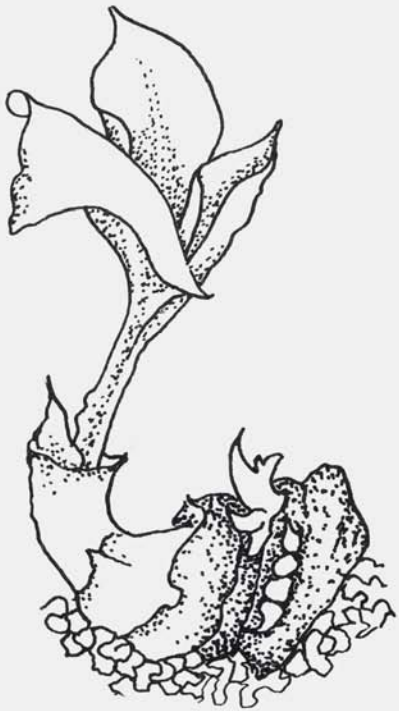


Fig. 4.
"Piggyback" propagation of new shoots near the end of a mature rootstock without severing the main shoot

Waves of Bloom

by Panayoti Kelaidis

The most spectacular flowering season the Rock Alpine Garden ever saw was the spring of 1982. From late April to early June masses of *Primula, Androsace, Dianthus, Penstemon, Phlox, Aubrieta, Arabis,* and *Alyssum* produced a show of color rivalling the gaudy displays of midsummer annuals bedded out in public parks. I wisely took a lot of pictures that spring, and they have stood me in good stead with general audiences in the intervening years. More importantly, that first spring when the rock garden strutted its stuff, the staff and the Board of Denver Botanic Gardens realized that rock gardens weren't just a Victorian anachronism, a place to esconce botanical oddities, but that this garden would be the spring centerpiece for the institution, a major draw at the time of year when the public is most excited about plants. Summer annuals don't look like much until mid-July, so the floral colors of the rock garden are a major attraction the first half of the growing season.

Rock gardens are mainstays of European botanic gardens, but I have marvelled that so few institutions in America realized how popular a feature a rock garden can be. The nursery trade in Denver is possibly even more excited than the public by the Rock Alpine Garden, since alpines can be sold and planted outside weeks or months before annuals and vegetables can be trusted to survive in our long, but changeable Colorado springs. Visitors to the rock garden rush off to nurseries with long lists of Latin names of plants they simply must have, and soon frantic nursery people are calling to find out where they can obtain seed of *Adonis, Pulsatilla, Gentiana acaulis,* or whatever else might have caught a customer's fancy.

May is still the month when the most species of plants bloom in the Rock Alpine Garden. Nevertheless, a sea change has taken place in this garden over the years. No longer is this primarily a spring garden, with the rest of the calendar year given over to greenery and expectation. As the surge of May phloxes and primulas, and all subsides into the quiet of foliage and spent flowers, we can now take a deep breath and brace ourselves for the next wave. Since visitors wander through this garden at all times of the year, we have striven to supply flowers to

justify their visits later in the season. Thanks to exchange with other botanical gardens and to the many dedicated private collectors, especially in Eastern Europe, a fantastic assortment of new rock garden plants are now available with which to create crest after crest of brilliantly colored plantings throughout the growing season. Since so many new plants are from Western Asia and the mountains of the Mediterranean, they often flower later and tolerate heat better than boreal alpines, extending the season of interest. Don't expect static, perpetual bloom, however: these are plants, not plastic. Once the *Dianthus* blossom, for example, there is often a lull before acantholimons come on in force.

The history of the Rock Alpine Garden has been one of gradual conquest of the gardening months: each year many more plants bloom in late summer, and more and more autumn flowers appear. Knowing what we know now, we would have carefully designed this garden from the beginning to feature focal points in each bed combining two or three plants that complement each other at roughly the same season, so that visitors would be constantly surprised and intrigued at our ingenuity. There was virtually no literature to guide us in designing a season-long rock garden, we have done so slowly, organically—almost accidentally. You, however, will have no such excuse: below I have charted out the principal plants that perform reliably and dramatically in the course of our gardening year. By incoporating a few from each season, you can develop that holy grail of gardening, the year-around garden. However, don't forget that the power and beauty of rock gardens depends as much on the architectural form of plants as in their bloom. I am convinced that every great rock garden is actually two gardens at once: a foliage garden designed for the harmonious blending and contrast of conifers, shrubs, cushions and mats; and a flower garden that can sweep you away in the spring and delight you year around with wave after wave of lovely bloom.

March

The rock garden year never really begins, or ends, but March is the first month when you might actually overlook a plant in flower because there are so many blooming: in the depths of winter you are sure to have memorized every detail of every crocus, snowdrop, or cyclamen. Rock gardens usually have plenty in flower by March. Most of us really don't need many more Porophyllum saxifrages or drabas than we already have. Never apologize for the peculiar bent to collect in our temperament and art. If a snob asks you why you have 23 yellow saxifrages in your garden, you can usually silence him by explaining that you're researching sectional affinities. If you want even more color in early spring, *Corydalis* can figure prominently in the March garden. The botanic garden in Gothenburg, Sweden has gathered together an incredible collection of species and produced innumerable hybrids as well. Many *Corydalis* tend to be woodland ephemerals (that do just as well in a shady scree), such as the hot pink 'George Baker', cool yellow *C. bracteata,* or the more and more numerous blue flowered gems. There is also a host of dryland *Corydalis* that do best in hot, arid climates. As is the case with the early small bulbs, it will be difficult to have too many *Corydalis* in the garden.

April

There is usually a day in April when everything is perfect: the last mulch is off the garden, the last winter casualty has been removed. The garden is graced with a

thousand fresh shoots and crystalline flowers. A gentle rain has washed everything clean, and there isn't a single nibbled leaf or blemished blossom. You need never worry about a rock garden in April—it's as close to heaven as you're apt to get in this life.

May

May is *the* month. If your rock garden is not burgeoning with bloom in May, you belong in the Southern Hemisphere. Let's skip May. It's all been said.

June

I am always amazed that so many gardens are quiet in June. Early in the month, *Dianthus* have taken over where the phloxes left off, but they don't last long, and then all is quiet. But over the years peak color in the Rock Alpine Garden has shifted from late May to later and later in June. Gradually a surge of new flowers appear: geraniums, salvias, and scabiosas fill the meadows of this garden, just as they do the meadows in the Alps. Some are large perennials, but all these genera have small forms and species that should be given their place. Among families that wait until June to show their best is the Campanulaceae. Only a fraction of the family are true alpines—and these among the choicest and most difficult of all. But an endless stream of compact, floriferous, and serviceable campanulas bloom in June. Crook's magnificent horticultural monograph on the genus is hopelessly out-of-date and incomplete, now that Josef Jurasek, Josef Halda, Zdenek Zvolanek and other Czech collectors have flooded us with stunning miniatures from Turkey. Many Mediterranean monocarpics provide cool whites and blues—like *C. formanekiana, C. ramosissima, C. calaminthifolia.* They may lead short lives, but die to live again by self-sowing in the garden. Others like *C. incurva* or *C. sporadum* surprise us by living and blooming several years. Since virtually all campanulas have decorative, evergreen foliage, they deserve a much greater role than they've hitherto obtained. Little-known, under-utilized species include the unbelievably huge white stars of *Campanula trogerae* in late June; and *C. waldsteiniana, C. tommasiniana,* and *C. hercegovina* all make perfect miniature mounds of vibrant, blue-lavender stars. *Campanula cachemiriana* has powdery gray leaves and cool blue bells from June to frost—and has been bone hardy for years. *Trachelium rumelianum* covers itself with lavender pompons for weeks in midsummer—an undemanding plant that should be in every garden.

The Figwort family (Scrophulariaceae) provides any number of genera and species—many with brilliantly colored blossoms in the summer months. There are dozens of tiny penstemons that thrive in warmer exposures—a few that are rarely seen but especially brilliant and adaptable include *Penstemon linarioides* in cool blue, and *P. thompsoniae* in blue or deep purple. Don't forget *Penstemon pinifolius*, always reliable, although blooming best with intense sun. Other showy scrophs include *Digitalis obscura* in sunset orange, flowering on and off all summer; *Chaenorhinum,* and particularly the endless permutations of *Veronica*, that underappreciated workhorse of the garden. Veronicas are as indispensible in the summer months, when *V. spicata* and *V. incana* are at their peak, as they are in May. A flood of Turkish and Asiatic species continue to elevate this genus in importance, adding to the backbone of European stalwarts. Compact verbascums, such as 'Letitia', *Verbascum dumulosum, V. acaulis,* and the salmon-pink *Diascia* species are hardy and bloom for months in the summer.

July

After the Fourth, it's low tide in the garden, and it seems as if only weeds and waste remain. But another wave is building. I remember when *Delphinium grandiflorum,* the little Chinese species, self-sowed throughout the Moraine Mound in the early 1980s. The bed was drenched with the piercing, pure blue pools of color, dark as the sea or the Italian sky. Like someone sunstruck, I assumed any plant that did that well must be a weed, and I destroyed one of my best spectacles before I came to my senses. But never mind; now *Delphinium grandiflorum* is everywhere again—along with its close cousins *Delphinium pylzowii* and *D. likiangensis. Delphinium cachmerianum* produces brooding, dark purple-blue puddles 15-20" high. Combine these with *Allium flavum* or *Silene maritima* for brilliant effect, but whatever you do, plant these midsummer bloomers liberally. July is no time to be a stickler about size. Add a dozen or so lilies; the size, elegance, and often fragrance of their blossoms is full compensation for being tall. After all, they are only large in one dimension. Wonderfully variable *Gentiana septemfida*, numerous *Allium* species, and a host of daisies—*Aster coloradoensis, Hircipium armerioides*, and an amazing number of *Helichrysum*—will transform July into a premier month for your garden.

While the gentians provide sapphire pools, the genus *Origanum* has taken center stage in the Rock Alpine Garden with its cascades of chartreuse and pink flowers. *Origanum libanoticum* creates a subtle lime-green fountain highlighted with rose that appeals as much to casual visitors as it does to rock garden purists. *Origanum rotundifolium* and *O. acutidens* intensify this effect on a smaller scale, while *Origanum scabrum* and *O. amanum* deliver the coup de grace, producing mounds only 6-8" tall and ever wider, with deeply colored bracts and long-tubed, exerted, showy flowers. In milder climates, *Origanum dictamnus* and *O. calcaratum* (*O. tournefortii*) are just as valuable. Various summer-blooming mints—*Cunila, Lavandula, Pycnanthemum, Scutellaria, Teucrium, Thymus, Ziziphora,* and many more—create a cool, pastel undertow that complements the brighter colors of the aster family.

In dry gardens, *Acantholimon* and *Eriogonum* provide an undulating ocean of July color. The buckwheats blossom brilliantly over their neat foliage from spring to frost in Colorado, inundating the garden with bright yellows, accented by touches of orange, bronze, and flashes of bright white. Acantholimons have a shorter flowering period, concentrated from late May to mid-July, but their statice-like seed is decorative for many more weeks. Combined together in a warm garden, these two genera can turn the summer doldrums into a tidal wave of flowers. Add *Asclepias tuberosa,* the classic lavender, and all the species of *Liatris* you can acquire, if you have a larger garden.

August

Evening primroses bloom from late May on, none lovelier than *Oenothera lavandulifolia,* a twiggy shrub less than a half foot tall and not much more than a foot across. This produces flush after flush of blossoms whenever it rains, and it enters our consciousness as an important element in the garden as the acantholimons ebb. Then suddenly the last half of the growing season is brilliantly illuminated by *Zauschneria*, the veritable burning bush of native plants, bright as if

—*continued on p. 227;* Waves of Bloom

Saxifraga rudolphiana (pp. 183-184) photos by Franz Hadacek

Saponaria pumilio (p. 184)

Ranunculus pyrenaeus (p. 183)

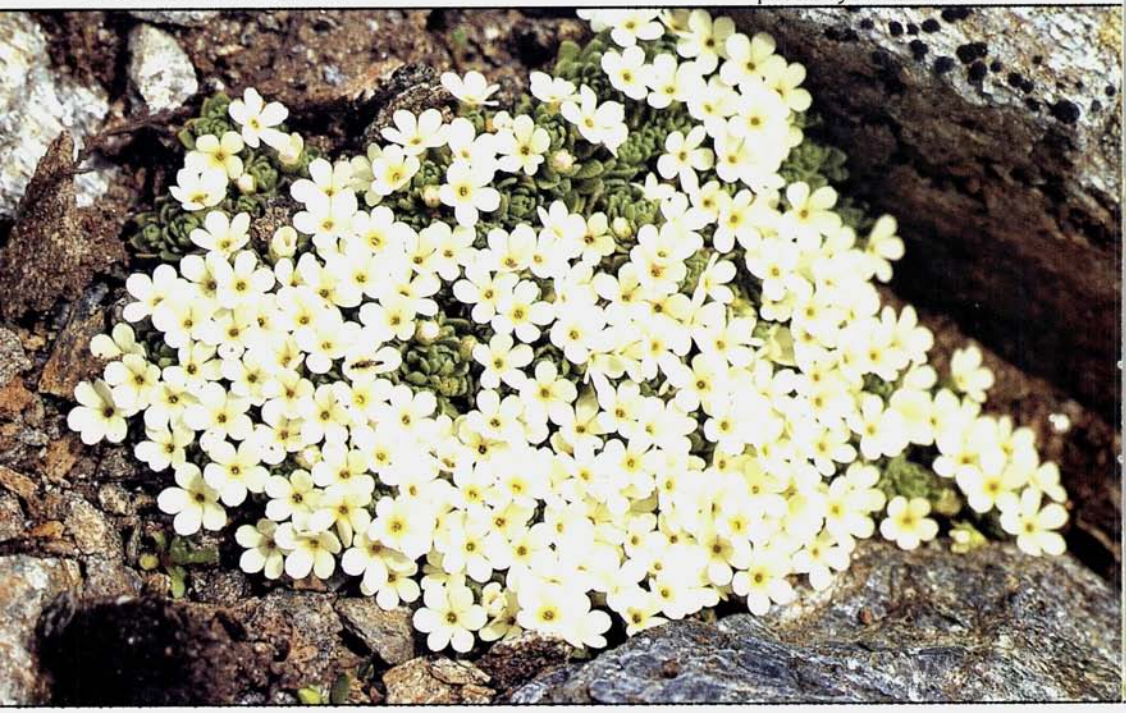
Primula minima (p. 182)

photos by Franz Hadacek

Primula x *floerkeana (P. minima* x *P. glutinosa)* (p. 184)

The Hohe Tauern of the Austrian National Park (p. 181)

Androsace alpina (p. 183) photos by Franz Hadacek



Plant Gems of the Austrian National Park

by Franz Hadacek

The *Hohe Tauern* range in the central Alps of Austria reaches across parts of the provinces of Carinthia, Salzburg, and Tyrol (photo, p. 180). This is one of the last remaining areas of unspoiled natural beauty within Austria, characterized by vast expanses of ice and snow, valleys molded during the Ice Age, massive alluvial screes, mountain pastures, alpine heaths, and forests. On the one hand, the grassy subalpine pastures harvested annually reveal this as an age-old center of human culture. On the other, the rock and ice at its very heart, now designated as a national park, remain virtually pristine.

The conservation area rises from 1000 m above sea level to the altitude of permanent ice and snow. With the Grossglockner, the park includes Austria's highest peak (3798 m); with the Pasterze, the largest glacier; with the Gamsgrube, one of the most botanically interesting natural areas in the Alps; and with the Krimmler, one of Europe's more renowned waterfalls. About 160 peaks in the park surpass 3000 m. The vegetation is adapted to extremes of exposure and weather, the growing season is short, and soils are mostly of mineral composition.

The village of Mallnitz is an ideal base, offering a good number of rewarding expeditions both short and long, from which the plant enthusiast may discover many treasures with a modicum of time and effort. Mallnitz lies at close to 1200 m in a lovely valley. In the village, one can find expensive hotels as well as more reasonably priced bed-and-breakfast facilities. Late June, July, and early August are the best months to see plants in flower, and September is optimal for collecting seed.

A short distance from the village, *Lilium martagon* grows in an alpine meadow. The prevalent color is red, and among hundreds of plants two or three white-flowered forms may also be found. The growth of most plants is of a very sturdy character. Surprisingly, there was no viable seed to be found in autumn, perhaps because the numerous deer living in the area are overly appreciative of the unripe seed pods.

The slopes at lower elevations are sheeted with *Campanula barbata.*

From time to time white-flowered forms can be seen and are even dominant in places. In contrast, *Campanula alpina* is a plant of higher elevations, and I have never encountered an albino. *Callianthemum coriandrifolium* grows along with the latter campanula, looking very much like a white *Ranunculus*. You can easily miss it when it is not in flower. In wet meadows of lower elevations, splendid orchids such as *Dactylorhiza maculata* and *D. majalis* are abundant, delighting the explorer. In moist places the orchids are sometimes 40 cm tall.

One of the first expeditions to be undertaken is a simple uphill walk of about two hours to the Jamnig Alm. Many interesting plants border the path, including *Saxifraga aizoides* with orange-yellow flowers, bright yellow patches of *Caltha palustris*, a big buttercup, the tiny, white-flowered, insectivorous *Pinguicula alpina*, tufts of pink *Gypsophila repens*, and numerous small blue bells of *Campanula rotundifolia*. Reaching the Alm, you are greeted by a still more abundant mass of flowers, especially the true deep blue *Gentiana acaulis* and *G. verna*. Every year again I am thrilled to see the deep blue carpets. If fate favors you, you may encounter white and pale blue forms, too. *Crocus verna* ssp. *albiflorus*, the common white spring crocus of the European mountains, may be seen blanketing the alpine meadows soon after the snow melts.

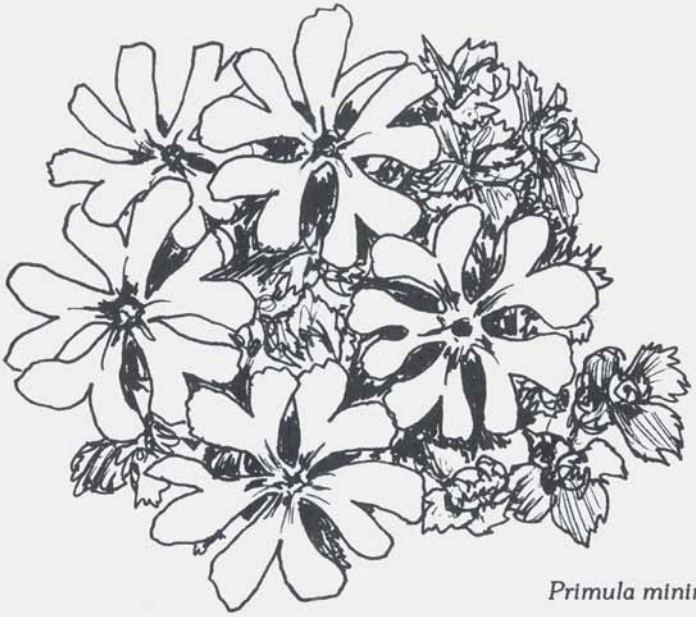
A short distance from Mallnitz, and easily approached by a good trail are the Mallnitzer Tauern. Most plants mentioned in this article grow over the whole of the Hohe Tauern, but nowhere are flowers so plentiful as here. Among them is *Primula glutinosa*, a characteristic member of this flora, growing in moist or wet clay grit, usually near siliceous rocks. The flowers are dark purple, very seldom white. *Primula minima*, a wild gem widely distributed across the eastern half of the Alps, is here, too, forming large mats covered with flowers atop flat, humus-rich turves (photo, p. 180). Generally found on limestone mountains, it also inhabits rocky pastures in lime-free areas of its range. At flowering time the slopes of the Mallnitzer Tauern are painted rose-pink from its countless blooms. Each has a white eye, and entirely white forms are frequent. With a certain amount of experience, one can find *P.* x *floerkeana*, the hybrid between these two primulas (photo, p. 179). In some areas these hybrids are quite common, and because they are also quite fertile an astonishing variety of forms and colors can be observed.

The mat-forming *Salix retusa* and the even smaller-leaved, more tightly congested *S. serpyllifolia* grow on large boulders in the alpine areas. Usually *Androsace obtusifolia* accompanies them. Upon close examination, we found yet another prostrate willow, *Salix herbacea*, one of the smallest trees on our planet.

Pulsatilla alba produces flowers in such numbers here that the meadows are nearly white. Rather like *P. alpina* in appearance, but of smaller size in all respects, its flowers are still quite large. *Pulsatilla alba* is not often seen in gardens, and despite my fondness for the plant, I have not yet succeeded in establishing it in my own garden.

The damp screes of the Hohe Tauern where *Ranunculus alpestris* and *R. glacialis* are plentiful are a striking sight. *Thalictrum alpinum* is one of the apparent here, too, growing up to 10 cm tall and preferring moist, stony places.

Dianthus glacialis is a plant of windswept ridges, usually in open places without the competition of meadow plants. It flowers in summer



Primula minima

and catches your eye with its intensive, dark pink color. The dense cushions of *Silene exscapa*, the flowers amazingly variable in color, size, and even in shape, are its only competition.

In mid July, *Rhododendron ferrugineum* and *Azalea procumbens* are responsible for the pink haze of the hillsides. Patches of white or pale yellow draw your attention to *Saxifraga paniculata, S. androsacea, S. bryoides, S. caesia,* and *S. moschata. Pedicularis verticillata* adds spots of crimson with its dense flower heads. Shades of blue are produced by *Myosotis alpestris, Campanula barbata, Phyteuma globularifolium,* and *P. hemisphaericum.* The yellow component is primarily contributed by *Arnica montana* in the meadows and *Senecio incanus* ssp. *carniolicus* in the screes. *Ranunculus pyrenaeus* is often to be seen, too, most beautiful from a distance, as close at hand many flowers are seen to be missing some petals.

A cable car takes you from the valley of Mallnitz to the summit of the Ankogel at 2630 m in no time. There, on the sunny side of the ridge, you can admire a distinctive, if not unusual, display of alpine flowers, as well as quite spectacular scenery. *Androsace alpina* is everywhere, and many individual cushions are huge (photo p. 180). The dominant color is white, but in some places pink forms occur, too. *Gentiana bavarica* var. *acaulis*, a very beautiful, compact gentian growing in moist places, provides hundreds of deep blue patches to be admired. *Aconitum napellus* remains an adorable dwarf at only 20 cm. On outcrops of schist, the rare *Saxifraga muscoides* grows in crevices, producing small cushions topped by large flowers of pale yellow or white.

The north side of the ridge is much steeper, and the rocks are much looser and more fragmented, forming large screes. These screes are home to *Saxifraga rudolphiana* and *S. biflora*, both plants found only on schistose

mountains at very high elevations in the central Alps. Enjoy them here, as their cultivation is nearly impossible. Although some botanists have classified *S. rudolphiana* as a subspecies of *S. oppositifolia*, it seems to those who see it in its natural habitat that it might well merit species status. *Saxifraga rudolphiana* (photo, p. 177) forms very tight cushions, sometimes half a meter in diameter, composed of very tight rosettes. Stemless, brilliant rose-purple flowers are borne in profusion.

Saxifraga biflora is of a different habit, taller and more loosely constructed. The flower is paler in color and not as large. In spite of the name *biflora* very often there are five or six flowers on each flowering stem. Both species produce hybrids with *S. oppositifolia*. On the Ankogel especially, hybrids between *S. oppositifolia* and *S. biflora* are frequently encountered. In many cases, the flowers of the hybrids are more intensely colored than those of their parents.

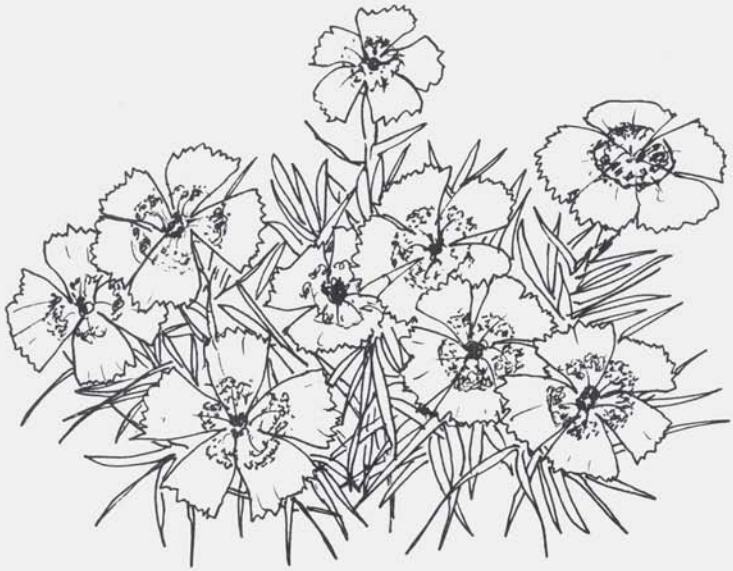
A chair lift leads from Mallnitz to a schistose mountain called Lonzer. Here grow *Dianthus glacialis, Ranunculus pyrenaeus* (photo, p. 178), *Androsace obtusifolia, Campanula cochlearifolia,* dark pink patches of *Linaria alpina,* and last, but not least, the much sought-after *Leontopodium alpinum.* Edelweiss is a cushion plant here, and the pure white flower heads do not exceed 3 cm in height. *Saponaria pumilio,* abundant locally on more open screes or windswept ridges, flowers late in the alpine year, its flower color varying from pale pink to dark pink, or even occasionally white (photo, p. 178).

The diverse flora and manifold geological formations of the Hohe Tauern make this a particularly stimulating region for exploration by lovers of alpine plants.

Drawings by Panayoti Kelaidis

Franz Hadacek is an expert gardener and long-time ARGS member. He lives in Vienna, Austria.

Dianthus gelidus



Plant Hunting in the USA

by Alexej B. Borkovec

Plant hunting is an attempt to fully experience a plant. Reading about a plant, seeing a picture of it, even growing it in your rock garden is only a partial experience: you have to see it growing in its natural habitat to fully appreciate it. Imagine our Patron Saint, Reginald Farrer, when he encountered *Eritrichium nanum* in the Alps—he practically melted down, as you can read in *The English Rock Garden*. Of course, Farrer was a great botanist and plant collector, but I believe he was a plant hunter first.

In his day, plant hunting was usually connected with considerable physical exertion: practically everything had to be done on foot, and even in Switzerland roads were still primitive and inadequate. In the mountains of North America, they were non-existent. The century of the automobile was only beginning.

Plant hunting today is a much less rigorous affair, accessible to almost anyone, particularly in this country and in the largest mountain chain in the world, the Rocky Mountains. Such a statement seems to contradict the general notion of mountain climbing as one of the hardest of all sports; I won't deny that it does represent a potential source of all imaginable hardships. It is also true that there are people who love to suffer and that to them mountaineering is the sport of choice. But what follows here is for those who suffer only when they absolutely have to, and even then as little as possible.

Now how exactly does one go about plant hunting? Obviously, you have to choose first the type of plants you are after and then locate the area where they supposedly grow. To give you an example from my most recent experience, I have here selected the Beartooth Mountains, home of many inhabitants of my own rock garden (erigerons, townsendias, other composites) and of innumerable other species. Many I don't even try to grow, as for example the famous *Eritrichium*.

The Beartooth Plateau, also referred to as the Absaroka Plateau, is a large mountainous region of northwestern Wyoming and southwestern Montana that includes Yellowstone National Park and is bisected from east to west by US Highway 212, which at one point climbs to an altitude of over 11,000'.

You may have noticed that the highway climbs, not you, and that is the secret of what I call "reasonable" plant hunting. The idea is to go as high as possible in the most convenient and comfortable manner, and only then to start on your own power. Fortunately for us, the reasonable plant hunters, there are many places in this country where you can practice this most wonderful of arts: the High Sierra and the White Mountains of California, the Siskiyous in Oregon, several areas in the Colorado Rockies, the Bighorns in Wyoming, and many more.

Now to give you some basic pointers. A practical, reasonable plant hunter needs a base camp. A base camp is a place at an altitude of some 5,000'-7,000', not more than 10-20 miles from the hunting grounds, but with a few eating places and a comfortable motel. Although I consider a hot tub a sign of yuppie decadence, it becomes a bliss after a good hike in the mountains and adds a star to any motel's rating.

Let me add a few words about altitude. True alpine plants grow in the so-called alpine or tundra region, which in the southern Rockies starts at or above 9,000' and at progressively lower elevations as you go north. In Alaska, the tundra is just a few hundred feet above or directly at sea level. In the Beartooths, it is around 8,500', which means that, one way or another, you have to get that high to see the great natural rock gardens that continue up to the region of eternal ice and snow. In the Beartooths, you can use your car all the way up and select almost any altitude you prefer; just look at your map.

Look at what map? A good base camp also has a Ranger Station, and a Ranger Station sells detailed maps of the area. I recommend topographic maps with contour lines at the 1:100,000 scale, or even 1:50,000. Such a map is really indispensable, and no one should do any mountain trekking without one. This kind of map also shows foot trails. One good rule not only for mountain ecology, but also for personal safety is, "Stay on the trail!" A brief study of the map will tell you how difficult a trail is—the more closely crowded the contour lines, the steeper the trail. You can also tell whether the trail first gains then loses altitude over distance. These things are impossible to determine from posted trail signs; that is, if you can find trail signs. They are extremely few and far between, and those you find are completely unreliable. If, for example, after an hour of trekking on a trail, you spy a sign "DUCK LAKE 4," you now know little more than you did before. Four what? Miles, kilometers, minutes, hours, days? I never managed to figure that out. But I must say that the trails in the Beartooths are very well maintained, and if you have a good map you won't get lost. But don't leave home without a map.

In the Beartooths, the absolutely ideal base camp is a little town called Red Lodge, elevation 5,250', right on Highway 212. It has all the necessary amenities, and in addition, it is only an easy 60 miles from Billings, Montana, to which you can fly from wherever you live, and where you can rent a car. Summer in the Beartooths—and for that matter in all alpine regions—is very short, not more than 8 or 9 weeks. Before the Fourth of July and after the end of August, snow storms make Hwy. 212 impassable, and the road may be closed. Forty-five minutes of pretty, somewhat scary, curvy driving will bring you from Red Lodge to the top of the world, the Beartooth Plateau Summit. There is plenty of free parking there, as they say, and you can select any one of the numerous trails that

after only a few hundred feet will take you into a complete solitude and wilderness. People and cars are abundant on the highway and at the numerous lookouts along the way. However, only a few, very few, venture onto the trails. Once you lose sight of the road, you will forget all about civilization and the Twentieth Century. And, of course, all around you are millions of flowers for tens or even hundreds of miles—that's how long some of the trails are.

The temperature on the Plateau almost never exceeds 60°F and can drop to freezing in less than an hour. The wind blows incessantly and when black clouds start gathering on the horizon, you may soon experience your first high mountain storm. That will be an experience not easily forgotten, even if you have been through many storms before. Thunderstorms so close to the heavens scare the heck out of you—or at least out of me. In the Rockies, summer storms are infrequent, but a plant hunter must always consider them possible and be prepared for them. Something warm to put on and a plastic rain coat are essential and should always be with you. For longer walks, take some food and drinks, but don't get overburdened lest you lose the precious feeling of lightness and freedom that high mountains so generously offer. For some, plant hunting is synonymous with photographing and a successful hunt means the acquisition of a good picture of a plant in its natural habitat. Nevertheless, in a strictly personal way, what really counts is the mental picture, the fulfillment of experiencing a plant we have known or grown, or, if the plant is new to us, an enticement to create a new acquaintance.

An expert plant hunter looks around and recognizes most plants he sees; an amateur, like me, recognizes barely one out of ten species and sometimes less. But both can share the delight of seeing these tiny inhabitants of lofty spaces in their original birthplace, the likes of which a regular rock garden can never provide. Unlike most of the southern Rockies, the Beartooths are not powder dry in summer; in fact, the Plateau contains hundreds of lakes, creeks, and outright swamps that never dry out. This is undoubtedly one of the reasons why every square inch, unless it is a sheer rock, is covered with plants.

Also, one plant at a time is seldom enough to satisfy Nature here. Plants grow one through the other, forming tightly-knit communities of several species in which it is impossible to see where one plant begins and the other ends. This propensity is not restricted to moist areas; you can find it also in drier areas. It is one of the irreproducible situations that our artificial rock gardens can never provide, and it may be one of the reasons why certain plants cannot be successfully cultivated. *Eritrichium* is an excellent example of this dilemma. In lowland conditions, a close association of two or more plants leads to a weakening of all the participants and to their almost certain and rapid destruction by diseases or parasites.

The Beartooth Plateau is an immense, elevated plain with occasional peaks that remain snow-covered throughout the year. The incessant wind and cold temperatures make it generally inhospitable, despite its fierce beauty and grandeur. Also, many people experience various unpleasant problems owing to the altitude, and for them a return to lower-situated trails may be a desirable variant in plant hunting. Since trails in the Beartooth begin at all possible altitudes, you may do your own selecting. With proper respect given to the map, you cannot go wrong. The views are always as magnificent as the flowers. I especially recommend elevations between 7,000' and 8,000', where trees are already

significantly dwarfed, the plants are beginning to assume their alpine character, and the vistas are gorgeous, because they extend several thousand feet up as well as down. Although a reasonable plant hunter will not take one step more than he has to, there are many steps to take on Beartooth mountain trails. For each step forward there will be another on the way back. Because many trails are intended for overnight backpackers, it may be a good idea to turn back well before reaching the end point. If you've already established a cozy base camp, this decision will be quite easy. In every way, the insertion of reason into plant hunting leads to the creation of a most wonderful way to spend a week or two.

Alexej Borkovec is a biochemist who has a rock garden in the Washington, D.C., metropolitan area.

Townsendia exscapa

American Alpines for Show

by Graham Nicholls

My love affair with American alpines started 16 years ago, about the same time I decided to try my hand at exhibiting plants in Alpine Garden Society shows. I had been glancing through *Collin's Guide to Alpines* when I spotted the word "*Lewisia.*" Having heard these syllables whispered between exhibitors at previous shows, I read on. "Wonderful color range," "mulberry-red and flaming scarlet," ran the description. I was hooked, but how could I get hold of a plant? I searched the limited number of garden centers around at the time and then local nurseries. Eventually, a *Lewisia cotyledon* hybrid was found, taken home, and re-potted. Now I would demonstrate to these exhibitors what showing was all about.

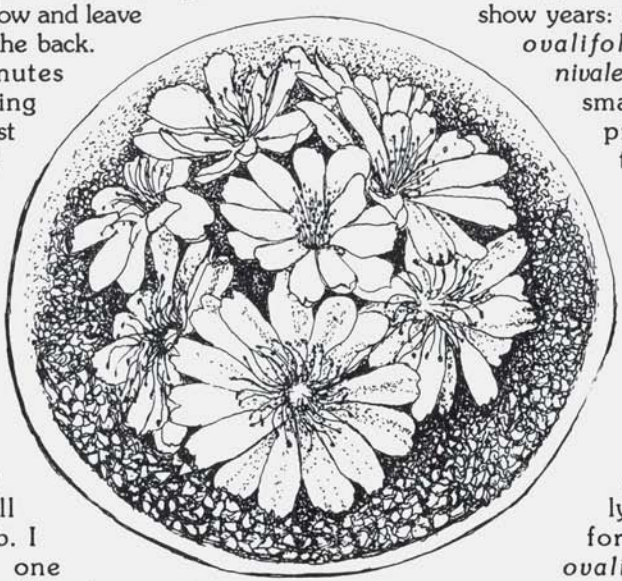
The following spring, with the show approaching in April, I watched the *Lewisia* grow, dreaming of the glory that was to come. I gradually realized that my plant wasn't growing fast enough. The show was only weeks away; it would never flower in time. What could I do? "It must be this cold weather stopping the growth," I thought. "Ah, I'll use the heated propagator."

Show day arrived and I proudly staged my lewisia, in a 5" pot, with lovely, bright green leaves and orange-red flowers on stems nearly 15" long. Only four entries in the class, I noted. No problem, the judges would be overwhelmed with my plant. Two hours later, judging over, I checked my entry. Not even a third! What on earth had the judges been thinking? I looked around, spotted one of the top exhibitors, and dragged him to my plant. He took one look, tried not to laugh, and there and then told me the facts of life in showing. From that moment on I decided that my "Americans" would be grown true to character.

Since that time I have exhibited many American alpines. Some have won prizes for me; others have dropped by the wayside. Here described are some I now judge to be good show plants. They may not be the best—each person has his own opinion about that—nor have they all been exhibited by me. They are just plants I consider good for displaying in pots.

Lewisias have stayed with me ever since that first fiasco, but now I show *L. rediviva* and *L. brachycalyx*.

Lewisia rediviva is easy to grow as long as you understand its need for a dry summer rest. However, getting it to flower on show day is something else. It requires bright light and a reasonable amount of warmth. It is a feat of ingenuity to make the nightly-closed flowers open in time for judging by 9:15 in the morning. If the sun happens to be out (we should be so lucky), I position the car so the sun shines through the rear window and leave the plant in the back. Mere minutes before judging you are almost knocked down in the rush as all the exhibitors take their plants to the show-bench, all hoping that the extra heat in the hall will finish the job. I remember one show day, cold and rainy, half a dozen of us *L. rediviva* exhibitors going into a restaurant next door and lining up our plants under the food heating lights in a vain attempt to "beat the clock." The form *Lewisia rediviva* 'Alba' has a particularly beautiful flower that really catches the judge's eye.



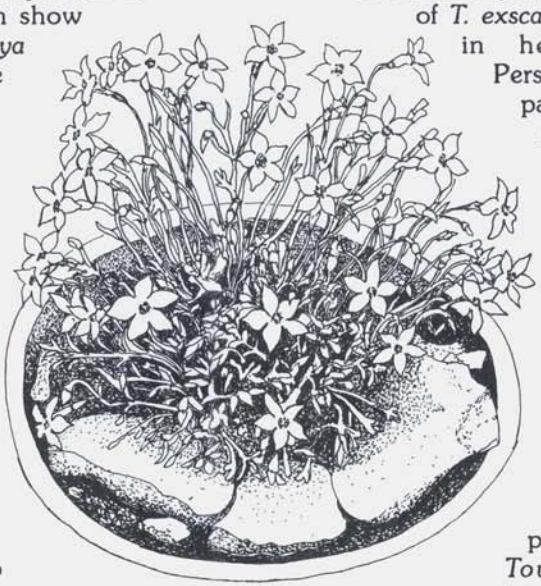
Lewisia rediviva 'Alba'

I didn't know too much about *Lewisia brachycalyx* at first, just growing a plain old white-flowered one. Then I visited Sonia and Jim Collins at Lakeside, Arizona. I was given a present of pink-flowering forms and told to grow them in pure sand. I now grow all my plants of this species in sand, in 6" pots. The pink form is out of this world. Needing a little more moisture than *L. rediviva* during its rest period, this species comes into growth on its own and usually flowers here in late April.

I grow many eriogonums, of which *E. soredium* and *E. shockleyi* are two beautiful dwarf species grown from Rocky Mountain Rare Plants seed. However, another species has stood out a mile during the last couple of show years: *Eriogonum ovalifolium* var. *nivale*. I have only small plants at present, but the individual I remember was shown in a 12" pot by one of the top exhibitors of the United Kingdom. An extremely compact form of *E. ovalifolium*, it was a silvery mat covered with white powder puffs and well deserved the Farrer Medal. Eriogonums come easily from seed, but because of their long taproots must be potted on to a deep pot fairly early. I always prick them out individually into 3" pots when they have their first true leaves. They grow away quite fast after that. If left any length of time in seed pots, the tap roots become very long and are tangled together, making pricking out difficult.

We can't talk about showing plants without including cushions, *Lepidium nanum* and *Kelseya uniflora*. Both form tight mats that creep slowly outwards, and both take many years to

build up a large plant. *Lepidium nanum* germinates very well from fresh seed and when potted on looks nothing like a cushion-to-be. The trick is to pot it deeper than the soil level at which it originally grew and pack slate or pieces of other rock around the neck. Then gradually over the next four to five years it will spread out over the rock, provided the compost is very lean. If you are lucky, it will produce its yellow flowers on show day for you. *Kelseya uniflora* has to be treated in a similar way. Again, you may be lucky and get the tiny pink flowers for the show. However, both species are great for exhibiting as foliage plants, and the judges do recognize that if you have a 6" pan of either species, you have grown it for a long time.



Gilia caespitosa

An excellent plant now appearing quite regularly on the show bench is the selected form of *Erigeron chrysopsidis* named 'Grand Ridge', very floriferous with large, almost double, bright yellow flowers. It grows into a nicely sized plant and not only covers itself in bloom but goes on and on flowering for weeks, very useful if you have several shows close together. Propagation is by cuttings, and I have taken them in autumn and spring with 100% success.

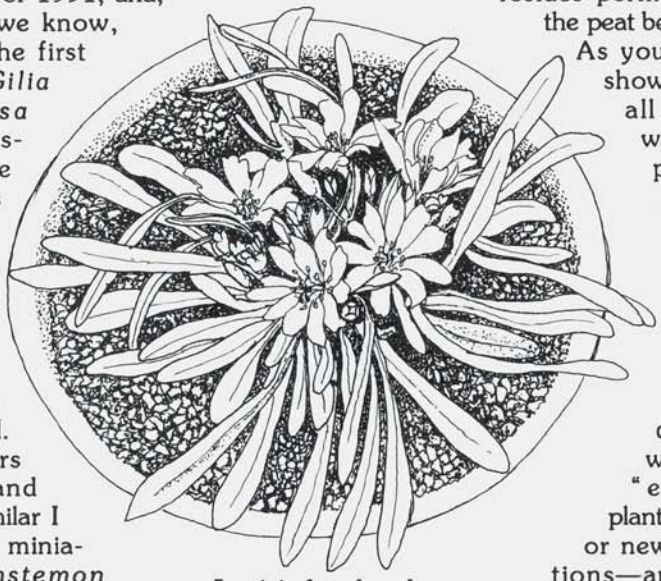
Sunflowers can bring brightness to the showbench, and *Hymenoxys acaulis* v. *caespitosa* does just that. It is a compact plant with tight rosettes of beautiful silver leaves. From each rosette comes a yellow-rayed flower, large in proportion to the plant, on a very short stem. It gradually spreads into a silver mat and can be shown for foliage alone.

Townsendias are another love of mine. During my visit to Sonia Collins I noticed a very large seed head of *T. exscapa* on a plant in her garden. Persuading her to part with some seed, I sowed it as soon as I returned home in July, and I was excited to see germination within three weeks. Since then, I have shown several plants of this *Townsendia*, all with white flowers 2" across. Greenfly and whitefly have to be shot on sight, however, and attention to watering must very strict for this plant to succeed.

Introductions by John Andrews and Jim Archibald of *Astragalus* species have enabled us to get this genus on the showbench. *Astragalus utahensis*, considered by Marcus Jones to be the most beautiful flower in the state of Utah, has been exhibited and appears to be reasonably easy to grow. With lovely mats of white-felted leaves and carmine-purple flowers on short stems, it can be a show-stopper. Once seed has set, the pods covered in creamy white hairs give

an extra attraction. Seed germinates quite quickly, and like eriogonums the seedlings need potting on as soon as possible. *Astragalus coccineus, A. loanus,* and *A. uncialis* have yet to appear on the showbench, but are being grown and eagerly awaited.

Gilia caespitosa is also a fairly new introduction, again from Utah, where it grows on the north side of sandstone cliffs. One of my plants flowered in summer of 1991, and, as far as we know, this was the first time *Gilia caespitosa* bore blossoms in the UK. It is very compact with tufted cushions and flower stems from 1.5"-3" tall. The flowers are red and tubular, similar I think to a miniature *Penstemon eatonii* flower. From seed, the plants tend to vary, and I have some very compact forms. The leaves are very sticky and pick up any dirt or dust flying around. The plants die back to resting rosettes during winter, but once the temperature rises they soon come into growth again. From cuttings they appear to come fairly easily, as I had a 13-out-of-15 success at my first attempt.



Lewisia brachycalyx

Finally, having started with a show disaster, I will end with one. *Sanguinaria canadensis* 'Multiplex' is a striking plant in the peat bed during the spring, but as I found out, is useless as a show plant. Some years ago, I took a lovely potful to a show. The white pompon flowers looked a treat, covering the plant completely. I placed it on the showbench, stood back, and thought, "That's a winner." Little did I realize what the warm atmosphere of the show room would do to the flowers. By the time the judges reached my plant, there were just a dozen or so bare stems standing upright in a pool of white petals. That plant now resides permanently in the peat bed.

As you can see, showing is not all about winning prizes. Although naturally we all like to have a red ticket, the showbench is where you can find well grown "everyday plants," rarities, or new introductions—and where you can make new friends. This is where you can get hold of a cutting or seed of that plant you have admired so long and found unavailable in the trade.

For me, it all started 16 years ago. Many seeds have been sown, many plants killed, and many disappointments have passed through the potting shed. Plants mentioned above are only a few of the successful ones. Completely different plants, including newly introduced ones, remain of Americans yet to be mastered in pots.

Graham Nicholls is a premier nurseryman in England. Drawings by Patricia Whalen.

A Commitment to Fertility

by Gwen Kelaidis

When we bring a plant out of Nature and into our gardens, we leave behind its many companions in the ecosystem in which it evolved. Most of these are casual fellow travelers through the same space in time and climate, but a few are likely to be critical to the health and happiness of the species.

The pollinators of a plant's flowers is an example of such. The *Osmia* bees that pollinate many species of *Penstemon* feed solely on the pollen and nectar of that genus, as far as we know. They have their own special requirements for overwintering and mating, choices of habitat for nest-building. We scarcely can collect a few of these to form breeding populations in the garden.

Bumblebees are not fussy about which flowers they visit and perform pollination services for flowers into which they can fit. Honeybees for decades have been pollinating not only fruit orchards but also our garden flowers. Now they are threatened by a viral infection that has already lowered their numbers significantly in the Northeast. What ultimately will happen, whether their populations recover, is a matter of considerable concern for fruit growers, and perhaps it should be for rock gardeners, also.

And so when we grow a choice rarity such as *Penstemon acaulis* responsibilities are threefold, to pollinate, to gather seed, and to re-sow.

Pollinating

To be really growing a plant, to really cultivate it, we must provide the pollination it would have had in Nature by hand-pollinating. Hand-pollinating results in a higher seed set, even in a situation where a few flowers may be crossed by the honeybees or other serendipitous bearers of pollen. In some cases, no seed will be set without hand-pollination, e. g., *Daphne cneorum*. I've found that by hand-pollination, I can cross the two cultivars 'Ruby Glow' and 'Eximia' for a modest harvest of berries (borne only on the 'Ruby Glow', interestingly). This year I dissected a flower to see exactly where that stigma was, and it is quite far down the floral tube. Needed to effect pollination is a very narrow twig or last year's crocus leaf about the diameter of a sewing pin, but a bit rougher, so that pollen will be

picked up. If you are not sure where the significant sexual parts are, dissect a flower and look. It's amazing how reluctant we may be to look that closely at at flowers; it's just one more way of understanding them, after all.

For larger, more open flowers, a paintbrush can be used to collect and carry the pollen. If you are pollinating several species, dip the paintbrush in alcohol between species and allow the alcohol to dry before re-using it. Some dedicated pollinators have a glass full of brushes, perhaps 25 or 40. I use my thumb for open flowers like *Lewisia* or *Aquilegia*, just brushing across the stamens and then the stigma. It is easy to see the pollen, usually a yellow dust. Do look to be sure the plant is shedding pollen—some shed only at particular times of day. Our *Sternbergia candida* produced pollen only for a few days this spring. Then came a cold snap, and the stamens never showed good pollen after that, although the flowers looked pretty much normal. No seed was set on flowers I pollinated earlier either, so I postulate that the cold was too much.

When you are ready to pollinate, first pick up pollen from two to five flowers of one plant, and then switch to a second plant, and so back and forth. Pollinating several hundred flowers can take 10-20 minutes, but after all, the bees spend all day at it.

The resulting production of cultivated seed means that

1) Seed will be made more widely available—as well as available to you!

2) There will be less pressure to collect either plants or seed from Nature.

3) Better seed production will result from outcrossing rather than self-fertilization.

4) You have the pleasure of truly interacting with the plant and of being truly productive.

If you want to maintain the purity of a species of a genus known to be easily hybridized, consider excluding insects from the plants. I grow *Aquilegia scopulorum*, and I want to be able to distribute seed that I am fairly sure will come true. There are a few other species of *Aquilegia* in the garden, *A. jonesii*, *A. saximontana*, *A. flabellata* 'Nana', and *A. laramiensis*. The first blooms well before *A. scopulorum* and is prevented from crossing by time. I make it a point to pollinate all the flowers of *A. scopulorum* every day, hoping to beat the bees to it. If my pollen gets there first, presumably it will reach the ovaries before all the rest. Once the flower has accepted pollen, the petals drop rapidly, and become unattractive to bees. But if I were really serious, I would need to rig up a cage covered with cheesecloth and simply keep the insects from reaching the flowers at all.

Seed Production

Many times plants do not live long in our gardens. No one has documented the life span of most plant species in Nature; think of the Golden Fleece Awards if the National Science Foundation were to support such "ridiculous" research! But from the few that have been studied, it seems that those darling little eritrichiums may live 100 years or more on the ridges of the tundra. We need to produce seed to keep trying new methods.

In our gardens, a year or two is great for many unusual plants. We'll show the seedling to a few close friends, bloom it, photograph it, and feel fairly satisfied. To learn how to grow these plants successfully—yes, I mean longer—we must have a quantity of seedlings to try in different sites, soil types, watering regimes, and exposures. We want enough to give away to other good growers who may succeed where we

fail. When we receive a gift of unusual seed, either from friend, collector, or a lucky act of Nature letting us arrive at a particular plant in a particular spot on the particular few days when seed is ripe, we have, I feel, an obligation to keep growing it.

Penstemon grahamii had lived and produced seed for six years in our gardens, producing in that time perhaps some 6,000 seeds. This year I have no blooming plants, but only a seedpot of young ones, a promise for next year or perhaps 1995. In an ideal world, I would now produce a crop of hand-pollinated seed every year. This is a case where Nature can be outdone by cultivation in seed production. The small native range of *P. grahamii*—seven known localities—had so little rain in the past few years that no seed was produced. It's up to horticulture to produce its own plentiful seed in this situation, to never need to return to Nature and rob such a meager store of wild seed.

There are less successful stories. We are able to grow *Gilia caespitosa*, a charming plant of sandstone crevices in the Capital Reef area of Utah. Its leaves are succulent and glandular, forming a tight cushion, and its flowers on 4" stems are a stunning coral. But we've never had a plant more than three years. It doesn't set seed, even when pollinated—or does it? Although we don't see the seed capsules, a few volunteer seedlings have appeared in our garden. I wish we had tried it in a trough. Plants of *Hymenoxys lapidicola*, another crevice-dweller, look only a bit more loose than the tight cushions of Daggett County, Utah and had many flowers this year. I was out there moving pollen from flower to flower, but the seed looks like it didn't develop properly. Could it be because we water the cushions with an overhead sprinkler? We've wondered the same thing about acantholimons, which seem to to produce very few good seed if there are many afternoon thundershowers just after flowering.

Consider when planting whether you will be producing seed. There are many plants that are obligate outcrossers, i.e., they cannot produce seed without crossing with a different individual of their species. Included are many verbascums, primulas, and all dioecious plants, such as *Ilex*. If you only plant one, you will not be able to produce seed. I have also been discouraged at low seed set on such plants as *Draba rigida* in my garden and postulate that the plants available for sale are mostly all a single clone. This makes me eager to obtain wild seed, on the thesis that more diverse genetic material would result in more seed set in cultivation.

Gathering the Harvest—or Not

By the way, don't forget to follow up on your pollinating activities by collecting the seed at the appropriate time. You'll have to exercise restraint and not tidy up too much before the seed is ripe. After collecting, there is seed cleaning and the decision to re-sow the seed yourself or share with others who have a chance of growing that species.

On the other hand, sometimes it may be better not to collect the seed. Included in plants that self-sow into our gravel are many species of *Corydalis*, which we wouldn't take the time and trouble to handle properly in seed pots, sowing just after ripening; *Dracocephalum botryoides*, which only tolerates life when we choose its home but lives longer and happier when it chooses its own; and the remarkable *Lamium eriocephalum*, which we have sown at least six times in seedpots, without results. In the spring of 1992 our one plant made a spectacle of itself, the bronzy, scalloped leaves covering themselves with snowy hairs, the whole

plant transforming itself into a snowball studded with unashamedly delightful pink-and-white, fuzzy flowers. It then collapsed and died, leaving us with fond memories, deep regrets, and a few of those intractable seeds. But low and behold, from the scree downslope from the mother plant sprung over 100 seedlings the following spring. We may not be able to manage to grow it in the propagation frame, so in this case, we leave germination to the complex conditions of Nature in the garden.

Reintroduction of cultivated seed or plants into Nature is a topic worthy of a discussion all its own. Isn't it really a specialized horticultural venture to "re-release" a plant this way? Purists among our conservationist community object that cultivated plants undergo intense and immediate selection for horticultural conditions and are significantly different from wild populations through significant genetic drift even in two generations, making cultivated plants unsuitable for re-introduction. My concern is that field botanists who are generally in charge of such re-introductions (or even worse, the relocations that are sometimes demanded by the federal authorities invested with the responsibility to preserve small populations) have little horticultural experience. Getting a seedling from a peat-and-perlite potting mix into native clay in an area with 10" of annual precipitation would be a challenge for the most experienced among us.

As a zoo cannot really preserve the panda or the gorilla, the garden is not a perfect haven for gilias, penstemons, or orchids. Preservation of wild habitats must remain a high priority to this end.

Sharing your Love of Plants

Not the least of our responsibilities and privileges in growing wild plants is our opportunity to educate other gardeners, neighbors, and children about the nature of plants and their dilemma in our people-dominated world. The presence of these plants in our gardens gives us the opportunity to tell their stories, where they come from, the climate in which they live, and so on.

We are drawn to the beauty of plants—their delicacy, color, and the transience of the blossom, providing so sweet and so bitter an analogy for the transience of our own short season. We admire the intricate forms and complexity of leaves and of the plant body, so precise and so complicated that few artists choose to draw a whole plant or sculpt it. Try asking your favorite artist to draw even one large clump of *Sempervivum*, much less a big acantholimon, a daphne in bloom, a *Draba rigida*! The detail is overwhelming. When you think of it, sculpting the smooth, rather lumpy, naked form of humans is much simpler than any of these.

When you produce home-grown seed, you have the opportunity not only to share the beauty of a plant by showing it to someone in your garden, but to share the opportunity for others to grow it, to be themselves keepers and midwives to the growth of a new generation of rarities.

I submit that the pleasure of growing plants lies not in possessing them, but in having them be part of our daily living, in the enrichment they offer our lives, in the affinity we feel for them and for the natural world. Our gardens make our lives richer and bigger. It is a small thing to do in return to keep them fertile, to be their pollinators and distributors.

Gwen Kelaidis is proprietor of Rocky Mountain Rare Plants, a seed business specializing in cushion and saxatile plants of the Rockies and of similar climates worldwide.

Trillium chloropetalum var. *rubrum* at Royal Botanic Gardens, Edinburgh
This form is from northern California, and is now classed by Freeman as a segregate species, *T. kurabyashii*. (article on propagation, pp. 169-172)

Panayoti Kelaidis

Trillium erectum ssp. *sulcatum*
(pp. 163, 165, 166) Frederick W. Case, Jr.

T. erectum ssp. *sulcatum*, yellow mutant
(p. 166) Frederick W. Case, Jr.

Dense stand of erect form of *Trillium flexipes* in Kentucky (p. 166)

Frederick W. Case, Jr.

Trillium flexipes, selected form with wide petals and erectly held flowers (p. 166)

Trillium flexipes, form with erect flowers from Kentucky (p. 166)

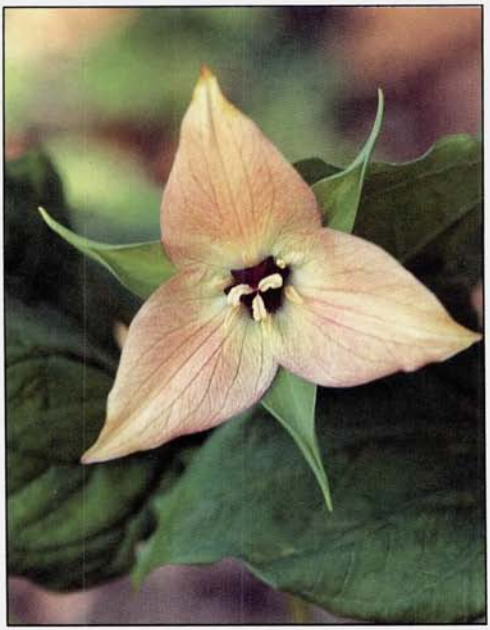
Trillium erectum, typical form and forma *luteum* (pp. 163-164)

photos by Frederick W. Case, Jr.

Trillium erectum, showing clump formation (p. 166)

T. erectum, selected form (p. 166)

Superior hybrid of *Trillium flexipes* x *T. erectum*, hand-pollinated cross from selected parents



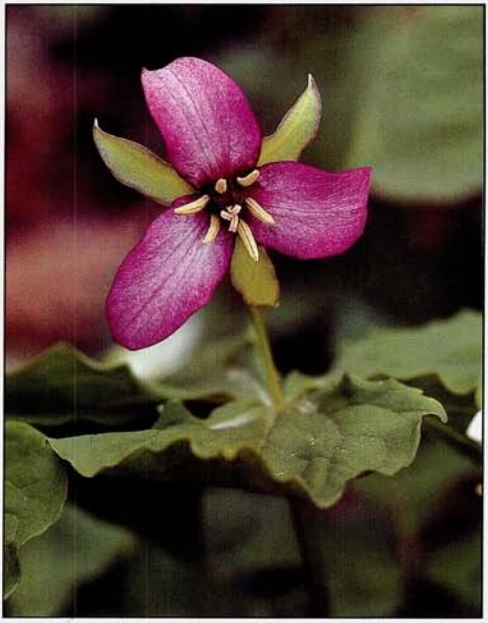
Trillium erectum ssp. *luteum* x *T. erectum* ssp. *luteum*, garden hybrid with huge flowers (p. 165)

photos by Frederick W. Case, Jr.

Trillium flexipes x *T. erectum*, probably from ssp. *sulcatum*, yellow, hybrid.
Authors' favorite hybrid, superb plant (p. 165)

Trillium flexipes x *T. erectum* hybrid, picotee, garden seedling, probably from Kentucky form (p. 165)

Flowers from several hybrid swarms between *T. erectum* and *T. flexipes*, in the Case garden (pp. 163-168)



Trillium flexipes x *T. erectum* complex hybrid

Trillium flexipes x *T. erectum*, garden hybrid, showing reverse pattern of bull's eye (p. 165)

photos by Frederick W. Case, Jr.

Trillium flexipes x *T. erectum*, garden hybrid, showing reverse color pattern of bull's eye (p. 165)

Trillium flexipes x *T. erectum* wild hybrid, found near Jellico, Tennessee

Trillium flexipes x *T. erectum* hybrid, picotee (p. 165)

Trillium flexipes x *T. erectum*, unusual complex hybrid, note color following veins

photos by Frederick W. Case, Jr.

Trillium flexipes x *T. erectum* hybrid, picotee color break (p. 165)

Trillium flexipes x *T. erectum* complex hybrid

Trillium flexipes x *T. erectum*, a complex hybrid, vigorous clump-former, and superb garden plant (pp. 163-168)

photos by Frederick W. Case, Jr.

Trillium flexipes x *T. erectum*, garden hybrid

Trillium flexipes x *T. erectum*, hybrid shown above (p. 165)

Bulletin Editors since 1962

by Marnie Flook, with Buffy Parker

Albert Merle Sutton (Vol. 20:4—Vol. 33:3; 1962—1975)

Albert Merle Sutton of Seattle, Washington, was appointed Editor of the ARGS Bulletin when Carl Worth resigned in 1962. Merle majored in journalism in college; he had worked in the financial department of Boeing for many years and was recently retired when he became Editor. Active members of the Northwest Region of ARGS, Merle and his wife Eileen were not only avid rock gardeners, but enthusiastic hikers, searching for alpines in many mountains of the Northwest. His exuberant and philosophical articles describing their plant explorations had appeared in the Bulletin since 1954.

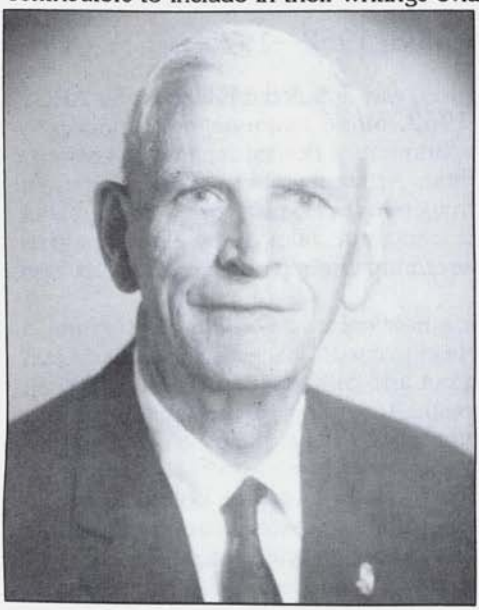
In his first issue as Editor, Merle began a new column, *Omnium-Gatherum*, a name suggested by his daughter Sharon. He explained: "It seems a fine quasi-Latin mouthful (one can see the Editor reaching out and gathering in everything he can get his hands on that might be of interest). According to Webster *omnium-gatherum* means, 'A miscellaneous collection of all sorts of things.' As a name for this column it will do until a better one suggests itself. A few words, also, about the new editor: Qualifications—Negligible. Background—Obscure. Botanical education—Informal. Literary accomplishment—Trifling. Reason for appointment—Desperation. Now you know the truth and we do not have to pretend."

Merle said that while he had time and energy for the job, he also had a capable editorial staff to help "maintain the technical excellence (botanically speaking) of the *Bulletin*": Brian O. Mulligan and Joseph A. Witt, Director and Assistant Director of the Arboretum of the University of Washington, respectively; and Carl S. English, Jr., prominent plantsman and botanist. This was the first time an Editor was assisted by such a staff.

Merle Sutton was Editor for 13 years. Changes were made under his direction, both in the cover and in the increased number of pages in each issue (from 32 to 36 to 40). More pages were freed for rock gardening articles when ARGS business and regional reports began to be published in the *Bulletin Board* in 1965. Merle continued to write a few articles for the Bulletin, and in his columns, often three or more pages in length, he covered an exceptional variety of subjects.

Besides numerous notes about changes and plans for the *Bulletin*, he often added a few explanatory comments about articles he had printed or wrote something interesting about their authors. He was always highly complimentary about the ARGS officers he worked with: Presidents Harold Epstein, Lincoln Foster, Bernard Harkness and Harry Butler, and Secretaries Edgar Totten, Lawrence Hochheimer, Richard Redfield, and Milton Mulloy. Often when an obituary of a member appeared, he would add a few reflective words about the person in his column. Other subjects mentioned in *Omnium-Gatherum* included the Seed Exchange, nomenclature, conservation, the *Bulletin* index, the many active 80-year old ARGS members, his eye surgery, books, meetings, awards, plant hunting expeditions, etc. He described the crisis when the corrected galleys and dummy for the January 1975 *Bulletin* never arrived; "the first Post Office failure in 149 mailings from Seattle to New Jersey."

Some columns contained thoughtful and philosophical essays about plants, mountains, gardens, or gardeners. He had read all the early issues of the *Bulletin*, including the five *Yearbooks*, and after referring to the wealth of material they contained, noted that: "In those early days of the society it was quite usual for contributors to include in their writings evidences of the great joy they experienced as a result of their gardening activities." After giving a few examples, he went on to say "Mostly our contributions of late are serious, full of advice, helpful and fully appreciated but seldom is there evidence of hearts overflowing with the joy that gardening should bring, and will bring to the gardener if his mood is receptive and his love of plants is sincere" (Vol. 21:2; 1963).



Merle's love of plants and the mountains where they grew was always evident in his writings. Shortly after he became Editor, Merle suggested that members send him lists of their ten favorite native plants, meaning plants from that member's state or those bordering it; he felt these lists would be both educational and interesting to other members. His personal list included treasures like *Moneses uniflora, Calypso bulbosa, Campanula piperi* and *Lewisia tweedyi*. (Vol. 22:3; 1964)

While Merle was Editor, the question of an ARGS emblem was finally decided. This "oldest unfinished matter of business," according to Harold Epstein, had been discussed in the *Bulletin* since Volume 1. The furor raised by an article Merle printed concerning mislabeled seeds from the Seed Exchange will be described in a later article. Inspired by an article about *Trillium chloropetalum*, he wrote a short article praising the four Northwestern *Trillium* species, all of which he had found in the wild, ending with: "Let those who will rejoice in the mutant trilliums, but to me a trillium ceases to be a trillium when all fluffed up with superfluous petals, be

they four or forty." (Vol. 27:3; 1969)

Although Merle often asked for contributions to the *Bulletin*, he was very upset when he was apparently misquoted in the minutes of the Annual Meeting in 1965: "the editor again pleads for contributions to the Bulletin from the membership." Merle wrote: "In his report he did not plead for contributions. As stated in previous Bulletins, the editor will never plead, or beg, or beseech. He will ask for contributions in a dignified manner—but plead—never!" (Vol. 24:3; 1966)

Merle Sutton started several new features: the first, Welcome! New Members, listed all members who had joined ARGS since the last issue. Another one was called Interchange, in which members could ask about anything pertaining to rock gardening. Response was enthusiastic, with questions or answers from ten or more members in each issue. Some of the longer answers ended up as articles. Interchange appeared in the Bulletin for six years (Vols. 23-28). Another, Plants to Know and Grow, contained short paragraphs written by various members, describing plants especially admired.

In 1970, Albert Merle Sutton was presented with the Award of Merit. The citation, written by Frances Roberson, described him as "a knowledgeable rock garden enthusiast whose patient attention to detail and untiring research has resulted in a cosmopolitan publication which lives up to our expectations in presenting informative readable material, gathered literally, from all over the world."

To express their appreciation for his many years of editing the *Bulletin*, a group of ARGS members arranged that Merle and his wife Eileen attend the 4th International Rock Garden Plant Conference at Harrogate, England, in April 1971. He was overwhelmed by this "tremendous outpouring of goodwill" and, after attending the meetings, wrote a detailed description of the conference in the July 1971 issue of the *Bulletin*. (Vol. 29; Nos. 2 & 3)

In the July 1975 *Omnium-Gatherum*, Merle wrote: "It has been said that thirteen is an unlucky number and this is proving true where your present editor is concerned for at the end of the thirteenth year of his tenure a stumbling heart and faltering eyesight have made it necessary for him to resign. With the distribution of this issue of the Bulletin the time has arrived for him to lay down his blue pencil and turn out to pasture his flock of extra commas, hyphens and other punctuation marks with which for so many years he has besprinkled his contributors' manuscripts."

Besides thanking his wife and daughter for their help and encouragement, he also praised the publisher, The Interstate Printing Corporation of Plainfield, New Jersey for the "excellent service and understanding help" they had provided. At the annual meeting in 1975, a Citation of Appreciation was presented to Merle by President Harry Butler, "as having faithfully served ARGS as Editor of the Bulletin for the past thirteen years." He was also given a watercolor of a dodecatheon and a cassette recorder.

Albert Merle Sutton died on October 14, 1975, a few days after passing on the details of the *Bulletin* management to the new editor, Howard Porter. In making the announcement, Harry Butler said that when he had visited Merle earlier that year, Merle's biggest concern was that a new Editor be appointed while he could transfer his methods and materials to him personally. A memorial to Merle, a series of quotations from his columns and articles, appeared in the next issue. "The Wisdom of Merle Sutton," was compiled by his friend Gus N. Arneson of Seattle (Vol. 34:1; 1976).

Howard N. Porter (Vol. 33:4—Vol. 35:4; 1975—1977)

In 1975, Howard N. Porter of Guilford, Connecticut, was invited to be Editor of the ARGS *Bulletin* for a five-year term. A graduate of Yale University, he was Professor of Greek and Latin at Columbia University for many years. He belonged to the Connecticut Chapter of ARGS and had been editor of their excellent newsletter, *The Connecticut Plantsman*, since 1973. He was an avid gardener, a skillful propagator of rare plants, and a steady prize-winner at plant shows.

Howard's wife, Mary V. Porter, wrote to me last fall in reply to my request for a photograph and reminiscences of the time when he was Editor. With her permission, excerpts from her letter follow:

"His method of editing, as I remember it, was to get off letters to ARGS members that he knew were doing interesting things and try to cajole them into writing something. He co-opted me as his secretary, copy editor, proofreader and general dogsbody, thus gaining for himself more time to get his hands into dirt, compost, roots, and so on."

"Howard has always been a brinksman, preferring the eleventh hour and the small hours of the morning for all serious tasks that could not be avoided or delegated to a wife, such as income tax returns, the grading of students' papers, and the putting together of the *Bulletin*. A 12-hour stint at the dining-room table, surrounded by all the copy and photographs, the room blue with pipe-smoke (that was before he quit the beloved weed) would with luck suffice to get the publication packed off to the printer."

"Then, after an hour or two of sleep, the editorial eye would again become the plantsman's eye, examining the progress of minuscule plants rooting under a plastic canopy, spotting a spider mite where it had no business to be, studying the droop of some petal, the color of some leaf."

At the annual ARGS meeting in 1988, H. Lincoln Foster said: "For thirty years, Howard has made innumerable and unheralded contributions to alpine gardening through his expertise in propagation, his generosity in sharing plants, and his willing contributions to both chapter and national publications. For his outstanding devotion to rock gardening and to the American Rock Garden Society, the Society itself is honored by awarding Howard N. Porter a long-due Award of Merit" (Vol. 46:4; 1988). After a long illness, Howard Porter died in March 1993.

Howard edited nine issues of the *Bulletin* before resigning in 1977. Changes made in the format, paper, and cover were done with the assistance of Buffy Parker, an "accomplished professional," as Howard described her. Buffy's tale of working with him and with the next editor, Timmy Foster, follows:

Although I only served as Secretary of ARGS from June 1985 to July 1990, I worked with a total of five different Bulletin *editors, spanning 15 years: Howard Porter, Timmy Foster, Sharon Sutton, Ted Marston, and Gwen Kelaidis.*

And from this experience, I learned that the one constant in life is change...Eighteen years ago, when Howard Porter took over as Editor, there were about 900 members in ARGS. It cost approximately $1 to print and mail a single copy. The page count for each issue was 52, and it took at least one week to get an accurate membership count from the mailing house. Deadlines were so flexible that the Winter issue sometimes did not go out until March. Ads were sent to the Secretary, Milt Mulloy, and then forwarded to the Editor, since there was no Advertising Manager. The Bulletin Board *was written by the President and sent directly to the printer, never passing over the Editor's desk. There was even talk of sending the* Bulletin Board *out as a separate mailing, so that members would receive pertinent information on time. In the summer of 1976, dues were raised from $5 to $7.*

Howard's first issue was Volume 33:4 (1975). Stepping into the breach, after Merle Sutton's retirement, Howard requested and received generous help. Foremost was the Editorial Advisory Committee: Roy Davidson, H. Lincoln Foster, Laura Louise Foster, Bernard Harkness, Anita Kistler, Donald Peach, Owen Pearce, Sharon Sutton, and Margaret Williams.

Howard asked me to design a logo and to come up with a new cover format, even though he realized that "...many will doubtless feel a nostalgic pang for the little green quarterly with the table of contents on the cover" (Vol. 33:4). And Timmy Foster offered her services as staff artist, contributing many drawings to enhance the cover. Merle Sutton's Omnium-Gatherum became "The Compost Pile." Howard explained: "I hope, however, that it will evolve to something like the Alpine Anthology of the Bulletin *of the Alpine Garden Society in England, i.e., a melange of notes sent in by members." He appealed directly to the membership: "...I also hope to hear from my fellow members what they want from the* Bulletin. *If the* Bulletin *is to be the best possible horticultural journal for rock gardeners, it must receive the thoughtful and creative attention of all" (Vol. 33:4).*

Howard struggled honorably in a field far removed from his profession in classical languages. I helped him establish a working relationship with the printer/typesetter, who was not used to clients with dirt-stained knees or foreign-sounding names for plants. But he was on his own when it came to learning about the frustrations of dealing with a mailing house through a third party, coping with postal requirements, and proofreading endless galleys from shy, retiring authors. After two years, he finally admitted that he could not satisfactorily balance teaching and editing. He wrote:

> *"This current, and belated, issue of the* Bulletin *is the last to be produced by the present editor. He has somehow, and for reasons he himself does not fully understand, found it difficult to keep the* Bulletin *on schedule. He knows that this has caused considerable difficulties in the orderly management of the Society's affairs and for this he apologizes. Good, however, will surely come out of evil, for the new editor is to be Laura Louise Foster, whose superb drawings have been the glory of the* Bulletin. *The Fosters are clearly the First Family*

of American rock gardening, and under Mrs. Foster's editing, I expect that we will be entering into an exciting new era in horticultural journalism." (Vol. 35:4; 1977)

Timmy Foster graduated from Bennington College (Vermont) and worked as an editor before marrying H. Lincoln Foster in 1949. They were members of the Connecticut Chapter of ARGS; Timmy's handsome drawings accompanied Linc's articles about native plants in *The Connecticut Plantsman*, the Chapter newsletter. She also illustrated Cobb's *Field Guide to the Ferns*, Foster's *Rock Gardening*, and Geoffrey Charlesworth's *The Opinionated Gardener*. Many of her original pen-and-ink and pencil drawings are in the archives of the Hunt Institute for Botanical Documentation, Carnegie Mellon University, Pittsburgh, Pennsylvania.

The 1987 Winter issue of the *Bulletin* was distinguished by the lead article, "Life with a Rock Garden," Timmy Foster's story about Millstream (Vol. 45:1). An expanded version of this fine article, one of the longest to appear in an issue of the *Bulletin*, is the first chapter in *Cuttings from a Rock Garden*, a superb collection of essays and plant portraits by Linc and Timmy Foster, with drawings by Timmy. This book, edited by Norman Singer, was published by Atlantic Monthly Press in 1990.

In the first issue she edited, Timmy Foster wrote: "It is with considerable trepidation that I follow in the pathway already trodden by such eminent editors...certain it is that I can claim neither their botanical knowledge nor their scholarship. However, with your help I shall do my best to turn out a presentable publication" (Vol. 36:1; 1978). She sounded even more skeptical in a personal letter, admitting that she would be willing to take on the editor's job only "if no one else turns up. I really do not feel adequate to the job, but with Linc's help, I could probably manage it."

But once she accepted the challenge, Timmy dedicated all her energies to the task. Since it took almost five weeks to put an issue of the Bulletin *together, from typed copy to mailing, she started by restructuring her volunteer "staff." The Advisory Committee evolved into: Assistant Editor: Viki Ferreniea; Contributing Editors: Roy Davidson, H. Lincoln Foster, Bernard Harkness, Anita Kistler, Owen Pearce, H. N. Porter; Layout Designer: Buffy Parker; Business Manager: Anita Kistler.*

Timmy wrote 50 post cards that first month begging for articles, explaining later: "...it takes between 90 and 100 pages of double-spaced typing to fill each issue of the Bulletin, enough words for a short novel every year" (Vol. 40:1). She asked Joel Spingarn for black-and-white photos; hired her daughter-in-law to type raw manuscripts; worried about the index; and decided to make some radical design changes. She explained the new two-column set-up: "...It has an additional benefit in that it allows for greater flexibility in picture size; in many cases a narrower than full page width is better suited to the subject matter than the full page spread" (Vol. 36:2).

She epitomized these changes when she dubbed the editor's column "Of Cabbages and Kings," quoting the poem by Lewis Carroll. (Her columns, usually five to seven pages long, were not only about the ARGS—the emblem, Seed Exchange, Awards, Plant Shows, early bulletins, and some of the problems encountered in editing the present issue—but often were thoughtful essays about some aspect of rock gardening. They were a very special part of each issue.)

Even though Timmy and I decided that the two-column format was easier to read and work with, we worried about the overall look. She expressed her doubts in a letter to President Jim Minogue: "I agree with your opinion that it would be a mistake to change the size of the Bulletin, *even though I personally wish it were a little wider for its height or a little shorter for its width; I think the proportions for the present* Bulletin *are ugly."*

Since Timmy was committed to Howard's printer in Guilford, Connecticut, the book was printed letterpress, meaning that she dealt with bulky galley proofs, cutting and pasting them to form page layouts. She did not believe color photographs were necessary: "Could a picture interpret the humor in Wayne Roderick's article in this issue and the personality of the early plant explorers about whom he writes?" (Vol. 36:2).

After settling design issues, Timmy worried most about plant names, botanical and colloquial, and since the printer was not familiar with botanical Latin, Timmy had to be very careful in her editing, underlining everything she wanted to italicize. Reference has already been made to the historic issue (Vol. 37:2; 1979), that contained color photographs for the first time. Timmy felt that Paul Maslin's phlox article was special enough to merit color plates. Since there was no money available in the ARGS budget, Milt and Jeanne Mulloy raised $500 by private subscription to cover the expense.

No sooner had Timmy "trained" the printer in the vagaries of typesetting botanical Latin, his business dwindled and went into bankruptcy. A crisis arose as the negatives for both the Bulletin *and the* Bulletin Board *had to be rescued immediately. Howard Porter assisted the Fosters, and they moved everything to the new printer, Deer Spring Press in nearby Norfolk, Connecticut, chosen not only because of proximity, but also because this venture was run by a gentle religious sect dedicated to fine work. But after a few years, the Brotherhood (or Brudderhof) reluctantly shut down the presses, realizing they could raise more money for their cause by building children's furniture. So during the winter of 1984, Timmy moved printers yet again, this time to Canaan, Connecticut.*

Timmy ended her tenure in the fall of 1984 by writing that it was only fitting "...to start our 51st year with a new editor with new ideas" (Vol. 42:4). In an effort to make the transition as smooth as possible, she made sure that Sharon Sutton, the incoming editor, would have enough material on hand for at least two issues. (The last issue she edited was Volume 42:5, the special 50th Anniversary issue.)

Timmy summed up her years in typically honest and enthusiastic fashion: "I truly enjoyed being editor (mostly)...I learned a great deal about plants and plantsmanship during my stint as editor, but mainly, I learned what I always suspected, that the members of ARGS are extraordinarily wonderful, enthusiastic, generous people with many and varied skills and talents that they are eager to share. Thank you all. May your seeds all germinate, your plants thrive and your garden burgeon" (Vol. 42:4).

Timmy's tenure as Editor was a labor of love to the society she had adopted when she married Linc, because her only remuneration was sleepless nights and an annual stipend of $250. The citation written in 1979, when she received the ARGS Award of Merit, put her gift in perspective: "...Throughout her membership in ARGS, an ever-ready willingness to lend a hand has marked the strong sense of responsibility and dedication which is so much a part of the character of Laura Louise Foster. Time does not permit enumeration of the many times she has met one or another need of the Society. Her dedication to the purposes and objectives of the Society could stand alone, however, on her assumption of the editorship of the Bulletin *when most needed. The excellence of the* Bulletin *under her editorship testifies fully to her commitment and competence" (Vol. 37:3).*

Timmy Foster died in January 1988. Her good friend Howard Porter wrote her obituary which, along with a photograph of Timmy working in the garden at Millstream, appeared in the Spring 1988 issue of the *Bulletin* (Vol. 46:2).

Sharon Sutton (Vol. 43:1—Vol. 46:4; 1985-1988)

Sharon Sutton was appointed Editor in the autumn of 1984. Sharon had edited *Alpines of the Americas*, the proceedings of the 1976 Interim International Conference in Seattle (for which she was awarded the Society's Award of Merit), and had had practical experience producing the *Bulletin* when her father was Editor. Sharon was the first Editor to be substantially compensated for her duties, at the rate of $9,000 per year.

In her first issue, Sharon re-introduced *Omnium-Gatherum*. Here she asked not only for articles, but also for suggestions from the membership. This issue was the first to have a color photograph on the cover. Thanks to materials and instructions from Timmy Foster and Anita Kistler, Sharon was able to produce the *Bulletin* despite being in the throes of moving. However, she was to be plagued with problems with the forwarding and delayed forwarding of mail, and with trouble with her first printer, who was eventually replaced. In her second *Omnium-Gatherum*, she introduced a new feature, the Fragments Department, for "all those

wonderful bits of wit and wisdom pertaining to plants and gardens..." Later that year another feature was started, European Notebook, in which Paul Halladin, of Geneva, Switzerland would write about various facets of rock gardens and gardening in Europe.

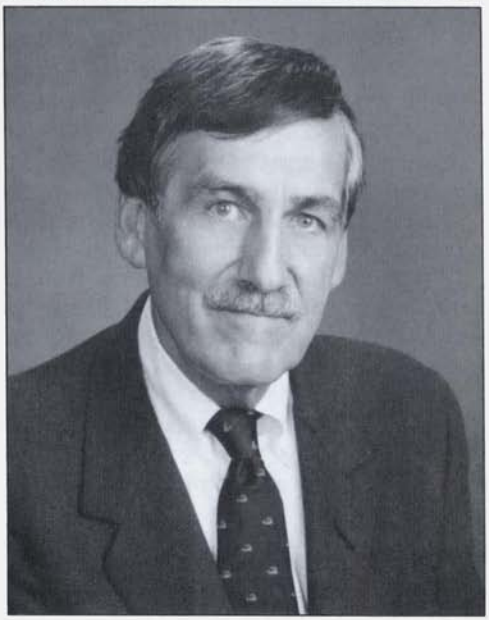
A feature from Merle Sutton's term was re-introduced in 1986, Plants to Know and Grow; members were urged to write about plants they thought should be better known. Sharon also suggested that a few articles for novices might be helpful so that "beginners and others...come to better grips with the fundamentals of this amazing obsession" (Vol. 44:4; 1986). The increased sophistication of the chapter newsletters inspired Sharon to instigate yet another column, Of Interest from the Chapters, in which she planned to share "some of this richness with the wider audience of the *Bulletin* and to let the whole membership in on a good thing." That year, Sharon also reported that Ted Kipping had agreed to assist as photo editor. Unfortunately, he only held that position for four issues.

Enclosed with the 1988 Winter issue was an Interest Survey, a checklist for members to answer and return to the Editor. Sharon planned to use this as a guide for future *Bulletin* articles. One of the first results of the survey was the Exchange Column, since many members showed interest in a help wanted and a wanted column, a "place to exchange ideas and information, to give and get help." A summary of the responses from the 330 members who returned the survey were tabulated in *Omnium-Gatherum*, Vol. 46:4.

The following notice appeared at the end of her last *Omnium-Gatherum*: "This is my final issue. I am released as editor of the Bulletin. Thank you for your contributions and kindnesses" (Vol. 46:4; 1988).

Ted Marston (Vol. 47, 1-4; 1989)

At the 1988 Annual Meeting, Ted Marston was appointed Interim Editor of the *Bulletin* for a one-year term. Besides being a member of ARGS and the Northwest Chapter, he was active in the Garden Writers Association of America, having served as president and as editor of their newsletter. He was the owner and editor of "Plants Alive," and ran his own company, Ted Marston & Associates, Horticutural Decisions, a communications and marketing firm.



Both the format and size of the 1989 issues were changed with his first issue and four pages of color photographs were added as a regular feature. Each issue began with "Foreword," a one-page column by Ted, in which he discussed the articles in that issue.

Ted was the first Editor to use modern computer technology to interface with the printer. Gone were the days when the printer created

typographic errors in scientific plant names, and the stage was set for much more efficient production .

Gwen Kelaidis (Vol. 48:1; 1990—present)

Gwen Kelaidis was appointed Interim Editor for 1990. She is well-qualified in botany and is an enthusiastic rock gardener. She holds degrees from the University of Wisconsin in German, botany, and science education and had worked as teacher, herbarium curator, landscaper, gardener, and seedsperson. She has served as president the Wisconsin-Illinois Chapter of ARGS and as secretary and newsletter editor of the Rocky Mountain Chapter. She was botanical editor of *Rocky Mountain Alpines,* and was very involved in the organization of Alpines '86.

Although not technically trained in editing or publishing, Gwen has written about penstemons for the *Bulletin of the American Penstemon Society* and contributed numerous articles to other horticultural publications. Gwen has also served as editor, board member, and president of the American Penstemon Society.

Gwen's first issue began with a new format including a return to the previous *Bulletin* dimensions, 16 pages of color photos, a total of 80 pages, a color painting on each cover, and a new design. Gwen is the first Editor who has delivered camera-ready copy to the printer without going through any outside typesetting process; she does the layout on a Macintosh computer and produces her own laser output, thus avoiding potential errors made by further handling of the text. No doubt this change has streamlined the production of the *Bulletin* and eliminated much frustration. The printer, Ag Press of Manhattan, Kansas, also handles packaging and distribution of the *Bulletin,* eliminating dealing with several companies.

Anita Kistler retired after 12 years as Business Manager/Advertising Manager after 1989, and Al Deurbrouck took over the duties of coordinating between advertisers and the Editor. An Editorial Advisory Committee was appointed to advise on policy matters. A dedicated group of proofreaders, Barbara and Ted Cochrane, Bernice Petersen, Panayoti Kelaidis, and Anne Spiegel read each issue to correct mistakes. Many talented artists have contributed line drawings.

In content, Gwen's work differs from previous editors in writing no editorial comments or column. Many of the issues produced under her editorship have had overall themes, from plants of California, to drabas, primroses, water in the garden, and even a special issue on garden paths. Book reviews and plant portraits are included as regular features.

In 1991, Gwen Kelaidis was recommended by a search committee and approved as Editor by an unanimous vote of the Board. She is the first Editor to work under a written contract, renewable annually.

Marnie Flook is Archivist of the ARGS. Buffy Parker, of Darien, Connecticut, served as Secretary of ARGS. Sections contributed by Buffy appear in italics.

Sedums as Foliage Plants

by Ladislav Hlavaty

Rock gardeners often use plants whose beauty is not confined to their time of flowering, but that remain attractive and eye-catching through the year, even when flowers are very scarce. Herein lies the real value of alpines and all other rock garden plants. Their decorative and distinct foliage, with its ample spectrum of colors, shapes, and textures changes during the year, always providing interest and subtle delights. Such plants are not always enough appreciated.

One of the large groups worth much more attention no doubt is the genus *Sedum*. Sedums are often dismissed as too common, everyday plants, too easy to grow to be a subject of interest or pride for any but the beginning grower. However, *Sedum* includes nearly 500 species growing over nearly all of the Northern Hemisphere. These are succulent plants with simple leaves of all imaginable shapes, from nearly round, clavate, conical, cylindrical, terete, or awl-shaped, to flat, rounded, shell-like, ovate, obovate, ligulate, lanceolate, linear, or spathulate. The margins of the leaves may be entire or variously finely crenulate and serrulate to roughly and remotely dentate. The colors vary from blue and glaucous through a whole range of green shades to rose, orange, red-golden, yellowish, tan, bronze, even to purple so dark that it is nearly black. And the leaf colors change over the seasons.

And it is important that nearly all sedums are indeed easy to grow. In any garden it is possible to find some species of these highly adaptable plants that will thrive. They seem to be ideal for all plant lovers, those who have very little time for the garden, as well as the specialist. So versatile and willing are these plants that a whole garden may be composed solely of members of this genus; there is at least one example of a very beautiful rock garden in the United States planted with only sedums.

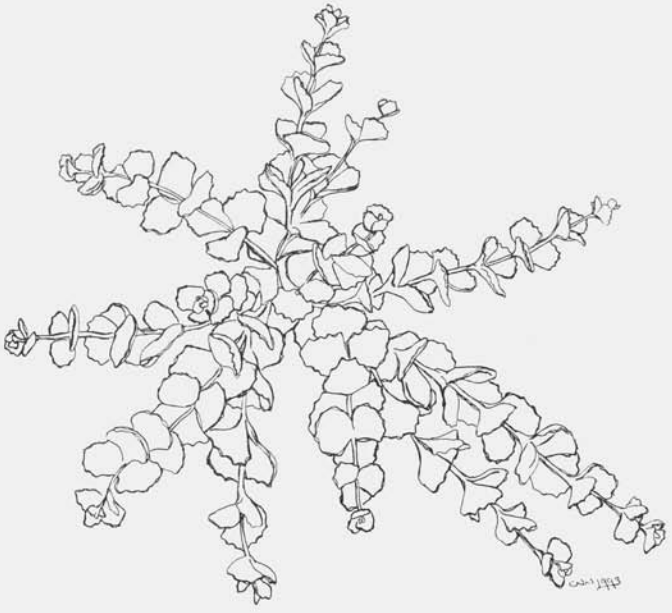
Really, since it is impossible to discuss more than a few species in a short article, I choose here several distinct ones that I love and consider beautiful. The tender and half-hardy species must remain for a later treatment. From a gardener's viewpoint, we can divide our plants into several groups.

Flat and mostly glaucous leaves of various shapes are characteristic for several plants:

Sedum cauticola is often cultivated, with its tufts of short stems covered with glaucous, obovate, blunt-tipped leaves, finely crenulate on each upper half. The leaves turn grayish blue or even purple when grown in full sun (photo, p. 222). The rich pink inflorescence in September is a bonus beauty of this modest plant, ideal for limestone and also for trough culture. Its variety *robustum*, deciduous (as is the type), is somewhat larger in all respects, but not less beautiful. Its home is Japan. Perhaps even more spectacular—I'd say so—is the Siberian *Sedum pluricaule*, known from Sachalin and northern Japan also. It is somewhat shorter, and its leaves, densely crowded on the suberect stems, are the color of raw meat when grown in sunny positions, while in partial shade they remain glaucous with distinct purple tints (photo, p. 222). Showy, vivid purple flowers appear here in July and August. This plant is also worthy of use in troughs.

Sedum sieboldii is another very popular plant, used even in hanging baskets and as a pot plant, but it is quite hardy even in our not-so-mild climate. When grown outdoors, it is deciduous, and the wintering caudex with buds for the next spring should be protected a bit. Otherwise, the flowering of the following season will be poor. It is not necessary to describe this plant, so commonly grown is it.

Sedum ewersii is also lovely and so well known as to be thought common. It originates in Central Asia and Siberia. The most usual form makes nicely green-glaucous, loose mats in late summer, producing a profusion of purplish pink flowers. Variety *homophyllum* is much smaller, never becoming invasive, and thus is more highly recommended for small rock gardens. There are several very promising new collections of this species from Central Asia.



Sedum sieboldii

In external shape, *Sedum anacampseros*, the high alpine European species, is similar to the previous plants, quickly forming an intricate carpet of glaucous rosettes on the tips of its stems. In winter, these become somewhat leggy.

Sedum spurium from the Caucasus and

Turkey, in its common forms is often used here as a groundcover in cemeteries and other public places. There are numerous cultivars with very distinct leaf colors. The very dark-leaved forms 'Bronze Carpet', 'Purpurteppich', 'Schorbuser Blut', and 'Erdblut' all have vivid carmine flowers. Other selections remain green all season, as for example the popular 'Green Mantle'. Newer to cultivation is 'Tricolor', with white, pink and green in stripes on each leaf. The young shoots are always vivid pink.

Perhaps it is worth reminding you even of *Sedum stoloniferum*, from moister conditions in nature. It is used as a very good and fast-growing groundcover among rhododendrons; it tolerates partial shade.

A great gift to alpine gardeners are two flat-leaved sedums from the American East, *Sedum glaucophyllum* and *S. nevii*. The first, green with only a hint of glaucous-gray, often turns to pale brown in summer or when grown under drier and sunnier conditions, while the latter usually remains pale glaucous. Both plants prefer moister places in the rock garden and a bit of limestone in the soil.

In the West we meet with the species of the alliance of *Sedum spathulifolium*, more jewels. While the typical plant has greenish-gray leaves that turn only slightly red in a hot sunny position, its selection 'Roseum' retains a purplish color all through the year. Subspecies *pruinosum* has more-or-less farinose leaves, silver as if powdered. This pruinose, waxy cover is very nice and present even in deeply colored types such as variety *purpureum*, which turns purple only during dry summers. The selection named after its collection locality on the Oregon Coast, 'Cape Blanco', is a tiny, really silver gem.

Sedum obtusatum, with its plump, tightly arranged, red-margined leaves is sometimes hard to distinguish from *S. oregonense*, another very lovely, slow-growing, tiny jewel seemingly especially created for small gardens and troughs (photo, p. 223).

Quite different is *Sedum oreganum*, with very glossy, fleshy leaves that turn from dark green to red or brownish red in some forms (photo, p. 224). It is an excellent, carpet-forming plant, now becoming very popular here, particularly in the colored selections.

Sedum debile, on the other hand, has ash-gray to silver leaves, on first sight reminding us of our familiar *Sedum dasyphyllum* of the Mediterranean, particularly in its more robust forms. It seems not to form large colonies or carpets, but rather buns to 6" across (photo, p. 224).

Another of its countrymen, *S. divergens*, reminds one in its leaves a little of the eastern, particularly the Caucasian, types of *S. album* when not in flower. It, too, is an excellent carpet-forming species, turning to dark bronze or red as the season draws towards winter. The terete or awl-shaped leaves of *S. stenopetalum*, particularly in young colonies, are very similar in outer shape—nearly semiglobular—to those of some saxifrages of the *Saxifraga juniperina* alliance.

But let us return to Europe now. The above-mentioned *S. dasyphyllum* is a very small plant, even in its most robust forms from northern Africa. Its basal, blue-glaucous leaves can be pale violet or dull rose in some forms. Its variability is perhaps endless! Small colonies of the various selections are welcome everywhere.

Another almost common species of great variability is *Sedum album*. The leaves vary from cylindrical to nearly rounded, but there are also types with nearly flat, plump leaves, each with a

significant groove. The color varies from pale green to very dark purplish-bronze, as seen in variety *murale*.

Sedum album var. *rhodopaeum* has very tiny leaves, almost round and pale, vivid green. The well-known cultivar 'Coral Carpet' forms low carpets an inch high and is a nice coral red when grown in a sunny place. Very nice are all types of *Sedum album* in the winter when colors of leaves are shining. To be fair, I must warn you that this species can be terribly invasive.

Sedum gypsicola from Spain is somewhat similar, its densely arranged leaves dull green and papilose, grayer in very dry conditions and sometimes even slightly red-tinged. It is a plant that does not form extremely dense colonies.

If you need to fill some flat spaces between stones in paths, try some form of *Sedum hispanicum* var. *minus*. It is—unlike the typical *hispanicum*—quite perennial, and it forms very nice carpets in a short time, usually no thicker than 2" tall. Two distinct forms are commonly grown, one turning to rose-purple and the other glaucous with a shading of turquoise blue. Neither type ever becomes weedy or as ubiquitous as the annual *S. hispanicum*. Very similar in appearance are *Sedum pallidum*, which often lives through the winter, and *S. bithynicum*, which is just as perennial as *S. hispanicum* var. *minus*. Both have green, glaucous leaves and are tiny plants; the latter has rusty, cinnamon red-brown stems rather than purple, that contrast nicely with the leaves. Despite the name *hispanicum*, these plants come from the Eastern Mediterranean region, with the most beautiful types from Turkey.

Another tiny plant from the same area is *S. lydium*, vivid green and only about 1" tall (photo, p. 223). The lower leaves often turn vermilion red in sunny places. This species prefers moist places and heavier soil in the garden. In all Europaen species just discussed, the flowers are white with pink shades added by the color of the carpels and the anthers.

I could remind you of many other excellent, tiny jewels such as *S. brevifolium* and the wide alliance of *S. anopetalum* and *S. reflexum*. And we must not forget another distinct group from the Far East, the species around *S. kamtschaticum*. These have flat, vivid green leaves of various shades, sometimes turning bronze, some forming large carpets as in *S. hybridum*, others only wide clumps of suberect, or ascending, or simply spreading, deciduous stems that are always densely leafy. Let us name *S. middendorfianum, S. ellacombianum, S. floriferum, S. kurilense,* and *S. sichotense*. There is even a variegated plant in this group, *S. kamtschaticum* 'Variegatum', its leaves green and yellowish white, the entire plant usually only 3"-4" high and about 6"-8" across.

There is one unusual species in this group: *Sedum takesimense* is an evergreen and quite hardy, medium-sized plant with vivid, grass-green, rhombic to widely elliptic and finely dentate leaves and yellow flowers in summer. It is endemic to the small island called in Japanese, Takeshima (which now belongs to South Korea and is named Ullung-do). It is an easy plant, growing quickly from seed and filling in its place, tolerant of more moisture than any other sedum. It is relatively new in cultivation.

Drawing by Cindy Nelson-Nold

Ladislav Hlavaty lives in Prerov, in the Czech Republic. He has been rock gardening for 31 years and has had a special interest in sedums for 20 years. He grows about 250 kinds, documenting his collections with his own photography.

1. *Seed will be accepted only until November 1, 1993.* Late-ripening seed will be accepted after that date if an alphabetical listing has been received before Nov. 1. Overseas members, please try to mail before October 15.

2. *Any amount of seed is appreciated. To receive donor privileges, submit a minimum of 5 different kinds of seed suitable for rock gardens.* Donors receive 10 packets of seed in addition to their basic orders.

3. *Send clean, dry seed as early as possible.* As seed continues to ripen, send several mailings. After your first donation, you will be issued a donor number. Please include this number with subsequent mailing. Do not use last year's number.

4. *Use paper envelopes no larger than 2" by 4" (5cm x 10cm).* One envelope this size filled with seed is likely to be suffi-

cient for our requirements. As few as five seeds of a variety will be accepted if the seed is very rare. Use separate envelopes for each kind of seed.

5. *Mark each envelope clearly and legibly with the botanical name in BLOCK CAPITAL letters.* If collected in the wild, please state the location where collected, altitude, etc. If only the genus name is given, please include a brief description, such as height and flower color. Please make every effort to verify the accuracy of the names.

6. *Make an alphabetical listing of the seed species sent.* If handwritten, use block capitals; typewritten lists are easier for us. Please submit the list on standard 8 1/2" by 11" paper with your name and address clearly printed on each sheet.

7. *Group envelopes alphabetically, checking to be sure that the seed envelopes sent match the list.* Secure the envelopes with a rubber band and enclose in a padded mailing envelope with the list of seeds.

8. *Be sure your name and address are clearly written on the outside of the mailing envelope. Ask the postmaster to hand cancel the envelope.*

9. *All members of ARGS will receive a seed list. Thank you for helping us to make this event an overwhelming success!*

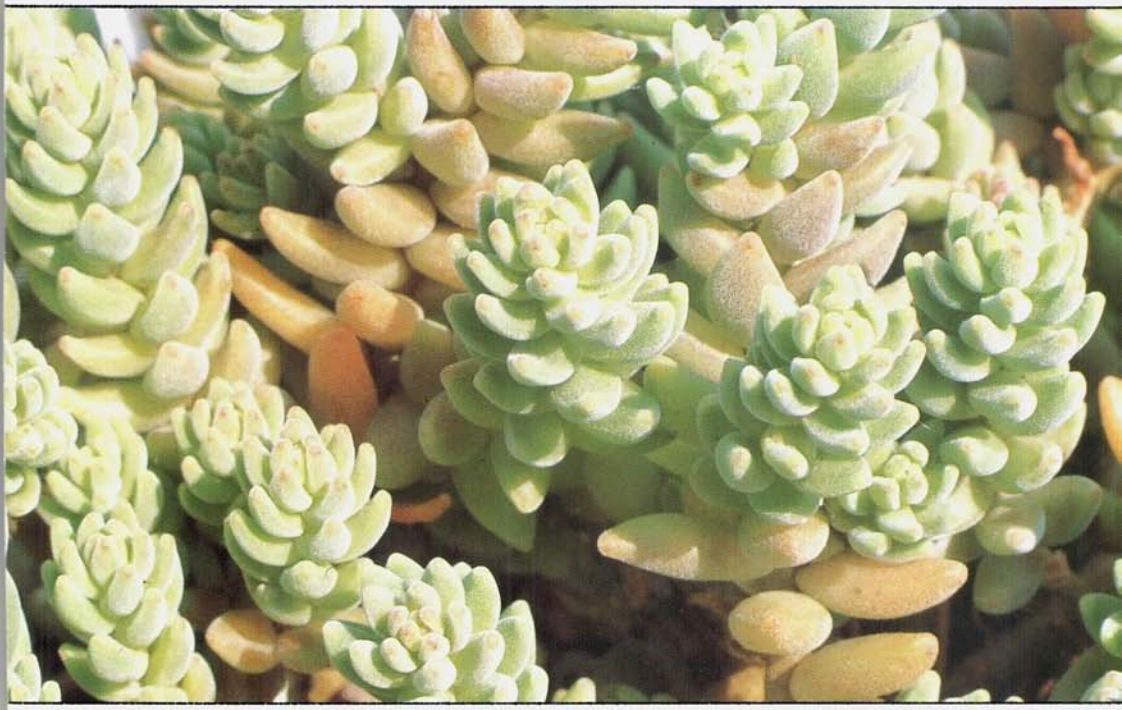
Mail Seed Early to:

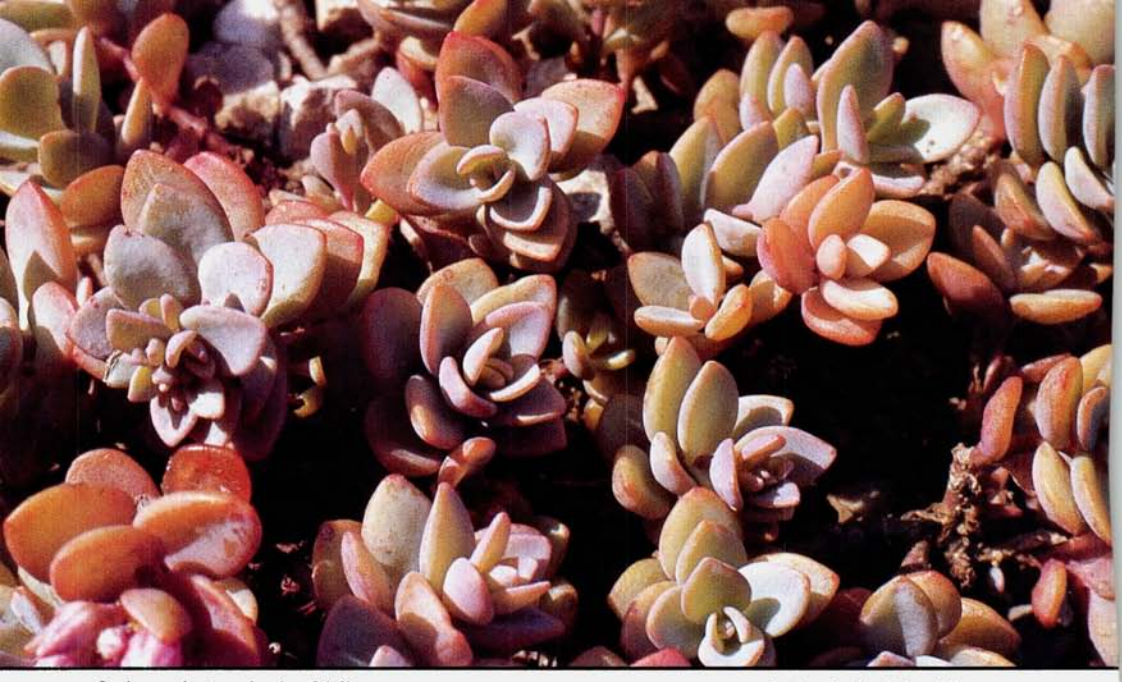
Pat and John Bender
Directors, 1993-94 ARGS Seed Exchange
4123 NE 186th Street
Seattle, WA 98155 USA

Sedum hispanicum var. *minus* (p. 218)

Sedum gypsicola (p. 218)

photos by Ladislav Hlavaty



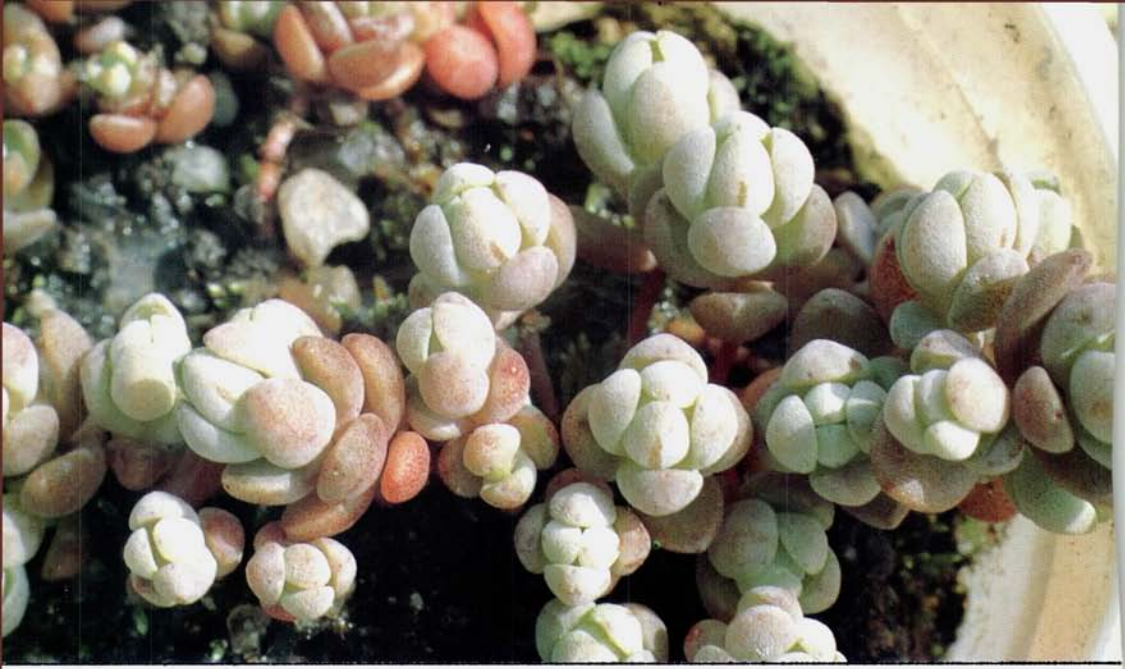


Sedum pluricaule (p. 216) photos by Ladislav Hlavaty

Sedum cauticola (p. 216)

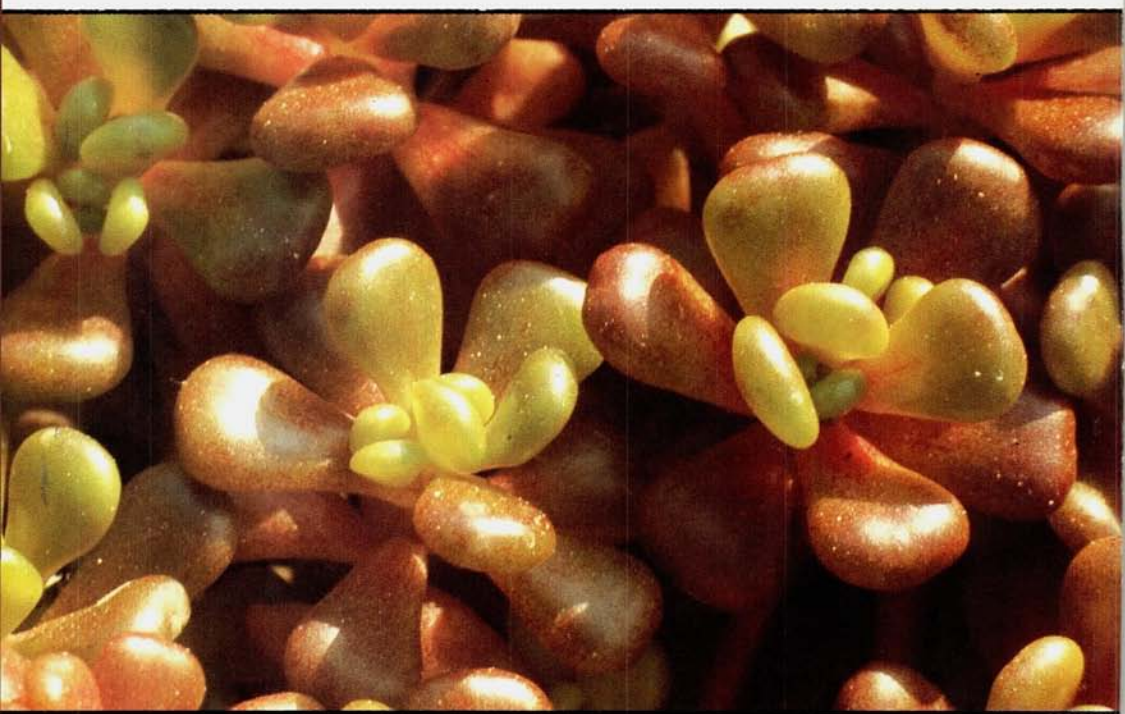
Sedum lydium (p. 218)

Sedum obtusatum (p. 217)



Sedum debile (p. 217) photos by Ladislav Hlavaty

Sedum oreganum (p. 217)



Propagation

From Germination to Garden for Beginners

by Ev Whittemore

Congratulations! There are new seedlings in some of your pots; you are now a parent—or caretaker—of little plants. Letting your seed pots dry out is a sure way of killing seedlings. It is now necessary to move your seedlings to constant full light, and the amount of water needed will increase as light intensity is increased and the seedlings grow. Use either an indoor lighting system, or, if the season is warm enough, put the seed pots out in the frames. Give enough light to grow sturdy seedlings with strong roots and healthy tops.

Successfully growing plants from seeds requires commitment. You cannot totally ignore seedlings, yet they are not perilously delicate. Remember that in nature new seedlings may be subjected to brutal winds, hot, drying sun, or intense cold. Any plant with protected roots and a top mulch will have an edge on survival, so think of building a sand frame in which to sink your pots.

Let your plants grow until the first true set of leaves shows. If you've been cautious and sowed your seeds in Burger King cups or 4" pots, you don't have to be concerned, since seedlings have a bit of room to grow before they outgrow the pot. If you are in doubt about when to transplant, consult a gardening friend.

Eventually you realize these seedlings should be moved into individual pots. Before you start transplanting (pricking off), get all your supplies together. Collect pots, labels, marking pen, mulch, a plant flat, and watering can. At this time, I introduce my plants to "real soil." No matter what your trough or garden soil consists of, certainly it isn't peat and perlite. Using peat/vermiculite or peat/perlite mediums may be risky, since such a mix can end up bone-dry within a day in hot weather. So prepare a potting mix by sifting damp top soil into your wheelbarrow and adding a few shovels of sharp sand or grower grit. Mix thoroughly.

Some growers prefer to have the seed pots on the dry side when potting up; others like the contents of the pot wet. I try to strike a balance, watering the seedling pots about four days before tackling the job. The medium is fairly dry and falls away from the roots more easily this way.

Being right-handed, I cup my left hand and turn the seed pot upside down in it, giving the bottom of the pot a sharp whack with the palm of my right hand. This usually loosens the contents and sends it into the cupped hand. Pray while doing this that you don't break any of the small, green plants. Occasionally, I will then gently drop the soil mix on its left side from about 4", to loosen the soil ball and free individual plants. Always guard against breaking roots by handling everything gently. No "bull-in-a-china-shop" work here, please. Be as careful as you can, since you cannot glue the roots back on the plants. It is best to handle the seedlings by the leaves rather than by the roots.

I find a sturdy plastic fork a useful tool to separate the plants. One day I broke off the two interior tines and found I liked that even better. Or use a pencil.

If the seedlings are small, and I decide to put two in each pot, I will tip the pot on its side and half fill it with planting medium, so the medium reaches top to bottom. Lay two plants side by side on the medium and continue adding soil mix until the pot is full, then bring the pot upright. Make sure the tops of the plants are not so low in the pot that they won't get air movement; I like the surface of the medium about 1/4"-1/2" below the top of the pot. A second way is to fill the pot with the soil mix, make a hole in the center, and place the plant in the hole. A third option is to fill the pot to the level to which you estimate the roots will reach down, hold the plant in the center, and pour soil mix around the roots to the proper level. Tamp the soil gently around the plant with a dowel, the bottom of a trowel, or your fingers, always watching not to exert too much pressure, so as to protect the roots. Only experience will show you what works in your situation. The next step, which I consider essential, is to mulch the top of the pot. Small rocks, granite grit, larger bits of rough sand—whatever—but do it! Roots will be cooler, evaporation will be less (you will not have to water as frequently), and weeds not a bother.

After a thorough watering, place the seedlings in a shady spot out of the wind for a few days until they have recovered from transplanting and adjusted to their new pots. Occasionally mist the top growth with water from a spray bottle—a clean window cleaner bottle is fine. Generally speaking, three to four days will be enough for the roots to reestablish and the tops to perk up, but use common sense in this step. If the sun is hot, or it is terribly windy, hold the plants a few extra days. Carelessness or laziness at this stage will result in dead seedlings.

Next, move the plants to frames, sinking them in sand, if possible. Or pack the pots closely together in a plant tray, lined on the bottom with newspaper. (Leave one side unlined so that the tray will drain.

Then wait four to six weeks, until roots start to show at the bottom of the pot. By then, the plants are actively growing, the nutrients originally in the growing medium are probably used up, and a feeding is in order. Some growers like to push their plants ahead by feeding earlier. Do what you feel is right. Osmocote is a good choice of slow-release, balanced fertilizer, Rapid-Gro or Peters can be used for liquid feed—try for a balanced fertilizer, unless you know those plants demand a special food.

Once the plants have put on substantial growth, they are ready for the garden. Some plants, like astragalus and townsendias, don't do well in pots and should be transplanted before they fill the pot. For most, it is fine to leave them until the tops reach across the pot. You can also pop the root ball out of the pot to check whether the roots now reach the sides of the pot all around. If not, just pop the plant back in. It is best not to wait until the roots start to circle the bottom of the pot! If you aren't certain whether plants are ready for the garden, ask a friend who has experience at this or take a couple of plants to a Chapter meeting. Never be too shy to ask advice. While you are at it, make sure you have garden-worthy plants and not useless weeds. A lot of seed is sent out mislabelled, and there is no point in further propagating mistakes. Ask a knowledgeable gardening friend who grows from seed if you have the opportunity at any stage after germination. Better before the work of potting up; better before planting out.

The preparation of the rock garden itself is a topic that deserves to be addressed separately, and proper preparation of the garden soil and design is the most important factor in whether your plants will ultimately succeed. Since you

want the best for your new plants, the effort is worth it.

Once you've decided it's time to plant, water your pots a couple of days before you plan to set them out. I don't worry about perfect weather for planting, but do it whenever energy, time, and the mood are parallel. Loosen the soil in a good-sized area surrounding the spot where the new seedling will live. I like to water the hole before I put the plant in—this settles the soil and puts moisture deep into the ground. Gently loosen the roots of each plant as you take it from the pot; never allow roots to remain in a ball at the bottom. Firm the soil around the plant gently, remembering you do not want to break roots. Water in, mulch, and water again to clean the leaves of any dust or soil. Unless it is a cloudy day, pop an overturned pot, box, or some other container over the plant. Lift this container with a rock or piece of wood on the side away from the sun, so the air doesn't become too warm underneath. Don't forget to label the plant. In a few days, you should be able to do away with the pot, but remember to watch for wilting and keep the watering can handy.

Much of growing plants from seed is common sense and learning by doing. Don't be discouraged by failures—we all have them—just don't give up easily. You didn't learn to drive a car in only one lesson, learn to read or write with one try, or dress yourself the first time. A constant effort and experimenting are the keys to success for a beautiful garden with many treasures grown from seeds.

Ev Whittemore gardens and gardens and gardens in Penrose, North Carolina. Her garden will be on the tour for the 1994 Annual ARGS Meeting.

—*continued from p. 176;* Waves of Bloom

someone lit a bonfire. *Zauschneria garrettii* starts blooming by the Fourth of July in hot years, but it isn't until the end of August that the remaining zauschnerias ignite. They can be virtually prostrate (*Z. californica* varieties), or robust subshrubs up to 4' tall (*Z. arizonica*). All thrive in ordinary loams or mineral soil and need only hot sun to do their best. They combine brilliantly with *Caryopteris* and stark white eriogonums, such as *E. niveum*, for a truly patriotic note. Where they do well, the zauschneria peak is a grand climax of the gardening year.

Some rock gardeners object to the pampered hybrid asters that blossom so heavily in the garden, finding them too chubby and full of floral flesh. But don't reject the entire genus. There are many native and exotic asters of more austere beauty that serve a similar purpose. Claude Barr's native selection *A. kumleinii* 'Dream of Beauty' thrives on neglect, forming a dramatic, cool pink counterpoint to the predominant reds and blues of the sunny garden. *Aster linariifolius* is an outstanding miniature from the Eastern States that thrives in a wide variety of sites and soils. Endless species of daisies ebb and flow through the summer months, and if we don't use them we lose out on some of our most brilliant possibilities.

A rather low goldenrod—*Solidago missouriensis*—arrived in the cleft of a giant granite boulder when the Rock Alpine Garden was constructed. That original clump has self-sown to a dozen or more localities throughout the garden. Although it can be weedy in a scree, along a path or confined in the proper ledge few plants are more artistic, with golden, foot-long wands splaying into the late summer air. For several weeks various species of goldenrods shimmer throughout the garden, providing an unplanned and now essential wave of color.

Late-flowering sedums are not to be forgotten: We think rose-pink *Sedum sieboldii, S. pluricaule,* and *S. ewersii* essential for late summer. Ivory-white *S. tatarinowii* is as beautiful in leaf and bud as it is in shimmering late July bloom.

September

Many rock gardeners forget that if you deadhead judiciously in the spring, many plants rebloom predictably in late summer. Sunroses (*Helianthemum*) are one example. *Salvia jurisicii* from the Balkans and *S. huberi* from Turkey both produce as heavy a September re-bloom as the initial flowering, if they are cut back in early June. The various color forms of *Salvia greggii* and related Southwestern salvias make a big splash in warmer gardens in September. Another genus of mints has assumed a major role in the Rock Alpine Garden in recent years: *Agastache* can grow to 2' or more in height, but the Southwestern species and hybrids of this genus have such showy flowers in a wide range of colors lasting so long in the late summer that they deserve a place in any garden. Bright rose-pink *A. cana* was the first to gain wide currency here, but *A. barberi, A. rupestris,* and many hybrids with the more tender *A. aurantiaca* and *A. mexicana* bring deeper reds, oranges, and near yellows to the September backdrop.

In cooler microclimates, several species of heathers and gentians are at their autumn peak, creating pools of aquamarine and amaranth.

October

By October the garden is awash with fall color, the yellows of dwarf willows and *Prunus,* the reds of dwarf cotoneaster and nandina brought to life with the first heavy frosts. The rocks are knit together with a tapestry of tawny groundcovers—red leaves of *Geranium dalmaticum, G. renardii, G.* x *cantabrigense*, the deep purple-maroons of the basal leaves of penstemons such as *P. hirsutus* and *P. digitalis*. The sempervivums regain their brilliancy. The last great crest of the gardening year for me is when beds of cyclamen come into prismatic bloom, and the cool blue goblets of *Crocus* and hot pink waterlilies of *Colchicum* surprise us with their sculptural and opalescent beauty.

November, December, January, February

Even in the darker months of the year there are always surprises and spots of brilliant color, from witchhazels in the background to the special winter-flowering bulbs, heathers, aconites, jasmines, and hellebores. In older gardens, snowdrops can spread quickly and create dramatic garden pictures in the woods, covering the forest floor with dancing white bells. *Chionodoxa, Anemone blanda,* or various *Scilla* can quickly create blue ponds of color where they naturalize, and a bed of winter heathers always brings a long season of delight.

Through the year, a rock garden is a setting where wave after wave of color glimmers and flows through the rocks—sometimes more vividly, and other times in softer, subtler ways. Plan and plant for these successive surges, and your rock garden becomes an extraordinary work of art, with intensity that flows across the calendar year.

Panayoti Kelaidis is curator of the Rock Alpine Garden at Denver Botanic Gardens.

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