Bulletin of the

American Rock Garden Society

VOL. 46 SUMMER 1988 NO. 3

BULLETIN OF THE AMERICAN ROCK GARDEN SOCIETY

CONTENTS VOL. 46 NO. 3 SUMMER 1988

CALENDAR OF COMING EVENTS

Annual Meeting (Columbia-Willamette Chapter)
Rippling River Resort, Welches, Oregon . . . . . July 29–31, 1988
Eastern Winter Study Weekend (Allegheny Chapter)
Pittsburgh Hilton . . . . . January 27–29, 1989
Western Winter Study Weekend—Vancouver
(Alpine Garden Club of British Columbia) . . . . . February 1989
Annual Meeting (Delaware Valley Chapter)
Wilmington, Delaware 1989

Cover: *Veronica liwanensis* and *Galium (Asperula) odoratum* (p. 124)
Andrew Pierce, photographer

Published quarterly by the AMERICAN ROCK GARDEN SOCIETY, a tax-exempt, non-profit organization incorporated under the laws of the state of New Jersey. You are invited to join. Annual dues (*Bulletin* included), to be submitted in U.S. funds or International Money Order, are: General Membership, $20.00 (includes domestic or foreign, single or joint — two at same address to receive one *Bulletin*, one Seed List); Patron, $50.00; Life Member (individual only), over 55, $300; under 55, $350.

Membership inquiries and dues should be sent to Buffy Parker, 15 Fairmead Rd., Darien, CT. 06820. The office of publication is located at 15 Fairmead Rd., Darien, CT. 06820. Address editorial matters pertaining to the *Bulletin* to the Editor, Sharon Sutton, P.O. Box 1371, Port Townsend, WA 98368. Address advertising matters to Anita Kistler, 1421 Ship Rd., West Chester, PA 19380. Second Class Postage paid in Darien, CT., and additional offices. Postmaster: Send address changes to *Bulletin of the American Rock Garden Society* (ISSN 0003 0864) 15 Fairmead Rd., Darien, CT. 06820.

VOL. 46 SUMMER 1988 NO. 3

Bulletin of the American Rock Garden Society

Heavenly Mountains – Ala Dag

Zdenek Zvolanek
Prague, Czechoslovakia

Turkey has always been the Promised Land for collectors of bulbs. Few rock gardeners have visited there and most who have, visited in the last 10 years only. It is interesting that all of them keep any information to themselves and even in foreign rock garden bulletins, as far as I know, an extensive article about the region has yet to be published. Even pure travel information is very skimpy: one mountain climber proclaimed at a lecture for Prague rock gardeners that to undertake a trip to those parts by only two people would be dangerous.

In planning our trip with Josef Jurasek, we tried to locate a mountain above 3000 m high yet some distance from the sea, sensing that the least frequented alpine regions are those far removed from the nearest road. We

decided against taking a tour to Ercilas Dag at Kayseri (3916 m), a mountain of volcanic origin, and gave preference to one of limestone in order to find richer and more varied flora. We rejected the idea of traveling into the eastern part of the country because of difficult transportation and because of insufficient information on the composition of the local mountains. So we chose the central part of Taurus.

The best authority on Turkish mountains today, from a rock gardener's point of view, is Jim C. Archibald of England, a professional collector of seeds. We turned to him with lots of questions and his information made us confident of success in our mini-expedition. There was considerable delay in securing our documents, so that we did not depart in the middle of August, but on September 5, with a Turkish visa for two weeks only. These restrictions proved to be an asset, for by choosing Ala Dag in the province of Nigde, we were just in time for ripe seeds.

The trip to central Taurus by train is unpleasantly long. We left Prague Friday evening. After some refreshments in Bulgarian Plovdiv, we boarded a train Sunday before midnight, which although called an express did not act like one at all. By Monday afternoon we arrived in Istanbul and after crossing the Sea of Marmara took off by another slow express for the provincial town of Kayseri.

While traveling for 26 hours in a coupe filled with country people, we were given the opportunity of learning about the Orient at first hand. Tuesday evening we drove by bus from Kayseri to Nigde where we slept in one of the plentiful modest hotels, then boarded another bus in the morning after a rude awakening by roaring loudspeakers carrying chants from minarets to all worshipers.

Jim Archibald was right. The Turks are extremely hospitable and kind people. Always at a critical point, some young English-speaking man would appear and offer us valuable information. On the bus to Camardi we met four students from Istanbul who planned to cross Ala Dag. One of them advised us to get off the bus at Cukurbag and to seek out a man there who acted as a mountain guide to foreigners and who had maps. God's Providence worked again. As we left the bus, there he was, the sought after guide, sitting on a motor bike and offering his services to us. He was Cavit Safak, a teacher of German language down at the coast, who for the 3 summer months lived with his parents in the mountains. He was able to speak English with us. Cavit was hired for a day for 5000 Turkish lira (about $6.00). This entitled us to see his collection of pressed alpines, slides, and correspondence with foreign mountain climbers. We dined with his family twice, kneeling fashion, and slept there on rugs. We became friends fast and presented him with a Fufi film which left us with only three for our slides.

On Wednesday afternoon we made a quick trip with Cavit's brother Hasan to the base of Ala Dag and demonstrated to him how excited rock gardeners can get over new plants and how fast we could collect seeds. Next day a donkey was loaded with our backpacks to take them up to the water springs at about 2300 m. There we were given a sketchy map, drawn by some Italians, with a wish for us to enjoy our 8 day stay in the mountains.

Our first intimate encounter with Turkish flora began on a mountain steppe in the northern half of Ala Dag between the village of Cukurbag and the highest mountain Tazru Demirkazik (3756 m). There the plants had to endure a very hot, dry, and scorching summer and take rest under snow cover of a hard continental winter. The dominant plants were armed with prickly to treacherously thorny stems and leaves, a protection against the appetites of numerous herds of sheep, goats, and cows. The seed collector, willing or not, turns into a fakir. The highest bushes were the half–meter–high *Berberis crataegina.* Trees and snakes were found only in the vicinity of villages and in their gardens. The most abundant plants were species of *Astragalus,* the best of them, without a question, only 8 cm high, woolly and silvery, with hidden thorns and low set flowers. Another was reminiscent of slightly more robust *A. angustifolius* and a third, the largest one, had pronounced clumps of hair around the pods. These plants were chopped up and stored as fire wood.

Up to the elevation of 2000 m grew the compact silvery *Acantholimon venustum* var. *venustum,* with flowers only half the height of the variety cultivated in our gardens, *A. venustum* var. *laxiflorum.* But the most desirable and a temptation to all rock gardeners were the local woody bindweeds. *Convolvulus compactus* is a close relative to European *C. boissieri* var. *compactus,* rarely found in Greece and one of the most beautiful of shrubs. It has tiny silvery leaves and, as the Latin name suggests, the whole shrub is densely compact. The large flowers are white and low set. Rare and attractive, this convolvulus is priced at $6.00 for five seeds in Jim Archibald's catalog. Also compact but forming tight and hairy mats was *Convolvulus lineatus* var. *angustifolius.* The seed pods were sitting directly between gray–green leaves and that is where one would see the pink flowers. Some of the plants had strongly twisted stems, thick as a thumb.

Daily the sun was bearing down on us, giving me such a sunburn I had to walk around covered as a Tuareg. The dry air gave us a perpetual longing for water. In the 8 days of our stay only once did the sky cloud over and mist for about an hour. During our stay the crocuses began to bloom on the steppe, some a pale violet and others a nice dark form of *Crocus cancellatus* ssp. *cancellatus* . But there were also other flowers: lovely low set heads of creeping *Pterocephalus pinardii,* and the orange–flowered biennial poppy,

Papaver tauricola. The local steppe was stony and the plants which grew there did not intertwine.

The nights were quite cold, which was refreshing for the plants, but we were forced to take refuge in our sleeping bags shortly after sundown when the wind began to blow.

A very pretty plant at 2000 to 2500 m was *Aethionema glaucescens,* formerly *Iberis glaucescens* or also *Crenularia glaucescens.* It is a miniature shrub resembling a bonsai because of its strongly developed trunk with seed heads on stems 1 to 2 cm long. Together with this shrubby type also grew *A. oppositifolium (Eunomia oppositifolia)* with even more compact and stiffer leaves than the one known to us from cultivation. It grew up to 3500 m. For the orthodox alpine gardener there was an *Asphodelus* species with lovely compact clumps of leaves, but with stems 20 to 40 cm high, making it less desirable. Also there was *Stachys citrina* ssp. *chamaesideritis* which has very decorative woolly leaves but will not attract owners of small rock gardens because in bloom it reaches up to 30 cm.

On small rocks of hard dolomite at that elevation grew *Galium cilicicum* var. *rubiaceae,* a diminutive plant reminiscent of the genus *Asperula.* Its stems get woody at the base, its flowers are white, and the leaves lush green. An almost identical plant but with grayer leaves occupied cracks of rocks and stony fields at 3000 to 3400 m. Another occupant of those rocks was a tiny draba, probably *Draba cappadocica.* On rocks protected from rain throve a small asperula somewhat similar to the Greek *Asperula arcadiensis* with its silvery leaves. Closer to rocks were shrubs of *Daphne oleoides* with leaves slightly different from those of Bulgarian Pirim.

There were new and interesting alpines right after we crossed the summit at 2400 m. On the northern slope, in soil without a trace of humus, grew unusual centaurias. One, *Centauria chrysantha,* had rosettes of sparkling white, wavy, lyre–shaped leaves forming rug–like colonies with yellow flowers tightly set and surrounded by long thorns protruding from basal leaves. The small compact broom, *Genista albida,* a dweller of rock crevices, grew very sparingly with thick ground hugging stems and branches only about 2 cm long, forming colonies up to 20 cm wide. We were surprised to find rosettes of fleshly succulent leaves belonging probably to genus *Rhodiola.*

A grassy growth of another *Galium* species, *G. cappadocicum,* looked promising. Supposedly it has yellow–green or purple tinged flowers. We were in time for a little known sun rose, *Helianthemum canum,* also called *H. oelandicum* var. *panicillatum.*

But a long enough time was spent in company of the steppe population, and we looked in anticipation to the highest peaks of Allah's Mountains, forming a magnificent panorama. The most difficult ascent of my life thus

far was to take place. Try to understand, this is an alpine gardener, of non–sporty type, 45 years of age, slightly overweight, not acclimatized, hungry, exhausted by heat and his 20 kg backpack, after a few hours of ascent, gets very heavy and so do his legs. While taking frequent rests, I enjoyed the sweet black fruit of low growing buckthorn, *Rhamnus fallax* (syn. *R. alpina* ssp. *fallax*) and looked with pleasure at a neat centaurea with yellow flowers. You try to identify it — there are some 150 different kinds growing in Turkey. On the rocks, cushions of saxifraga began to appear, known to us Czechs by the popular name of "stonebreakers." This one, *Saxifraga kotschyi*, breaking the heart of Dr. Horny because the only specimen in cultivation is in Edinburgh. I watched them with increasing apathy, the same with *Omphalodes luciliae* ssp. *cilicica,* pale blue flowers on tall stems, giving preference to shady cliffs.

The ascent was endless. I would climb for a while and then rest lying on gravel, observing my younger companion, dear Josef Jurasek, diligently collecting seeds, now squatting, then bending or kneeling, his knapsack always on his back. As we reached about 3300 m, the day was drawing to a close and we caught a glimpse of about half a dozen snow cones crowning some outcrops not far off. Here I fell to the ground and refused to go on and let Josef graciously revive me with water melted from chipped ice.

Next morning the climbing did not get any easier. I had to rest frequently. Josef never stopped collecting seeds. This time there was a beautiful small variety of *Lamium* with curious leaves and fairy–tale pink flowers; the seeds were large and had to be emptied into a bag. My return to life was unexpectedly fast as at about 3550 m a 2–m–long waterfall appeared in a scree. All around it on cliffs were neatly formed cushions reminiscent of dionysias or of Aretian androsaces. The seed pods were just a few mm above beautiful woolly rosettes which made it clear to us that though we lost *Draba acaulis* in the fifties, it will again be restored to cultivation.

The saddle between the second highest peak (Kyzylkaya, 3725 m) and a third (Engin Tepe, 3723 m) was at about 3600 m. There we discovered a particularly lovely, half woody cinquefoil, not more than 15 cm high with good–sized pale yellow flowers. There too, the seeds were plentiful on this elegant, stemless alpine of the group. Josef, full of conquering enthusiasm, swiftly climbed up and down Engin Tepe (myself somewhat slower the next day). From there we continued to descend to a plateau, Yedigoller, meaning Seven Lakes. There on the north slope a profusion of dark pink flowers covered the growth of *Acantholimon ulicinum,* the insignificant color form of which we propagate under a wrong synonym, *A. androsaceum.* The white flowered *Arabis caucasica ssp. caucasica* was pretty, a much smaller form than those we cultivate.

I must admit that what charmed us there was a scree–dweller penny cress with pink flower heads, *Thlaspi sintenisii,* which can challenge the Balkan *T. bellidifolium* as well as the alpine *T. rotundifolium.* The lakes were almost dried out and the grass still not recovered from waves of heat and sheep, but it was very comfortable to sleep on. In the morning Josef, our collector of small gentians, saw between clumps of grass some kind of small leaves. He dug them up, broke them and found the roots to be bitter tasting. It will be up to him to decide between *Gentiana verna* ssp. *pontica* or G.*verna* ssp. *balcanica,* which has a similarly narrow basal–leaved rosette.

Assuming that nothing more of substance awaited us on that mountain section, we walked back to the southern slopes of Engin Tepe. There we spent the night on carefully raked rock chips and in the morning began diligently searching and collecting. Principally we looked for the tiny seed heads of miniature *Erysimum caricum,* supposedly with pale yellow flowers. At that elevation erysimums grew more robust and what we found could very well have been *E. kotschyanum.*

Exceptionally pretty alpines grew on rocks and stony fields at 3300 m. First of all was rock jasmine with diminutive elliptic rounds of leaf rosettes and with seed pods on very short stems. The presence of short reddish–brown projections tempted me to assume that the plant at hand may have been *Androsace dasyphylla* rather than *A. villosa* var. *congesta.* Another miniature growing there was *Alyssum propinquum,* forming 20–cm–wide silvery carpets with flowers and foliage not more than 1 cm high. Typically gray, short, pointed leaves were sighted on small cushions of *Dianthus brevicaulis* ssp. *setaceus.* There one could find many plants with flower stems up to 5 cm high yet some also over 10 cm. When in bloom the flowers will most likely be smaller and of deeper shade.

It was a pleasure to meet the dark form of *Veronica caespitosa,* which although an old friend of our alpine gardens is seldom seen in cultivation. In those mountains it grew only between 2800 and 3300 m on stabilized screes, stony fields, and rock crevices, often forming mats 40 cm wide and reaching up to 2 to 3 cm including seed pods.

Among very decorative shrubs of the region belongs *Onobrychis cornuta* (Leguminosae), forming precisely circular prickly mounds up to 70 cm in diameter and up to 30 cm high. The leaves are elegantly shaped and in shades from green to blue–gray with sharp thorns. They are rough, especially if you pitch your tent over some seedlings. The shrub hides its carmine flowers between thorns, thus making the seed collecting difficult. Josef solved the problem by gently bending the dear shrub down and then looking for the round flat pods underneath. Other representatives of this family were a hard to identify species of *Oxytropis* and a creeping, pink flowering *Anthyllis*

species. Here and there we could admire lush green clumps with clear yellow flowers only 4 cm high, obviously belonging to the genus *Scutellaria.* Yellow flowering too were bushes of hypericum with curiously shaped leaves, but we considered 30 cm too high to be suitable for rock gardens.

The mountain of Engin Tepe consisted of large rock ledges suitable for walking. Growing there were small rosettes of sempervivum in pale green color, all shriveled by drought and looking as if wrapped in tissue paper. About five species were written of a relatively short time ago in Turkey so I hesitate to state that we found *Sempervivum brevipilum.* Regrettably, we omitted to take a shoot from between the ledges of a fine diminutive cinquefoil, *Potentilla pulvinaris.* It has white felt–like leaves with flower stems only 1 to 3 cm high. There were no seeds, so it will be up to a different collector.

Yet from the Turkish Kabschia, *Saxifraga kotschyi,* which grew in crevices protected from the south and west, we brought back plenty of seeds. We also collected seeds of small *Arenaria ledebouriana* var. *ledebouriana,* plants with woody stems and short prickly silver leaves. The flowers on 10 to 15 cm stems are white.

Descent on steep gravel hillsides was rapid by jumping and sliding down the hill.

We managed a one day trip to the southern half of Ala Dag. To reach the tree line was very demanding, so before the last valley I watched over our equipment while Josef reached the goal. There they were, the evergreen *Abies cilicica* ssp. *cilicica,* vanishing slowly because they are used as firewood. We heard that the Turkish government is considering the possibility of declaring the region of Ala Dag a national park. This then could stop the devastation. In the southern part the grazing of sheep is intensive, so that in lower regions, those plants surviving are only species of *Acantholimon, Euphorbia, Rosa, Astragalus,* and other coarse alpines.

The scenery around Mount Kaldi Dag (3688 m) was tempting but our time ran out. We heard about a bus from Nigde to Istanbul that made the trip in 11 hours, so we dropped the tiresome train journey. On through the night we went, with three stops for tea. We slept some on the bus and had our last day for sightseeing in Isanbul with its, novel for us, business rush.

It would be hard to say if I will ever return to those heavenly mountains. There is a great longing driving us to explore other parts, yet the two of us know that in the year 1988 we shall climb the Turkish mountain Kackar (3937 m), not far from Batuni.

The MacPhail and Watson Turkish Veronicas—A Symposium

(In 1977 John Watson brought off his third Turkish collecting expedition and as a volunteer I set off with him immediately following the Chelsea Show in May to commence the reconnoitering. After a mere 2 days in the field, however, I was forced by illness to return, and an SOS to Jim MacPhail brought him flying as my replacement. It is therefore as an onlooker I must regard the endeavor, yet I remain intrigued by all I missed and fairly envious of the results. At Denver Botanic Gardens for example I was quite struck last summer with an assemblage of veronicas gathered for evaluation from various growers [for the rock garden there was nonexistent in 1977]. Correspondence allows this report of five species: Veronica orientalis ssp. orientalis, V. thymoides ssp. pseudocinerea, V. caespitosa, V. kotschyana, *and* V. liwanensis, *introduced or reintroduced by the MacPhail and Watson Expedition. All were identified by number on the seed packets. Seed was distributed in the United States and Canada in 1978, following storage in refrigeration.)*

Roy Davidson, Coordinator
Seattle, Washington

It may sometimes seem exasperatingly long before the results of a plant expedition are made known, not merely the list of gleanings, but an actual evaluation. It just takes that long to assess and compare, and even then the results may never reach publication, thus implying that nothing of any value was gathered. This is assuredly not the case with the MacPhail and Watson 1977 trip to Turkey.

Turkey has been, of course, an incomparable source of good garden plants especially for hot, dry climates since before records were kept. It is rather remarkable that new finds are still being made, and remarkable, too, that these five essentially or totally new species have succeeded in a breadth of garden climates.

Veronicas, while intimately variable (and mostly blue flowered), are by and large easily recognizable and very distinct from most other Scrophular relatives. Although these five little Turkish species do not present any startling distinctions, each has its own appeal. The following contributions from growers and from the germination records along with Watson's brief field notes attempt to describe and evaluate their qualities.

Betty Lowry (Western Washington) and Mark McDonough (Washington/ Massachusetts) have had the enviable success of maturing all five: Betty Blake (Michigan), Panayoti Kelaidis (Colorado), and Anita Kistler (Pennsylvania) have also contributed by both garden skills and written reports to which have been appended some further notes of recent collections of Turkish

veronicas, all described in Vol. 6 of *Flora of Turkey,* Davis, 1978.

Betty Lowry writes, "Gradually, over the years, most of the plants from MacPhail and Watson's 1977 gatherings have been lost here, but not the veronicas; all five are still with me...five totally distinct small species probably scarcely in cultivation prior to this expedition, if at all. Only three have proven themselves in the open garden, all having been tried in the various sunny scree locations, but I still have hopes of establishing the other two as Mark McDonough has been able to do, without overhead protection of frame or alpine house. As the field notes indicate limestone crevice habitats, they will be tried there once I have the crevice garden built. Failing that, *Veronica thymoides* ssp. *pseudocineria* and *V. caespitosa* are certainly first class alpine house material. After a couple of false starts, the tricky white-leaved *V. bombycina* has been coaxed into accepting our cold-wet winter conditions, so why not these as well?

"All of the five are relatively easy to increase from cuttings for experimentation in the garden. They have not seeded other than a scant harvest on one occasion from *V. liwanensis.* The rather sparse flowering undoubtedly results from my failure to feed them; the scree must be exhausted by now." (And, of course, flowerless plants don't provide seed!)

Mark McDonough notes that all of these veronicas, "are hardy in zone 5 New England winters. Only *V. liwanensis* and *V. orientalis* ssp. *orientalis* are resilient in soggy winter conditions to persist through a Seattle winter. All five can be grown in New England out of doors, although those mentioned as being more difficult are still probably best if protected."

Veronica orientalis ssp. ***orientalis*** Mac & W 5835

(Field notes: shrublet, to 9 cm; dark blue; limestone banks, outcrops, 1750 m) Three of five American growers reported germination.

Blake: Linear gray-green leaves 1/4 to 3/8 inch long on decumbent stems undulating outward, with upright racemes of small clear blue flowers barely above the 6-inch plant, yet clearly visible and with occasional repeat flowering. Original plants are still thriving and an occasional seedling appears. Though small and attractive enough, only a "second-class treasure." It prospers in nearly full sun at the top of a wall with limestone chip mulch and would benefit from a severe clipping following the bloom.

Kelaidis: Sprawling to 8 to 10 inches with tiny hairy blue-gray leaves and good clear blue flowers covering the plant over a long season. Will attain a foot in width and 4-inch height in three seasons. Wouldn't want to be without it.

Lowry: A garden–worthy shrubby species reaching only 6 to 7 cm here in rich scree in full sun; small revolute leaves are gray–green, flowers mid–blue. Growth and flowering were better at first, vigor and floriferousness decreasing after several years.

McDonough: Sprawling woody based "shrublet" to 6 inches high by 18 inches across. Tends to die out after a couple of years, but easily propagated from cuttings. Leaves are hoary, very small, narrow, linear, with revolute margins, faintly toothed at the apex, grayish–green. Flowers in loose cymes, brilliant dark blue with white eye, smallish blossoms. Can be covered with blooms, yet not as showy as *V. liwanensis*. Good for a dry, sunny location in a raised bed or trailing from a wall. Will tolerate full sun and considerable drought, although more lush if receiving more water.

Overall appearance is that of a loose tangle of stems, rather scantily clad in small foliage, with a good sprinkling of flowers. Not spectacular, but worth growing. Easy to grow, resistant to winter wet, very hardy and dependable bloomer in both Western Washington and Massachusetts gardens.

Veronica thymoides ssp. ***pseudocineria*** Mac & W 5840
(Field notes: 1.5 cm; dark blue; crevices in limestone pavement and outcrops, 2000 m) All four receiving seed reported germination.

Kelaidis: At Denver Botanic Gardens this silvery–white–hairy species slowly builds up to a 7–inch mat only a half–inch high in less than 3 years. The flowers of pure azure continue over a long time. The die–back is not so noticeable as in some. Superior.

Lowry: On the basis of habit and color impact, this is my favorite! The small revolute leaves are finely puberulent, giving a pale gray matte appearance. The white–eyed dark blue flowers make a stunning picture with the silvery foliage. It flowered only once, the second year from seed. A dwarf plant, not exceeding a few cm and forming a loose cushion when pot grown. I have not succeeded with this in scree or pumice beds in the open; it has been maintained in a frame.

McDonough: A choice scree subject, or suitable for growing in troughs, pans, or the alpine house. As choice and difficult as *V. bombycina*. Foliage is covered with a greyish white felt. Mat forming, never larger than 1 inch high by 8–inch spread for me. Very clear brilliant blue flowers contrast beautifully with the foliage. Flowers produced in very short clusters close to the foliage.

Reliably flowered each year, however very difficult to winter over—particularly in Seattle. Must be kept dry in winter. Some plants did survive unprotected in Seattle, but suffered considerable die–back. Container culture recommended. Cuttings will root slowly, and are difficult to re–establish. A very fine plant worth cultivating in the alpine house, or protected cold frame.

Veronica caespitosa Mac & W 5849

(Field Notes: Tight mat or cushion, 0.5 cm; pale to medium blue; limestone crevices, 2350 m) Five of the six planting seed got germination.

Kelaidis: The literature informs us this should be pink, but what we have (from Betty Lowry) is a luminous synthyris–blue with all the charm of an eritrichium. The huddled foliage remains nice after flowering. One of the top 5% of all the alpines I've grown (maybe in the top 2%) and just a shade behind *V. thymoides.* Grows 1 inch by 5 inches in 2 years. Superb for a trough.

Lowry: This choice cushion plant bears long white hairs on its green leaves, giving a woolly gray–green appearance; pale blue flowers, seen here only once. This has failed in our scree beds so far, and has, therefore, been kept in a frame. Stunning as grown at Denver Botanic Gardens.

McDonough: A tiny "bun" forming plant, a concise rounded mound 1/2 inch high by 3 inches around in several years. Tiny linear leaves are covered with stiff bristles, leaves are revolute. In 6 years, it has never flowered. Will survive winter wet in Seattle winters although suffers die–back, better with protection. Grown in very lean scree conditions and in containers. Plants in containers grew better as they were afforded winter protection from the rain. Too difficult and not free flowering enough to recommend except to the collector. Flowers are listed as being pink. Propagation by cuttings is possible but slow.

A Czechoslovakian expedition to Ala Dag in Turkey, conducted by Jurasek and Zvolanek in 1986, made a collection of *V. caespitosa* and of another as yet unidentified, with small silvery leaves, perhaps one of those here described or perhaps another, and even better, new species.

Veronica kotschyana Mac & W 5906

(Field Notes: Shrublet, 6 cm; blue?; around limestone outcrops, 3100 m) All five of those who planted seed got germination.

Kelaidis: Probably the worst of the lot, but still love it! Forms a tidy mat of woolly leaves and woollier buds that eventually have small blue flowers peek-

ing forth; not showy, but a plant with wool so dense it must rate "Good" and that tells how the others stack up.

Lowry: Grows well in rich scree in full sun; only about 6 cm high. Its characteristic look results from the distinctly four–ranked green leaves which carry sparse long hairs on sterile shoots. The tips of flowering shoots bear densely arranged leaves with copious long hairs which impart a shaggy–wool appearance on close inspection. From this wool emerges a nearly capitate inflorescence of tiny lavender–blue flowers. By no means is this showy, but it can be said to be interesting and distinct; it has been called cute!

McDonough: Short sprawling stems with small green leaves, with soft bristles at the leaf margins. Stems densely clothed with leaves, with short terminal clusters of purplish flowers. Not very distinguished, and rather difficult to grow. Particularly sensitive to winter wet. The largest plant I've grown is 4 inches tall by 8 inches across. Perhaps the least interesting of the Turkish veronicas, although small enough to consider growing among other alpines. Cuttings will root reluctantly with bottom heat.

Veronica liwanensis Mac & W 5936
(Field Notes: none given) All six who planted seed got germination.

Blake: This is the real treasure, a wonderful ground cover with beautiful leaves, large blue flowers, and "civilized" habit. In the high and dry Denver area this promises to be an almost incomparable success, particularly as a bulb cover, rapidly effective and striking in flower.

Kelaidis: This is one of the forthcoming indispensable ground cover subjects for the Great Plains–Denver area. It will reach 20 inches in one season while still only a quarter–inch high. The lustrous thyme–like growth takes on purple tints with cold. Whole masses of cobalt–blue flowers knock your eyes out for all of 2 months.

Lowry: A rapidly spreading plant, easily grown. Mine is on scree in full sun. Other richer sites are being investigated, but I have not as yet seen the flowering performance. Prostrate shoots are clothed with bright green, slightly toothed, round leaves, rooting down to form a flat mat from which bright blue flowers appear on short spikes. Not always floriferous on the screes and too rampant to be trusted among less vigorous alpines. Has at least once set sparse seed. Note that John Watson did not include this among the choicest saxatile and alpine collections; perhaps it is not a true alpine species. As

a ground cover plant, this should be superb, but it is among my least favorites, perhaps only because it is so easy?

McDonough: Undoubtedly to become the most widely grown and favored of the Turkish veronicas. Of landscape constitution. One of the best plants to come into recent cultivation. Will grow in almost any conditions, including a shady site. In sun, growth is flat, 1/2 inch high and capable of spreading 2 to 3 feet in a few years. Stems trail along the ground and root occasionally. Leaves are small, rounded, with small teeth on the last half of each leaf, smooth and glossy, looking like a neat *Penstemon davidsonii.* In spring, myriads of short clusters of relatively large brilliant sky–blue flowers appear on thread–thin 2– to 3–inch stems, each flower with a sparkling white eye. Leaves turn reddish purple in winter. Excellent potential as landscape material and as a ground cover, yet not so vigorous as to preclude its use among the choicer alpines in the garden. Seems impervious to habitat, exposure, frost, etc. Propagation is by cutting or the simple division of the rooted mats.

The Denver Botanic Gardens' plant of *V. liwanensis* originated as a seedling grown by Mark McDonough via a propagation grown and passed on by Anita Kistler, both of whom had high praise for it. Although this obviously performs in a variety of climates, Gayle Weinstein, garden coordinator at DBG feels it is premature to judge its merits solely on a single season's performance and found the post–flowering die–back a distraction.

Jim Archibald has communicated the thrill of seeing *V. oltensis* on May 24, 1985, forming little scabs of pure, intense azure on the dreary unpromising rocks and of returning the following year for seed. It is simply a reduced, extremely local race of *V. liwanensis,* isolated in the upper Oltu Valley, distinct in its minute pinnate leaves, so exquisitely tiny it is suited only to a trough or pan.

Is it of any significance that of the seventy–five plants Watson had researched as worthy of introduction from Turkey as goals of the 1977 expedition, not one was a veronica? Surely there are more surprises here in other genera as well!

Shaded Beauty

Andrew Pierce
Denver, Colorado

(Drawings by Panayoti Kelaidis)

Those who consider shade a problem forget that we often create our own shade dilemma. The early settlers of the West must have welcomed shade, but today with our more sun–loving outdoor living it is somewhat despised. This is generally true of course for rock gardeners, but at the same time there are situations where even the avid rock gardener is restricted to growing plants only in the shade. Don't be discouraged—*Aquilegia saximontana* may be the plant you want! Since time centuries ago when man started to construct buildings he created shade and then superimposed on top of this he planted trees, if they were not present, and our depths of shade became even deeper.

With most of the United States' rock gardening areas being at mid latitudes, if no large trees are present, shade is generally confined to the narrow portion of the garden on the north side of buildings. As soon as trees are added our useful shade area is extended. Man has made wooden structures such as pergolas or overhanging decks and patios that may produce shade lines even further into the garden and away from buildings. These taken together can be restful and welcome shelter from our very hot summer sun.

Shade is difficult to classify, indeed one's perception can change with the passing time of day, month, or year and additionally more so to an individual's taste.

1) Dense shade. Perhaps the easiest to define as here no sunlight reaches directly onto the plants except perhaps the tallest specimens. Not the best situation for color but, with the use of form, foliage (both color and shape), sculpture, rocks, and water, it can be made attractive.

2) Heavy shade. The situation where plants receive 2 to 3 hours of sunlight a day. Life colors are extended considerably here and this is often the situation of a north wall that receives perhaps 1 to 2 hours east and west sunlight a day for part of a year.

3) Partial shade. Sunlight may reach the plants for 4 to 5 hours a day and the range of suitable plants is increased quite dramatically. It is an area where some normally sun–loving plants may succeed but not necessarily be as floriferous.

4) Dappled shade. Typically found under lighter–foliaged trees such as honey locust, golden rain, and birch. Plant survival now falls into a different category due to root competition and the rainfall patterns. Plants may receive 4 to 5 hours of sunshine, but though the choice may be larger, other factors may have more influence.

5) Indirect light. A more common situation than people realize finds light, often in good values, penetrating into an area. Typical is the north side with no overhanging trees but with the east and west sides blocked by higher shade plants or buildings.

Plant factors

In the open garden we tend to look at a plant primarily from its flowering capabilities whether intense and short lived like early–flowering daphne or small trees of *Magnolia stellata* and the seasonal splendor of *Iris* species, miniature daffodils, saxifragas, and penstemons, but when we come into shade other more subtle and less often qualitative features start to take prominence.

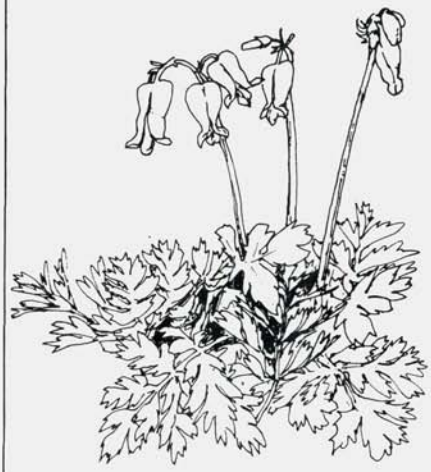
A) Leaf shape. By putting a relatively long narrow leaf of a fern against a dark broad one of a hosta or plantain lily, a personal effect may be created. Likewise almost feathery fronds of dicentra (bleeding heart) and aquilegia (columbine) contrast well with the bolder leaves of bergenia and sanguinaria (bloodroot). Every leaf has shape be they round, long, palmate, or pointed, and they make contrasting effects, often naturally.

B) Leaf color. Where would we be without this valuable feature in the shade garden? Green comes in so many forms we often fail to use its potential. Grays and almost blues of hostas, dark green of asarum, and variegations of several different plants are but a few.

C) Form. Clumps of juniper may be monotonous in some areas of the garden, but given the right choice of variety and shape they may be a very useful adjunct to the partially shaded rock garden site. By taking the gray of one and contrasting it to a dark–needled pine it can be very eye catching. The main thing is not to overdo such groupings. Of course pruning can further enhance shapes and form in the low light garden.

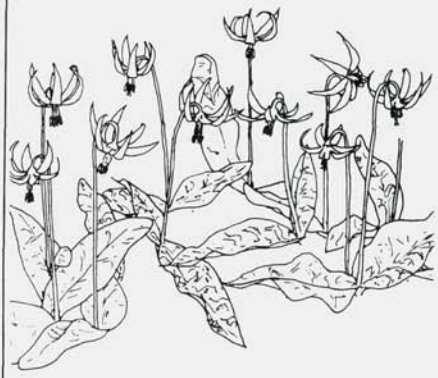
D) Ground covers. Even more importantly than in the open garden ground covers are needed to take the eye into more than one elevation of plant material. Because of surroundings and the varying angles of the sun, low light gardens tend to be smaller and ground covers can be very influential in helping a garden's personality. Obviously with your rock garden these should not be overdone else the whole effect will be spoiled.

E) Flowers. These are left to last as they are not always considered the

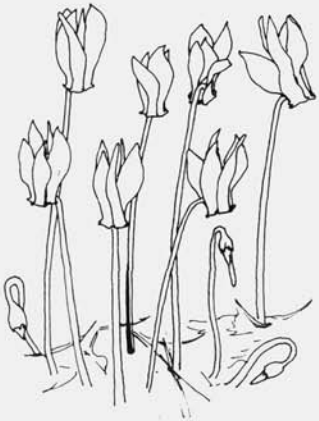


Dicentra oregana

Dicentra canadensis



Erythronium revolutum



Cyclamen purpurascens

dominant features in the shady rock garden. It is very effective to have splashes of color and in most instances a mottled appearance is all that is required. Of course the advocates of color will perhaps insist on a bold planting or two of *Viola corsica* or the like, but shade gardens by their intrinsic value often demand less flower. They exude more feeling toward form and foliage. By our desire for many, often unrelated, plants in the rock garden we put less stress on color and accent the plant itself for some other reason, e.g. because it is rare, of genus interest, a bun, or a true alpine plant.

Other design features

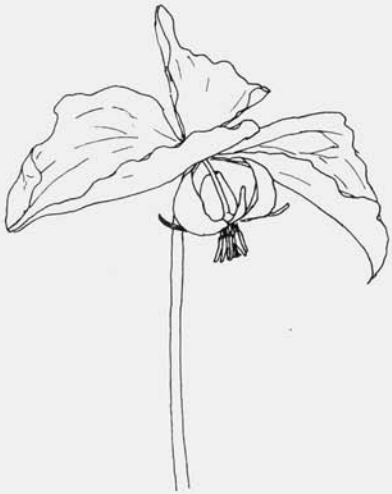
Careful use of ornamentation and physical features can extend the beauty of the shady location. The positioning of suitable rocks, sculpture, level changes such as low walls and woodwork, and the careful selection of material for path surfacing can be complementary to the overall design. Often with small areas this design is perhaps more important than in the larger mass of most gardens and extra thought has to be given to any positioning of ornamentation and rocks. True rock gardens, if built in the shade areas, sometimes have fewer rocks and instead incline toward the woodland garden. A person's interpretation can vary widely. Parts of the late Dr. Paul T. Maslin's garden were almost rock walls with pocket beds and crevices in the shade sections, in part due to the contours of the site. Excessive use of ornamentation and physical features will clutter the picture.

One very important consideration to our subject is drainage. Obviously with less sunlight there will be less evaporation from the soil, and if the rock garden is in a lower part of the garden, runoff from areas receiving higher precipitation, e.g. nearby lawn area, will only confound the problem. Initially it may be necessary to build a drainage system of 4–inch perforated pipe laid 12 inches below grade, covered with gravel or similar material to take excess moisture from the site. Very often natural grades can be used to relieve the problem. Alternatively it may be practical to use design features of small rock walls to raise levels, and then additionally use a mixed stone path as your drainage system with stepping stones among or over larger gravel.

Soils, mixes, fertilizer, and water or cultural variations

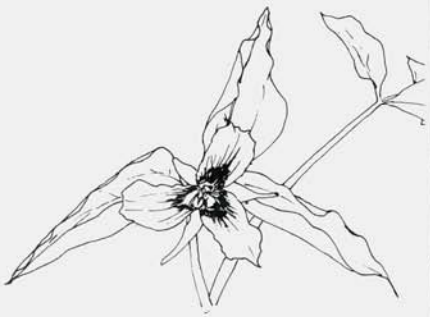
With most shade areas being relatively small the cost of soil preparation may not be the limiting factor as in a large garden, yet it has to be carried out more thoroughly if a long valuable life is going to be made of your site. Generally shade plants tend to require a soil that is of an open, friable nature,

Trillium rivale



Trillium cernuum

Trillium vaseyi



Trillium undulatum

fairly high in organic matter, that drains well but is only moderately high in available nutrients. A typical mix could be three parts existing soil, two parts of organic matter (peat, compost, leaves, etc.). Another mixture which is perhaps more rock garden oriented would be two parts existing soil, one part organic matter, and two parts fine gravel. Experimentation will play an important role, and you may adapt to the point of not even using the local soil and fabricating one in hope to suit your plants' fancy. The soil depth should be at least 10 inches after final settlement, and the level below the bed areas should be able to drain so that the water percolates through the beds and does not build up on a hard pan. This may kill your plants by depriving them of oxygen, rather than an excess of water.

If a light fertilizer dressing (5–10–5) is given at soil preparation time and some additional bone meal when planting takes place, little more fertilizer will be required for the first couple of seasons provided that root competition is not too severe. Remember we are after steady slow growth that makes good buns, etc., and not lush forests of plants all over the site. Should the odd plant or group fail to flourish, a liquid feed may be all that is needed to help it along, providing you know that it is a plant that normally grows freely. It is lovely to have trees and large shrubs as backdrops in any garden for their cooling effect, but like all plants they need room to grow without removing the moisture and plant food from the very shady rock garden you are trying to cultivate. Judicious root pruning can take place, but some plants, e.g. poplar, conifers, large maples, and oaks will deplete the soil of every bit of goodness over a number of years. Choose your plants wisely especially when it comes to dominant trees. They all look small in the plant container! Quite often the problem is not your own but due to a neighboring property owner, who perhaps even had the trees planted.

As in the rest of the garden, the problem of when and how much to water the shady rock garden has to be faced. With the variables in such a situation the amount of water retention is difficult to assess. It may be that your rock garden area is enclosed by non–ventilating buildings and wooden fences, and it will then have its own microclimate compared with the next house which has no wooden fences blocking the movement of air. Both gardens will have different water needs. What to do? For a start, never tie in the shade garden sprinkler system with that of the lawn areas. Its demands are much more particular and such a water cycle would drown most of your rock garden plants.

Low systems of trickle irrigation and small bubblers that can be turned on and off on a random basis may be the way to go instead of relying on a time clock. The problem is how to hide such a system. I personally use a hose pipe with a breaker on the end. It may take more time, but it does

allow me to give the drier patches more water, remove the odd weed, dehead the occasional flower and perhaps more importantly, makes me look at what I have and how it is doing in the shade area.

When you do water, please do it thoroughly to adequately moisten the soil down to pocket bed depth. In drier locales you will find, even in the height of summer, twice a week should be sufficient. Extra water conservation can be obtained by the use of wood chips or coarse peat mulches in the woodland areas and by small stone chippings in the other sections. Be careful to try to match your choice of chips with your local environment. They should add to the scene, not distract from it.

No leaves — spring sun

By considering the season and the very effect of deciduous foliage, a larger selection of rock garden plants suitable for the shade can be utilized. Bear in mind though that your design should not allow for such a preponderance of these plants that it is drab and uninteresting for the rest of the year. Such plants will be past their floral best by the time your deciduous plants come into full leaf. This is very typical of the eastern woodland where plants such as *Phlox divaricata, Iris cristata, Hepatica americana, Anemonella thalictroides,* and trilliums create mats of color just as the tulip trees, oaks, and maples are leafing out. Other plants in the same location that have more persistent and attractive foliage are asarum, arisaema, *Sanguinaria canadensis,* and *Podophyllum peltatum.* Their flowers may not be as spectacular but again tend to be early in the summer. This woodland situation can be further enhanced by the use of snowdrops, aconites, some tulips and daffodils to extend the season back into spring.

In addition to the soil mix mentioned earlier for the woodland, add 3 to 4 inches of leaves and work them into the top 4 to 6 inches of your soil. Follow up with a leaf mulch of oak leaves, for example, to help retain moisture in the summer. I almost decry the way people throw their leaves in garbage bags every fall, when they should be using them back into their gardens—the place they originally came from!

Planting density

With the apparent lack of plants that bloom for a very long season, thought has to be given on how to add to the value of the shade rock garden by using a multitude of subjects rather than massing by any one species. The lists at the end of the article give you some indication of plants to use, but they will not tell you that dicentra usually flowers in late May or that galium

(asperula), sweet woodruff, is a great ground cover. Such information will have to be gleaned from the garden bookshelf. There are a fair number of books on rock gardening but most of them do not really get into the shade problem. You will have to look among books on perennials as well.

Again choice and personality come into play as no two persons' expressions of what a shade garden is are the same. We all need to understand that shade rock garden areas are with some of us and that their value must be recognized rather than rebelled against. There are intrinsic values in shade, but rock gardeners may be the last to realize their value as we stubbornly work toward sunshine.

Earlier in this article I pointed out that the avid rock gardener may not have a sun exposure to work with. To such gardeners I say that you are lucky if you have shade. Not everyone's summer is a pleasant 75 degrees. I remember a tour at Denver Botanic Gardens when it was more like 120 degrees in the sun! Plants are adaptable; perhaps people need to be as well.

Plants suitable for shade

Perennials

Adonis amurensis
Aquilegia canadensis
A. elegantula
Astilbe, various
Caltha leptosepala
Campanula poscharskyana
C. rotundifolia
Chrysogonum virginianum
Claytonia megarhiza
Corydalis nobilis
C. solida
Dicentra eximia
Dodecatheon, various
Doronicum cordifolium var. columnae
Hacquetia epipactis
Helleborus niger
H. orientalis
Incarvillea delavayi
Jeffersonia diphylla
Lewisia, various
Mazus reptans
Mertensia virginica
Polemonium foliosissima
Primula denticulata
P. hirsuta
P. juliae
P. sieboldii
Primula, other species, hybrids
Pulmonaria angustifolia
Saxifraga bronchialis
S. cotyledon
S. cuneifolia
Silene virginica
Synthyris missurica
Telesonix (Boykinia) jamesii
Tiarella cordifolia
Trillium, various
Trollius europaeus
T. pumilus
Viola pedata

Woodlanders

Anemonella thalictroides
Asarum species
Chrysogonum virginianum
Hepatica species
Iris cristata
Phlox divaricata
P. stolonifera
Pulsatilla, various
Sanguinaria canadensis
Trillium, various

Bulbs and corms

Anemone blanda
Cyclamen purpurascens
Disporum trachycarpum
Endymion hispanicus
Eranthis hyemalis
Erythronium, various
Fritillaria meleagris
Galanthus nivalis
Iris reticulata
Leucojum vernum
Narcissus, selected types
Uvularia grandiflora

Peat Lovers

Cornus canadensis
Epigaea repens
Haberlea rhodopensis
Iris verna
Linnaea borealis
Mitchella repens
Polygala paucifolia
Ramonda nathaliae
Shortia galacifolia
Soldanella montana
Vancouveria hexandra

Foliage

Alchemilla alpina
Arisaema dracontium
A. triphyllum
Arum maculatum
Asarum canadense
A. caudatum
Bergenia cordifolia
Dicentra eximia
Epimedium various
Ferns
Galium (Asperula) odoratum
Hepatica acutiloba
Hosta, various
Lysimachia nummularia 'Aurea'
Podophyllum peltatum
Sanguinaria canadensis
Saxifraga stolonifera

Shrubs

Buxus sempervirens
Euonymus x kewensis
Ilex x meserveae
Mahonia repens
Rhododendron, selections,
e.g. PJM

A New Public Rock Garden

Donald W. Humphrey
Falls Church, Virginia

In the spring of 1987, visitors to Green Spring Farm Park approaching the Horticultural Center from the parking lot could be seen to pause, turn and walk over to a wall to inspect small plants blooming from crannies and crevices between the rocks. They had discovered one of the newer rock gardens in the mid–Atlantic states.

On an octagon–shaped traffic island in the turn–around in front of the Horticultural Center, the 53–foot–diameter garden commands a strong visual position in the young park's growing number of display gardens. Designed and built by the author in 1986, the garden is still undergoing the process of soil improvement and planting. By the summer of 1988, this process should be completed and subsequent attention devoted to growing and appraising the rock garden attributes of a large number of plants for use in sunny rock gardens in the northern Virginia area.

The 17 acres comprising most of the area of Green Spring Farm Park were donated to the Fairfax County Park Authority in 1970 by Mr. Michael Strait, former editor of the *New Republic* magazine, with the stipulation that its use be rooted in the 200–year–old agricultural and gardening tradition of Green Spring Farm. As a horticultural facility in service to the over 600,000 residents of Fairfax County, Virginia, Green Spring is devoted to horticultural display and demonstration, education and cultural programs, community service and exchange, and interaction with others in the horticultural community. Not a botanic garden in the traditional sense, the park is designed to demonstrate to the county's residents the range of gardening opportunities available to them. In cooperation with the Fairfax County Department of Extension and Continuing Education, the Virginia Wildflower Preservation Society, and other plant societies and groups, the park maintains fruit, vegetable, herb, perennial, shrub, wildflower, and rock gardening displays as well as a 50– by–24–foot greenhouse.

The rock garden evolved from a planting of conifers and rocks that had been loosely arranged in the traffic island when the Center was built in 1982. Plantings of annuals and dwarf bearded iris provided color but a cohesive theme was lacking. Consequently, the superintendent asked the author to prepare a plan for a rock garden. Though formal in arrangement, the garden was designed to be reminiscent of a natural geologic outcropping that had been spared from the development around it.

The walls emerge from the north edge of the island and run parallel some 40 feet before they break off abruptly in a third wall facing in a crescent shape toward the south. Viewed from the Center, the two walls appear to be one, but they are in reality over 10 feet apart. This inclined inter–wall area is roughly divided into two parts: an upper wet soil (bog) area some 24 to 18 inches deep underlain by plastic which allows excess moisture to drain off at the lower inner side, and an area of deep, well–drained soil in the lower portion composed of sand, gravel, peat, compost, leaf mulch, and decayed sawdust. At the base of the crescent wall, a small alpine lawn of turfing and tuffet plants is in the making.

From the apex of the upper wall, the garden drops off on a gentle incline to the south and west in what is the largest section of the garden. Here is a fine collection of dwarf conifers framing the upper wall, many of which were donated by Dr. Albert Paulsen, former chairman of the Potomac Valley Chapter of the ARGS, from his nursery at Great Falls, Virginia. The combination of walls and conifers provides the principal architectural framework of the garden. Joining the conifers are a growing number of dwarf shrubs and subshrubs. Against the backdrop of the larger conifers, taller, spiky flowering plants are being set in tight groups to add color accents. Dwarf flowering bulbs and columbines are being used to line a flagstone walk that provides access to this section of the garden.

Because it is a demonstration garden, many of the plants used are relatively easy for the beginner to grow. Several species of pinks, from the larger *Dianthus anatolicus* and *D. gratianopolitanus* through tight tuffets of *D. petraeus* hybrids, *D. zonatus* and *D. alpinus,* are used. Also many species of plants from the southeastern United States have been planted including a fair sampling of *Phlox* species: *P. nivalis, P. subulata, P.* x *procumbens, P. stolonifera* (both pink and blue), *P. ovata, P. pulchra, P. amoena, P. pilosa* ssp. *pilosa,* the more robust *P. pilosa* ssp. *ozarkeana,* and an unknown, shy–flowering plant with decumbent, sterile shoots, which may be a naturally occurring hybrid of *P. ovata* and either *P. glaberrima* or *P. pilosa.*

From the southern coastal plain, *Cuthbertia (Tradescantia) rosea, Chaptalia tomentosa,* and *Marshallia graminifolia* are growing happily in the wet soil area, and *Penstemon dissectus,* a desirable species from Georgia, is doing well. Most of the penstemons, however, are westerners. The happiest of these are *P. strictus,* which bloomed continuously from early summer, and an as yet unidentified shrubby species with rich pink flowers resembling *P. kunthii* from Mexico. Whatever it is, it is attractive, free flowering, and appears to be hardy in northern Virginia. Also doing well are *P. cardwellii, P. pinifolius, P. linarioides, P. cardinalis, P. grandiflorus, P. procerus, P. barbatus* hybrids, *P. barrettiae,* and *P. fruticosus.* A somewhat more tenuous grip on life is

shared by *P. venustus, P. pachyphyllus, P. glaber, P. rydbergii,* and what appears to be a misnamed *P. campanulatus.*

Because our hot, muggy summers can sound the death knell for many alpines, the lateral orientation of the garden is to the south. A number of marginally hardy plants are being tried: *Cypella herbertii, Habranthus tubispathus, Sisyrinchium convolutum, Dierama pulcherrimum, Beschorneria yuccoides, Aristea ecklonii, Eustoma grandiflorum, Mimulus (Diplacus) bifidus, Phygelius capensis,* and *Zauschneria arizonica* (or *Z. californica* ssp. *latifolia*). Backup plants for a number of these are being carried over the winter in cold frames of the greenhouse, wisely, I hope, for a freak November storm dumped over a foot of wet, heavy snow on the garden. A few days before, some thirty species of plants, including the *Zauschneria, Phygelius,* and *Eustoma* were blooming bravely in seventy degree weather.

A final group of plants that are being looked at cautiously are rock garden annuals with the objective of finding diminutive forms that can brighten the corners of the rock garden, particularly during the dog days of summer.

Of the many species of plants now in the garden, the greatest failures were the candelabra primroses along with *Primula denticulata,* and *P. vialii.* Planted in the "bog" in the spring, they grew and flourished until July, the hottest on record for this area with 29 days above 85°F. Then one by one they rotted off at ground level until less than one third had survived by September's cooler weather. Without shade, the cool, moist lower soil of the bog could not save them. Seed will be saved from the survivors and grown on with the hope of finding some more heat resistant strains.

Already the garden has inspired a number of local people to develop rock gardens of their own. To a very large extent, the success of the garden will be measured by such a statistic.

Seed Propagation in a Coldframe

Morris West
Red Lion, Pennsylvania

A task few serious rock gardeners can avoid for very long is growing plants from seed. There are at least two compelling reasons for seed propagation. Many plants can only be had from this source, and the quality of the material is almost invariably superior.

To many people seed propagation is the greatest gardening pleasure, but to some of us without proper facilities it can be more of an onus than

a pleasure. Over a number of years I have experimented with simple methods that require a minimum amount of material and labor. In fact most of the labor is concentrated in two operations: a seed planting orgy and a planting out frenzy. The method involves the use of a coldframe where insulated seeded flats can be placed and plants grown on *in situ* until ready to transplant into the garden.

The first requirement is some type of coldframe. I originally used one devised by my friend, Nicholas Klise, made of bales of straw on the surface of the ground. This will suffice. However, temperature fluctuations will be maximum which is an advantage in the early stages but a definite detriment after sprouting occurs. A major advantage is that it can be completely dismantled and the straw used for mulch. I now use a permanent structure constructed of stacked concrete blocks 32 inches high (it is 24 inches below grade), 72 inches wide, and 60 inches deep. Minimum dimensions should be 24 inches high by 48 inches wide by 36 inches deep unless in a protected or favored site such as against the south facing wall of a heated structure.

The second necessity is some large containers which will hold water. These containers should hold at least 20 gallons of liquid. I have added anti-freeze to the water to lower the freezing point, but the benefits are unproven. It is ideal if the entire back wall can be lined with these containers storing 100 gallons or more of liquid. Various types of plastic shipping drums can usually be acquired at a modest price.

The third main component is some type of glazing material. Clear corrugated fiberglass panels proved satisfactory for a number of years. However, the need to replace a two–panel sliding glass door unit in our house provided me with a more durable albeit considerably heavier alternative.

Additional needs are styrofoam boxes or flats such as table grapes are frequently shipped in, clear plastic bags large enough to contain the styrofoam flats, and your favorite seeding compost providing it affords maximum drainage. Although I still use some humus such as peat moss, the mix should be composed of at least 70% coarser material. My basic recipe is 50% perlite, 30% coarse sand, granite chips, or limestone chips, and 20% humus. Seed is separated into calcicolous, calcifugous, and unknown or indifferent groups. The calcicolous get limestone chips or dolomite limestone. The calcifugous get sand or granite chips. The rest get whatever is available.

Anytime before late fall the structure is erected. The three solid walls are constructed with the open side facing as nearly due south as practicable. The water containers are placed along the back wall and filled, and the structure enclosed with glazing material. Sown flats can be placed inside as completed throughout the coming months.

The method used to sow the flats is critical to keeping labor at a

minimum. If the styrofoam flats do not have adequate drainage holes, these must be provided. The easiest way to make holes is with a heated metal rod. This operation must be performed outside since the fumes produced are quite noxious. The flats are lined with burlap, fine mesh screen, etc. and the compost added to a depth of 3 or more inches.

Time spent grouping seed by cultural requirements, ease of germination, and so on will be rewarded by less handling of flats later. The seed is sown very sparingly allowing plenty of room for each seedling's development. Seed envelopes almost invariably contain much more seed than the average gardener can use or give away even with moderate germination rates. Try sowing the excess seed directly in the rock garden as Paul Palomino recommends. You will be surprised how successful it will be. After seeding, soak the flats in a large container of tepid water. Allow the excess water to drain and then enclose each flat in a clear plastic bag. The flats can then be left outside to stratify or be placed directly into the frame.

If you can stand the suspense, the flats can be forgotten in northern areas until late February unless an unusually long period of abnormally high temperature occurs. The major danger, of course, is excessively high temperature. A minimum/maximum thermometer inside the coldframe is a valuable tool. I try to keep the temperature between 30° and 60°F. throughout February. By the end of that month some ventilation is usually required. Raising one side of the top glazing panel about an inch is usually sufficient. Since my coldframe goes unattended Monday through Friday, adjustments require some pluck as well as luck. If you are in residence, more frequent adjustments can be made. However, the containers of water are so efficient at moderating the temperature extremes, only minimal attention is really necessary.

The ides of March usually forebode removing the flats from the plastic bags. Once exposed the flats should receive a good soaking with a fine spray at least once a week. A dilute balanced fertilizer should be added to the water as soon as germination is complete. If the crop of seedlings is better than expected, thin the plants as early as possible by snipping off the excess with a pair of small sharp scissors. You can, of course, transplant the excess to flats or pots, but the average gardener can usually avoid this task and still have ample plants for the garden, gifts, and plant sales.

Normally the top glazing can be completely removed early in April. Some protection is required against heavy rain or ice storms. I use an old window screen which turns the heaviest downpour into a gentle spray. Continue to feed and water as necessary.

By early May, the coldframe should be completely open. Some of the fastest growers will be ready to take their places in the garden. I find an old teaspoon the handiest tool for cutting out a nice plug with each plant. If plants

or ungerminated seed remain in the flat, refill the holes with soil and water well. These activities will continue as time permits or seedlings demand throughout the growing season.

As soon as all plants are removed from the flats, the flats may again be enclosed in plastic bags if ungerminated seed remain. Placed in a shady spot, many species may germinate in late summer/fall or the following spring after another winter in the coldframe.

Some genera that have proven amenable to this regimen, producing good results with two or more species, include *Androsace, Aquilegia, Arum, Astragalus, Campanula, Centaurea, Corydalis, Dianthus, Dodecatheon, Erigeron, Iris, Linum, Lychnis, Oenothera, Penstemon, Saxifraga, Silene,* and *Thlaspi.* Two notable failures have been *Clematis* and *Gentiana.* Androsace of the Ontario Chapter insists *Clematis* is a snap so I'll keep trying, and perhaps the *Gentiana* require more patience than I possess.

Although the conditions described are neither trouble–free nor ideal, they do produce acceptable results for amateur propagators whose facilities, time, or inclination are limited.

Of Interest from the Chapters

Bulbs: Nature's Miraculously Packaged Flowers

Charles Hardman
Temple City, California

Earth's vegetable kingdom has adapted itself into an incredible variety of strange forms. This adaptation has come about in order to qualify vegetable life for continuing its existence on this planet. Fortunately, many of these strange forms are also beautiful to us humans. Among the strangest and most beautiful members of this vegetable kingdom are its species bulbs.

Their beauty lies not just in their flowers, but in their leaf shapes and leaf colors, and in the enormous variety of their bulbs, roots, tubers, rhizomes, and corms themselves.

Each bulb species has a character all its own. I like to think of bulbs as so many odd, brown gnomes guarding their treasures. They'll share their treasures with us, but only if we give them what they want.

And what do bulbs want? soil that suits them (lots of sand is usually good—most bulbs love sand); good water (rain water is best, naturally); sunshine according to their needs; fresh air; and a bit of food about four times

during the growing season.

Many bulbs need protection from excessive cold during the winter. And nearly all need protection from excessive heat during the summer. Beyond these simple requirements, don't lavish too much attention on your species bulbs. They're wild things. Given the right conditions, they don't want or need a lot of pampering.

Fertilizer? Plenty of potassium, adequate phosphorus, calcium, some trace elements, and a little nitrogen, preferably in the form of nitrates, not nitrites. Try Potassium nitrate or—and?—Calcium nitrate, both readily available from most fertilizer companies. These should be applied with an ungenerous hand about four times per growing season; most bulbs don't seem to require nearly so much nitrogen as other, faster-growing plants.

Bulbs do, however, require plenty of potassium, and another good form, besides the Potassium nitrate already mentioned, is Potassium sulphate, which is also readily available not only from fertilizer companies, but from nurseries as well.

Superphosphate for phosphorus, Magnesium sulphate (epsom salts) for magnesium, and a bit of chelated iron and other trace elements in light doses, round out most of your bulbs' food requirements.

Most soils—and many sands also—have some trace elements available to bulbs. Silica sand hasn't much nutrition of any kind, but that seems to be the exception. Granite sand may contain as much as 7% potassium and some trace elements. River sand, pit sand, blow sand, all seem to have some trace elements which your bulbs can use. These are slowly leached out of the sand as it deteriorates over the years due to weathering and chemical actions of the bulbs' roots.

I use a lot of granite sand in my sand mixes for bulbs, and I've had great success with it. But for certain bulbs—a few gladioli, certain amaryllids such as clivias, and terrestrial orchids (especially the Australians), granite sand seems to have the wrong pH. So I keep on hand some silica sand and some river sand. With these, I make special sand mixes—often with granite sand included—for those bulbs have an aversion to straight granite sand.

If you're considering organic gardening with bulbs, I can only wish you luck. My own attempts at leading bulbs along the organic path produced disastrous results. Rotten roots and rotten bulbs became commonplace during my organic gardening days. Many amaryllids tolerate *some* organic fertilizers, and dahlias and daylilies, along with callas, seem to do pretty well with organics. But...

Be careful! The roots may be gone and the bulb rotting before any above-ground effects are noticed.

No doubt there are plenty of exceptions to my no or few organics "rule"

for bulbs. One exception which I have noticed and which seems worth mentioning is terrestrial orchid tubers. Many of the European and Australian orchids which grow from tubers will not tolerate chemical fertilizers. These plants want organics in very mild forms: rotting eucalyptus leaves for the Aussies; rotting tree leaves and *tiny* amounts of old animal manure or bird lime for the Europeans. ("Tiny," in this case, means 1/16 to 1/8 teaspoon to a gallon pot every 2 weeks during the growing season. Avoid packaged or sacked cow manure, as it's often loaded with salt, which the animals are fed in order to force them to gain weight.)

We hear a lot these days about the disappearance of animal and plant species from all over the world. From the arctic, where oil drilling and pipelines threaten wild caribou and marine life, to the antarctic, where penguin populations are declining due to ocean pollution, our world has problems. And both the Asian tropics and the American tropics are being decimated with probable loss of species which haven't even been discovered before they're lost from us forever.

You can do something about this.

You can adopt a species. Or two. Or three.

Learn all you can about your adopted species. Grow them. Propagate them. And share them with other people. By doing so, you'll be helping Mother Nature reverse the tide of decimation. If you help save even one species from extermination, future generations of people will still be able to enjoy its beauty or its health–promoting abilities (many life–saving drugs are still being discovered in plants; often enough, they're ornamental plants).

And helping save a species is so easy. Bulbs grow from seeds just like other plants do. In addition, most bulbous plants reproduce vegetatively. With good care, most seedling bulbs can be bloomed in from 3 to 5 years. It's exciting to watch little seeds grow into little bulbs and then on into bigger bulbs. Many of the seedlings change dramatically as they mature into bigger and larger bulbs.

And there's nothing quite so satisfying as watching your own seedlings bloom for the first time. Just seeing those first flowers open is a thrill well worth the time it takes to grow the bulbs to flowering size.

As for the flowers themselves, all I can say is, if you really aren't interested in growing them, then for goodness sakes do yourself a favor and don't look at any pictures of species flowers. Because if you do, you may end up another species bulb grower, happily hooked for life.

(Reprinted with permission from the *Southwestern Chapter, ARGS Newsletter,* October, 1987.)

Plant Conservation and the ARGS

Judy Glattstein
Wilton, Connecticut

I find myself on the horns of a dilemma. It happens when I lecture about plants for the shady garden or have a group tour the garden. "Trillium," I say, "is a great garden plant. They are easy to cultivate, have beautiful flowers, and the sessile species have attractively mottled foliage. However, since they are slow to propagate, the majority sold in the United States are plants collected from the wild. On ethical grounds, they should not be bought as this only encourages the trade." In other words, do as I say, and not as I have done in the past. When I bought my first trillium, perhaps 20 years ago, there was not the same concern for plant conservation as exists today. There was not the intense pressure on natural habitats through construction of highways, shopping malls, office parks, and housing.

My son went to school in Cleveland, Ohio. We made that great parental lemming trek twice a year. You could always spot those engaged in this pursuit: stereo system, trunks and suitcases, milk crates of text books. We tend to swarm in mid to late August and early May. In early May, the *Trillium grandiflorum* along one stretch of Route 480 in Ohio were so thick they could be identified at 60 miles per hour. The last time we went by in 1986, houses had replaced the forest and the trillium were only relict patches.

The destruction of habitats, coupled with the demands of collecting to supply eager gardeners is putting pressure on native plants which could conceivably push them over the brink. Even reputable institutions such as The New York Botanical Garden are involved. Nearly every issue of their publication *Garden* features an article on the destruction of tropical jungles and the need to preserve them. Yet The Shop in the Garden sells little plastic packages of native plants, including trillium.

It seems to me that it is time for the American Rock Garden Society to become involved as a national organization. I do not mean to suggest that we should be purchasing habitats. There are several organizations such as The Nature Conservancy which are following that policy and with more funding than we have available. It might be possible to fund research into methods of commercial propagation of slow–to–produce plants such as trillium and orchids.

A policy that encourages chapters to sell only propagated plant material at tail–gate sales and chapter meetings would be a starting place. It would, carried further, encourage members to purchase from those nurseries which propagate. This in turn might stimulate the commercial production of plants. Phraseology in catalogs needs some interpretation, like real estate adver-

tisements. Only sources which clearly state that material is propagated can be relied upon. "Nursery grown" you see, can be used for a plant which is collected from the wild and grown in a nursery for a month or two. "We do not collect, but obtain our plants from a reputable supplier," does not tell you where the supplier obtained his plants.

Plants can and should be rescued from a site slated for disturbance/destruction. But the difficulty of identifying salvage/rescue plants from collected plants confuses the issue. If salvaged plants go to the rescue groups, if they go to be used as propagation material, fine. If they are sold in a turn–key type of operation, then the possibility for abuse is increased.

There are advantages to the eager gardener as well. A collected plant passes through many stages on its way from the wild to the garden. A collector sells it to a wholesaler who passes it on to a retailer who sells it to the gardener. The collector is not always a botanist or horticulturist. The worst instance I have ever heard of is where a second–stage wholesaler ended up with a thousand (that's right, thousand) plants of *Sanguinaria canadensis* rather than the trillium he had ordered. So you may not always get what you send for. Then, the plant may not respond well to this multi–stage journey. When it dies in your garden you can't be sure if it was due to fatigue or other problems, never lack of expertise on the part of the gardener! (Perhaps you would like to hear about my expensive compost heap?) A vigorous plant with a healthy root system which has been properly cared for will make the transition into the garden with far less difficulty.

To play devil's advocate, what about special forms? How about double bloodroot, double trillium, double anemonella? These plants are doomed in the wild. As sterile forms they cannot reproduce from seed and are at a disadvantage. And, the removal of an individual plant cannot compare with the wholesale removal of hundreds and thousands from a given site. In addition to the removal of the particular plants and their reproductive potential, the future plants in the colony are depleted.

Plants will sometimes reproduce well in the garden, e.g. *Jeffersonia diphylla*. But where is the safe area in the wild to re–plant them? None, any more than for the animals also under pressure.

Research needs doing, before spectacular plants are reduced to the equivalent of the last passenger pigeon in the Cincinnati Zoo. We need to find out NOW how to propagate and supply the demand. Yes, I have bought trillium, but in the past. I have not bought any in some time. Instead, when I want new species, I look to seed exchanges or a trade with another member. If I need more specimens of plants I already have, then I propagate.

The broad picture suggests the funding of research. But more than that it is the attitude which should be fostered by national in a trickle–down system to the chapters and individual members.

A Sandy Rock Garden

Irma M. Gourley
Hermiston, Oregon

As I look over the membership of the ARGS, I note the absence of fellow gardeners from my own area or from any similar ecological area. Yet this is the natural home of rock plants, if not of high alpines.

The climate is one of extremes: very hot in summer, very cold in winter, and very windy occasionally. The land is semi–desert, covered with sagebrush and tumbleweeds where it is not irrigated. This particular portion, about 8 miles from the Columbia River, is extremely sandy. Nevertheless, the growing season is long, the sun is bright and, if water is supplied, a great variety of plants thrive.

Sand is the chief constituent of the rock garden, which has few rocks besides those supporting the terraces. Its outstanding characteristic is superlative drainage. Watering is essential at frequent intervals. Some plants, particularly those with hairy leaves, resent overhead sprinkling.

The home for the plants is a large oval mound of sandy soil, terraced into three levels at present, the terraces stabilized by large stones, the planting areas nearly level. The mound is about 30 by 50 feet, with a wide sand path all around it and stepping stones leading to the various levels. The rock garden is not complete because I experiment with all kinds of material and am saving space for new plants. Already there is much to enjoy every season of the year. How pleasant it is to meander among plant treasures from many climes!

Winters are cold, and snow cannot be relied on for cover. Sand, however, if fairly dry, does not freeze deeply, nor do the plants frost heave. Those years in which rains soak deep before heavy freezing occurs bring much damage to water lines and plants. Even normally hardy trees succumb then. So hardiness is always a question mark.

Sunny, calm winter days lure me out to do a little cleaning up or just to see what is happening and dream of plans for the coming season. February and March are busy months, devoted to sowing seeds from the ARGS seed list and elsewhere, ordering from the new catalogs, and reading up on past bulletins.

Soon, the warmer days coax the garden to renewed activity. Emerging spears of bulbs and swelling buds are everywhere. This is the most hazardous time of year for frost damage. The tender young shoots are liable to be damaged by a sudden hard freeze with no snow cover. The rock garden

is among the first to respond to approaching spring. There are a few bulbs, but aubrieta is the center of the spring show. At first a blossom here and there, and soon it is a sheet of blue–purple, purple, and red–purple, and will remain that way until the first actually hot weather slows it down.

The tiny wild daisy, *Crocidium multicaule,* bursts into bloom before you ever notice it. It grows everywhere: sand, gravel, vacant lots, backyards, roadsides—a brilliant carpet of yellow, opening only in the sun. It self sows in my garden. Together with most of the very early bloomers, it leaves the scene at the outstart of hot weather, but its departure is so unobtrusive that when it goes to seed it just disappears.

My draba (species unknown) begins before the official arrival of spring. It is similar to one I grew before as *Draba haynaldi.* The green, roundish balls of foliage are compact, mounding up against the rocks that support the third terrace facing north. The plants spread sideways, but not much toward the front. They have proved easy to divide, so I now have them on east and west terraces, but not on the sun–soaked south ones. The clear yellow blossoms on short stems make a good showing.

Planted in front of the draba is a group of miniature jonquil–type *Narcissus*: *N.* 'Sun Disc,' *N.* 'Chit Chat,' and *N.* 'Pixie's Sister.' These all have round, bright yellow flowers, which are extremely long–lasting. Last fall I added *N.* 'April Tears,' *N.* 'Wee Bee,' and *N.* 'Minnow.'

In the same assemblage of small plants are *Anemone nemerosa* and *A. nemerosa* 'Alba Plena.' The white one is prospering, the blue, recently planted, hasn't bloomed. *Anemone blanda* 'Atrocaerulea,' on the west–facing terraces, hasn't increased much though it bloomed well last year.

White *Erinus alpinus* occupies a place beside the draba. It hasn't done too well and I fear it may disappear altogether. If so, I'll replace it. Reputedly short–lived, its decline may be inherent, and not due to its situation.

Trailing a bit behind the draba, two more crucifers come on the scene: *Erysimum* 'Sprite,' and *E. kotschyanum.* My preference is for *E.* 'Sprite' because it has larger flowers on stems just as short as those of *E. kotschyanum.* The flowers of both are the same yellow as the draba's. The leaves of *E.* 'Sprite' are a trifle larger but just right for the size of the mat. They seem vigorous, bloom abundantly, spread nicely, divide satisfactorily, but they can die out, or die back, suddenly. It may be their nature. Heavy frost on young, tender foliage followed by bright sun or hot, dry summers could be contributing factors.

Harmonious with the aubrieta, phlox add more colors to the pageantry of spring: pink, rose, lavender, and white *Phlox subulata* and taller clumps of *Phlox bifida* and restrained, compact mats of *P. subulata* ssp. *brittonii* 'Rosea' and *P.* x *douglasii* 'Red Admiral.' I take out some of the larger clumps

from time to time, moving pieces to fresh territory. This keeps them healthy and within bounds. Not all are rampant, but I like the brilliant display of the husky growers. A garden, to present a unified scene, must have a predominant color or plant to hold the picture together. In the early spring, mine are aubrieta and phlox, with a host of others to complete the picture and offer interest and variety.

Quite different is the utterly charming *Trillium nivale,* slowly increasing in a more shady spot. Each year it adds a non–flowering stalk of leaves, which blooms the following year. Last year it had five flowers. Several snowdrops, *Galanthus nivalis* 'Sam Arnott' keep it company. A neighboring clump of *Pulmonaria angustifolia* blooms later. The pulmonaria has shown reluctance to establish itself.

A few plants of *Iris pumila* have joined the aubrieta on the second north–facing terrace. My old purple *I. pumila* blooms profusely, and spreads alarmingly. Most of my other pumilas behave just the opposite. They bloom shyly, fleetingly, or not at all and diminish rather than increase. The fast–spreading kinds, as well as those of weak constitution, are now in special beds. On the rock garden with the aubrieta I have lovely white *I.* 'Snow Maiden.' It has well–shaped blossoms and increases moderately. My latest to bloom is 'Nuggets,' a bright gold that blooms long and increases well. These two and a light blue one lend interest in the early season, doing well with aubrieta culture.

Dicentra 'Luxuriant' can well be termed everblooming. Mine abides on the first north terrace. Tufts of decorative, much–cut foliage and reddish hearts that last a long time ensure its place among the elite. *Dicentra* 'Luxuriant' seems to do better in partial sun than in complete shade. The area where it is planted has added leaf mold and compost to make it more moisture retentive, but the sandy mixture warrants excellent drainage. There are, now, several columbines adjacent: *Aquilegia discolor* that blooms early, *A. saximontana* and *A. scopulorum* which haven't bloomed yet. A further member of this group is *Polemonium pulcherrimum,* which hasn't proved very permanent. There is a new *P. carneum,* white form, not yet old enough to bloom.

As the first floral wave begins to subside, a fresh one is advancing in ever increasing momentum.

Dianthus take up the pink and rose theme begun by phlox. *Dianthus* 'Avalon Rose' is showy with double, fragrant rose flowers, large and plentiful. The plant is hardy, vigorous, and reputedly ever blooming (here it stops during summer heat, resuming after the temperature drops). *Dianthus* 'Essex Witch' is much like it, but a somewhat stiffer plant with flowers a pinker hue. *Dianthus* 'Spotty' doesn't do well here; the flowers soon fade and cease. The

low grassy foliage is its chief attraction. Then there are small, low growing ones which are handsome the year round and deck themselves with little pinks in due season.

The majority of my dianthus are of the gratianopolitanus type. They were grown from seed and show great diversity of flower color and habit of growth. Some are a bright red, some pink, many rose, none white, and none double. Flowers are large and abundant. The plants are tolerant of many locations, including the very hot terraces with southern exposure. (The terrace mound runs east and west in its longest dimension, so there are long terraces which get the full sun as well as reflected heat from the sandy paths.) The maiden pink, *D. deltoides,* isn't among my favorites. It self–sows much too prodigiously. *Dianthus deltoides* 'Zing' has many good qualities. It blooms during summer and has wider, greener foliage than most pinks. It is a rather weak grower here.

Veronicas bring blue to complement the pink and rose dianthus and geraniums, white *Arenaria montana* and iberis, and yellow daises and potentillas. Veronicas are good natured, accepting any location where they are planted and able to hold their own against unruly neighbors. *Veronica saturejoides* is a particularly good 2–inch–high shrublet. The bright dark–blue flowers, in short spikes, appear quite early in the season. The glossy dark–green foliage remains attractive all year.

Globularias, also blue flowered, are very nearly the toughest plants in my garden. They manage to thrive even where roots from the neighbor's trees impoverish the soil and rob it of all moisture. Most other plants have died there. These larger globularias aren't on the rock garden, but the compact, small–leaved, prostrate *Globularia repens* is doing remarkably well in the hottest part of the south terraces. It grows harmoniously with a dwarf yellow helianthemum which is not entirely hardy here.

A stone cress, aethionema, bearing light pink flowers and tiny bluish leaves on a small shrublet is not among the gaudy or unrestrained growers. It needs to be placed with well–mannered neighbors of the miniature type. Eligible are several low, creeping penstemons such as *Penstemon caespitosus* or *P. crandallii* ssp. *procumbens.* Also *Erigeron elegantulus* will produce its bright lavender daisies at the same time. Some of the sedums with blue leaves harmonize with the foliage but bloom at a different time. These sedums must be evaluated before being turned loose in the rock garden to be sure they will grow where they are wanted and not invade every nook and cranny. *Aethionema* x *warleyensis* ('Warley Rose') is somewhat larger, having deeper–pink flowers and desirable in any choice assemblage.

Nature has supplied us with an abundance of yellow flowers—a bright and cheerful color as essential to the garden as the green of leaf and grass.

Two yellow daisies native to dry, stony ridges are *Erigeron linearis* and *E. chrysopsidis. Erigeron linearis* has made itself at home in my rock garden. It is a perpetually blooming plant, flowers following one another in unending succession, each burst of bloom having longer stems so that the spent seed heads are hidden. The leaves are grass–like. In the wild it doesn't get much taller than 6 inches and not much broader, but in the garden with water it may double that. *Erigeron chrysopsidis* is much like it but even more attractive, with softer hairier leaves, very woolly buds, and larger daisies. But, whereas *E. linearis* is easy to grow, *E. chrysopsidis* invariably dies and I can't even get seed of it to germinate.

My other collected yellow daisy is *Eriophyllum lanatum* var. *integrifolium,* which differs from typical *E. lanatum* in having entire leaves and smaller flowers. Stems and leaves are very white woolly, and the plant is quite compact and upright. It behaves like *Erigeron linearis,* blooming continuously, seeding itself, growing larger than in the wild. It doesn't like an excess of water and is not long lived. The erigeron is easily divided, but not the eriophyllum. Because of its aversion to summer sprinkling, the eriophyllum or Oregon sunshine is growing around the yard wherever it can with only a few small plants in the drier part of the rock garden.

Many campanulas are available, but I have sampled only a few of this beautiful genus. My earliest one is *Campanula portenschlagiana.* Several of these are planted in proximity to *Dicentra* 'Luxuriant.' The bellflower has shown no inclination to encroach on its neighbors. A few plants are in small rock crevices where they survive, but no cascading mass of foliage, yet. The blossoms, borne in great profusion, are of a vivid purple–blue, brighter than most campanulas. Now, *C. portenschlagiana* 'Resholt' has joined the older form. The glossy, sharply–toothed leaves of this and many other campanulas are a boon all season.

As the spring flowers pass their prime, the seedy stalks are cut down, straggly branches trimmed back, rampant bushes pruned, unwanted plants removed, and watering becomes a daily necessity.

To take even a cursory glance at the multitude of penstemons would require many pages. They vary from wee, flat *Penstemon caespitosus* to tall, coarse *P. grandiflorum.* Many of the gorgeous large–flowered blue ones do their very best in sand; deserts are their homes, so they self–sow here. One I assume is *P. hallii,* grown from seed, is among my favorite small penstemons. The little clump of grass–like leaves, 6 to 8 inches tall, is supplemented by short flower stalks with several chubby blue bells, large for the size of the plant. It blooms early, one of the first penstemons. It divides easily and prospers wherever I plant it, even where the area is sprinkled overhead. I have *P. hirsutus* 'Pygmaeus,' modest in color and size, but boun-

tiful in flower, and in foliage that colors brilliantly in spring and fall. There are shrubbies: small *P. procerus,* tall yellow–flowered *P. barbatus* (really a nice creamy yellow), *P. pinifolius, P. richardsonii, P. crandallii, P. linarioides,* and others grown from seed. This is a good climate for penstemons, and I plan to add more both from seed and plants offered by the too–few rock garden nurseries.

Some plants, such as *Verbena canadensis,* are valued for their ability to bloom long and freely, even during hot weather or after frost. Its somewhat straggly habit is not too noticeable planted among heavenly blue flax and brilliant blue *Delphinium grandiflorum* 'Blue Mirror.' Good additions to this group of heat–tolerant plants are *Gypsophila repens* and *Geranium sanguineum* var. *prostratum (lancastriense),* both with pink flowers to enhance the rosy verbena. All these are vigorous, floriferous plants, and the linum and delphinium give height to the assemblage.

At present helianthemums are taking up rather more than their share of the south terraces. The fault of blooming only until noon is overcome in many named varieties, which are superior to seedlings in most ways. *Helianthemum* 'Amy Baring' is a delightful prostrate plant with green foliage and orange–yellow sun–roses that tries to bloom all summer. I hope it proves hardy, but older plants of helianthemum suffer from hard frost, although most recover.

Another fresh green mat is produced by *Galium anisophyllon,* raised from seed. The whole plant presents a cool effect after the warm weather is well under way. The near–white flowers are displayed in airy clusters, and the bright green leaves, in whorls, decorate the soft mat. It increases slowly and can be divided. The roots or stems seem to have a somewhat unpleasant odor not noticeable unless cutting or digging around it, a minor fault in an otherwise very worthwhile plant. Asperulas and galiums rarely appear in plant catalogs. Some of the small asperulas are particularly desirable. I am trying out all that are offered, and success has been variable; the oldest one still with me is 3 years old, so I hesitate to comment on their performance here.

To find an oenothera that can be trusted on a sandy rock garden requires much elimination. The beautiful white–flowered *Oenothera pallida,* growing locally on sand dunes, is much too land grabbing, as well as too large, for my terraces. Yellow *O. serrulata* is appropriate in size, blooms in summer, and is a very dainty plant of the Meriolix section. The individual plants don't spread underground, but the seedlings appear in excessive numbers.

The queen of the oenotheras is surely *O.* 'Mexicana Rosea': large clear pink flowers appearing from May till hard frost, upright foliage with narrow jagged leaves frequently displaying red tints. It is hardy, easy to increase (no seedlings here), and fragrant, too. It does ramble by underground stems,

so the colonies have an informal nature. The flowers, because of their size—three inches or more across—outshine most rock garden blossoms. Blue flax is compatible, and very small flowers such as *Gypsophila repens* make a good contrast in size. *Artemisia schmidtiana* 'Nana' is fine in the foreground and *A. canescens* in the background. A great pest is the leaf–cutter bee which loves the satiny petals of the oenothera to line its nest. The half–circles the bee cuts out can reduce every flower to a fragment in a short time.

There is a campanula with a golden tinge to its leaves, possibly *Campanula* x *tymonsii,* which blooms at the hottest time of year. Its leaves are much after the pattern of *C. cochlearifolia,* on a prostrate creeping mat. The pale bluish bells are about the same size, but they face up and are a shallow bell shape. Before the blossoms open, the entire foliage mass turns golden and is soon covered with flowers. It blooms for an exceedingly long time, enduring the hottest weather. It spreads at a moderate rate, and is a jewel for sunny, hot positions as well as cooler locations.

Sedums are difficult to describe. *Sedum pluricaule* 'Rosenteppich' blooms in August. It is completely deciduous, opening up its new succulent foliage rather late. The rosettes have tints of rose, blue, and gray—very nice in summer. Then in August, rosy–purple flowers appear in masses. These remain presentable only a short period, but when they are removed, the foliage again pleases. It is not at all rampant. The first frost ruins the entire plant above ground.

A search in past ARGS *Bulletins* brought to light no mention of *Scutellaria alpina* except as a plant seen on a trek through the Alps. But someone must grow it because seed is offered in the seed list almost every year. Seed was the source of my plants. I have been growing *S. alpina* for more than 15 years, always in light soil but not in the same garden for I have moved several times. It has been an easy doer, able to cope with extreme heat or cold, dry or wet. The flowers are the largest of any scutellaria that I have grown. It is quite showy in bloom because of the many flower stalks bearing the flowers above the foliage mass. The blossoms are the labiate type of the mint family. The leaves are set thickly on the stems with short nodes so the plant is dense, compact, and low. New flowering stalks keep appearing, so it is seldom out of bloom. Seedlings appear in abundance but not enough to term it weedy. These young plants can be moved, though mature plants would probably resent moving. I haven't tried dividing any of the plants because so many young ones are available. The coloring of *S. alpina* is a two–tone or bi–colored lavender–blue and creamy–white with hints of lavender.

A few years ago I sent for seed of the white form of *Scutellaria alpina* from which I managed to get two, alive, onto the rock garden. The white form is not pure white, but the same creamy white with a hint of lavender of the

species. Unfortunately the white form is not as dependable as the species. It is somewhat smaller in all its parts and disappears when not satisfied. However, one 4–year–old plant has been seeding itself. The seedlings are generally white, but many die before they are a year old. There are, now, in various locations about six plants which are 1 to 2 years old. I am hoping some of these will show the strong constitution of S. alpina.

Summer weather, with low humidity and high temperature, demands special plants that are sun–loving and heat–tolerant. Green or gray foliage mats, white and pastel flowers highlighted by brighter colors, fragrant blossom or aromatic leaf—these are the essence of the rock garden in summer.

Arenaria (Minuartia) laricifolia ranks high as a bright green, grass–like ground cover if one of moderate growth is desired. My largest mats are about a foot wide in 5 years. The white flowers aren't so large as those of *Arenaria montana* and are more starry in shape, borne in an airy manner all summer. This arenaria is not the least daunted by the fiercest southern exposure.

Low–growing *Artemisia schmidtiana* 'Nana' is a joy in the summer garden. The fluffy mounds seem to invite your touch, and then you become aware of the tangy fragrance of sage, so characteristic of the deserts. *Artemisia canescens* is taller with foliage dissected into the tiniest divisions like a cobwebby lace—a work of art. The flowers are of no moment, better removed. *Artemisia canescens* might be rather large for a moderate–sized rock garden.

Achilleas are fairly close kin to the artemisias. There are four kinds on the sunny south terraces. These all have small clusters of tiny white daisies in late spring or early summer. The foliage of all is very attractive, varying from an ashy white to gray–green. Names of these seem confused as they are hybrids, and I have received different plants under the same name. The one with the best all–year–round appearance is *Achillea ageratifolia.* None of this white–flowered group has spread unduly.

The first week in July finds the indomitable *Campanula cochlearifolia* opening its small bellflowers on short stems in profusion. It rambles all over the lower north terrace, and a few colonies are on the west terrace and on the upper level. The little, shiny, toothed leaves are decorative all season. The white form seems more permanent; the blue–flowered plants have gradually disappeared.

Fall is a season to enjoy. Watering the garden ceases to be a daily chore, and the weather is often the best of the year, warm and calm, but often frosty at night. Few flowers choose this late season to start blooming, but many have a second burst of blossom that rivals the first. The dwarf asters bloom then, but few of them can be admitted to the rock garden. They just take over! *Ceratostigma plumbaginoides (larpentae)* also flowers in fall, but it, too,

requires much space. It is very colorful with its bright blue flowers. If annuals are not banned, the deepest purple form of sweet alyssum makes a delightful companion for the dwarf asters, and greets one with fragrance.

Fall, also, is the time when the current season's performance is still fresh in mind, and so plans for the future are entered in the notebooks. And as I wander among the plants, I am molding my memories of the past, enjoyment of the present, and dreams of the future into the perfect rock garden.

The Exchange

Wanted: Seeds of *Erythromium rostratum* (Big Thicket area of east Texas) and *Erythronium propullans* (Minnesota, etc.). Will trade seeds (to be collected) from extra–nice wild *Erythronium revolutum* x *oregonum* or other Vancouver Island natives such as *Romanzoffia tracyi*. A. Guppy, Box 7216, Depot D, Victoria, B.C. V9B 4Z3, Canada

Sources of Dwarf Hollies: Though a number of you have expressed interest in the article on dwarf hollies by Virginia Morell in the Winter 1988 issue of the Bulletin, you have also expressed frustration at not knowing where to get the hollies. They are not easy to find in most areas. The following are sources Virginia has found.

The Cummins Garden, 22 Robertsville Rd., Marlboro, NJ 07746 *A Bulletin advertiser (Only known source of *Ilex* x 'Rock Garden')

Miniature Plant Kingdom, 4125 Harrison Grade Rd., Sebastopol, CA 95472 (*I. serrata* 'Koshobai'—a real jewel. He also ships.)

Holly Haven Hybrids, 136 Sanwood Rd., Knoxville, TN 37923 (Large collection including 'Dwarf Pagoda,' 'Green Dragon,' 'Piccolo,' and several other crenatas. He also lists 'Clarendon Spreading' and 'Maryland Dwarf.')

Simpson Nursery Co., 1504 Wheatland Rd., P.O. Box 2065, Vincennes, IN 47591 (*I. verticillata* 'Red Sprite.'

For anyone interested in the Holly Society, the Secretary is Mrs. E.R. Richardson, 304 North Wind Rd., Baltimore, MD 21204.

Help Needed: My side yard is shaded by a silver maple. If it were not so important for cooling the house, I would cut it down. A raised bed was filled with roots just 5 months after being made. Any suggestions for coping with the roots? Barbara Coatney, PO Box 160, Etna, CA 96027.

A Different View of *Thlaspi arcticum* vs. the Oil Conglomerates

Helen A. White
Anchorage, Alaska

The article about *Thlaspi arcticum* and potential drilling in Alaska's Arctic National Wildlife Refuge (ANWR) on page 94 of the spring issue of the *Bulletin* contains much misinformation. The author asserts to begin with that the plant is hard to find in garden literature and implies that it exists only in the wildlife refuge which covers about 20 million acres on Alaska's North Slope.

It is not difficult to find in garden books. I have three such books right here which describe it: Hulten's *Flora of Alaska and Neighboring Territories,* Anderson's *Flora of Alaska and Adjacent Parts of Canada,* and Polunin's *Polar Arctic Flora.* The first two books show the plant in question as being found in Canada's Yukon Territory as well as in Southeastern Alaska. With such a wide spread of known habitats there are bound to be others yet to be discovered.

There is an extremely good chance that *T. arcticum* will be discovered in yet other stations in Alaska since the two where it is known are more than a thousand miles apart, and there are many thousands of acres of the state as yet to feel the tread of botanizers. It is an insignificant looking and weedy appearing little plant and could easily be overlooked.

The author further asserts that the Arctic Ocean adjacent to the refuge accounts for 10% of the world's fish harvest. In actual fact, not even 1% comes from the Arctic. The refuge is definitely not considered the most important biome in this hemisphere—far from it. It is important, as any unique habitat is, but others in the state are just as important and unique.

The author's point in discussing *T. arcticum* and other plants and wildlife of ANWR is that they will be harmed if Congress agrees to open a portion of the refuge to drilling. She quotes the federal government Draft Coastal Plan in Resource Assessment as saying that there is less than a 20% chance of finding oil in the ANWR region. Oil companies will drill with just a chance of 3% and take the risk of finding black gold. Twenty percent is considered a good potential in the industry.

The article also implies that if oil were to be found in the ANWR it would be only enough to serve America's needs for 200 days (more than half a year), which may be true. But that is quite a lot when one considers that we procure oil from many sources. Would the author care to be without all the

things that petroleum makes possible, from perfume to gasoline, even for 200 days?

The author of the Thlaspi story also mentions the quantity of oil spilled at the adjacent Prudhoe Bay oil field. That was regrettable, of course, but it was promptly cleaned up with no harm done. I would venture to wager that more than that amount is spilled in New York's marinas and small boat harbors in a day or two; many small spills equal one large spill.

It is to the advantage of the various oil conglomerates to take special care of the environment as they work. They certainly do not operate as they did some years ago. The wildlife and flora in the Prudhoe Bay area have survived very well and in some cases have even increased since the drilling first began. The oil companies have proved to be good neighbors.

Up to 90% of the state of Alaska's income is derived from petroleum production. The state needs petroleum to keep operating on a decent level. We think the oil companies, with government oversight, can protect the refuge's plants and animals and also produce oil.

Omnium-Gatherum

New Postage Rate—Due to new postage rates, the mailing charge for the ARGS/PHS Lending Library will be $1.75 per book instead of $1.25. An updated ARGS/PHS Library Service Catalog was mailed to members in June along with the new Membership Directory.

Exchange Column—The Interest Survey showed a definite desire for both a help wanted or trouble shooter column and a wanted column, described as free for non–professionals and dealing with information, seeds, tools, and plants. We will start out with the two ideas combined in the Exchange and see where it leads. The new column, beginning in this issue, will be a place to exchange ideas and information, to give and get help, but will have nothing to do with money. If you have something to sell, then it's an ad you need, either regular or classified, and you contact our Ad Manager, Anita Kistler.

The Exchange is for you if you have something related to rock gardening to give away or to exchange; if you need to know how to grow something, where to find something, or what to do about garden pests with or without feet; if you want suggestions of plants to try, names of others using computers to keep garden records, or a list of good garden books that will put you to sleep or wake you up.

Requests may be sent to the Editor. Please include your address so that those responding may do so directly. If there is a response of particular

interest, a copy sent to the Editor will be appreciated. Some replies will be printed depending on interest and space available.

Interest Survey—The surveys are still coming in. The final compilation of results will be reported in the fall issue so there is still time to be counted.

AGS Conference, 1989—The Diamond Jubilee Conference of the Alpine Garden Society is being held at Exeter University in the county of Devon, on the weekend of Friday, 14th April 1989 to Sunday, 16th April 1989. Speakers invited to talk include Jim Archibald, Jim Jermyn, Christopher Grey-Wilson, Phil Pearson and Steve Doonan, and as well as the lectures, the Conference will host the West of England Alpine Show for this year. Other attractions will include trade stands, exhibits and sales tables, visits to local gardens, practical demonstrations, and as an added attraction, pre- and post-Conference Tours of English gardens, which will include the Main Spring Show in London.

Further details and booking arrangements are being finalized, but in the meantime please contact Roger Stuckey, 38 Phillipps Avenue, Exmouth, Devon, England, with any queries.

Some things you should know—about *Bulletin* policies and about submitting articles and pictures for publication in the *Bulletin*.

Ideal: Articles should be typed, double spaced, using a reasonably dark ribbon; this includes computer printer as well as typewriter ribbons.

Actuality: Even articles handwritten on paper bags will be considered for publication, if they are legible.

Frequently asked question: How long should my article be?

Usual answer: As long as it takes to say what you have to say without crowding or padding.

Restrictions: I have been asked to avoid poetry, foreign languages other than Latin in botanical names, and travelogs that stray far from the specific interests of rock gardeners. Articles featuring North American plants, places, and gardens are to be encouraged.

Question: I haven't written very much. What if I have something to say but don't think I write well enough for the *Bulletin*?

Answer: If you have something to say, by all means say it. Get the ideas down somehow and let the editor worry about dressing them up for their appearance in public. That's one of the editor's jobs.

Question: I write well. How can I keep the editor from meddling with my beautiful prose?

Answer: Simple. Tell the editor that you do not wish to have your beautiful prose meddled with. If the editor agrees that you have written beautiful prose, your wish will be respected. If changes seem to be needed, your agreement will be sought. If no agreement is reached, your article will be returned. (Long

ago my father sent an article to Roy Elliott, editor of the AGS *Bulletin,* with the request that he not make changes. A piquant and very polite reply came from Mr. Elliott. Would he mind terribly if the editor took the liberty of moderating somewhat the 90 degree slope on which my father wrote of sitting, contentedly meditating upon the ponderosa pines and great masses of *Lewisia tweedyi* growing there?)

Frequently expressed problem: I don't know enough to write for the *Bulletin.* I don't have anything interesting to write about. I'm afraid to write for the *Bulletin*...all those experts out there...a chapter newsletter maybe, but not the *Bulletin.*

Solution: If you are truly convinced that you have nothing to contribute, then find someone who does. Encourage that person, or better yet those persons, firmly and beguilingly to write for the *Bulletin.* If our membership won't write for the *Bulletin,* who will? Being such a highly specialized group makes it difficult to find outside authors unless they belong to kindred organizations, which also have publications and are scrambling for articles. It isn't as though we wanted articles about politics, sports, great new salad ideas, or something else easy.

General preference: If recounting a trip to the wilds or to a garden, it is far more interesting to describe fewer plants in greater detail and tell a bit about their growing conditions than to list many and tell nothing more about them than that they were seen.

Editing policy: It is the policy of this editor to edit gently so that the author's intent, basic wording, and individuality are not violated. Changes are made in the interest of clarity and correcting typographical errors in spelling, punctuation and the like. If the article needs major revision the author will be consulted if permission has not already been granted. Many authors (including some of the best) will say something like, "Here's an article for your consideration. Make any changes you think necessary." This is helpful and speeds things up considerably.

Plant name policy: As you have doubtless observed, the world of plant names is far from static. In order to achieve some stability, the policy here is as follows. Plant names from each article are compiled into a huge list: typically the list runs from twelve to fifteen pages double spaced. It is first checked in *Hortus III* and the *Seedlist Handbook.* If there is disagreement, and there often is, further checking is done in other references. The list is then sent to a superb gardener and meticulous researcher for a final check with her references. This invaluable help will be discontinuing as it has proven too time consuming. The editor will use libraries of the University of Washington for this final checking unless a more practical solution is found. After the research is completed, the names are checked in each article and

appropriate corrections made. Despite our best efforts there are plant names we are unable to verify, particularly cultivars, many coming from seed exchanges, nurseries, and catalogs. A further listing of references used will be provided in a later discussion. Your suggestions for reliable references, especially from your area, are most welcome.

Color photographs: In order to have color inside the *Bulletin,* it is necessary to have from six to eight excellent, very sharply focused slides all on the same film. Kodachrome is preferred because of its quality and frequency of use. Ektachrome or Fuji film are possibilities. Slides appearing to be in sharp focus when screened are not necessarily so when printed. Inside the *Bulletin,* there will usually be two pictures to a page so that horizontal slides are most useful, though it may be possible to crop vertical slides. For a color cover, a vertical slide is preferred.

Black and white photos: These must be exceptionally sharp in focus and have good contrast in order to reproduce well.

Drawings: Versatile, inexpensive, and by far the easiest to reproduce well, drawings should form the *Bulletin's* pictorial backbone. Drawings may accompany articles or artists may send samples of their work to the editor and request a copy of the list of plants to be mentioned in the coming issue.

Deadlines: *Bulletins* are mailed out the fifteenth of January, April, July, and October. Articles and color photographs should reach the editor by the first of November, February, May, and August; drawings and black and white pictures by the middle of the same months. If special arrangements are made with the editor, it may be possible to extend the article deadline. Also keep in mind that an article arriving before the deadline does not ensure its inclusion in the coming issue of the *Bulletin* due to space available, timeliness, subject balance, and other factors.

CHANGING YOUR ADDRESS?

Please send prompt notification of change of address to the Secretary,
Buffy Parker, 15 Fairmead Road, Darien, CT 06820

If you do not do so we must charge you for the additional postage needed to forward Bulletins and notices returned to us because of non-delivery at your former address.

Notice must be received 4 weeks before scheduled mailing dates of the 15th of January, April, July and October.

Supplement to ARGS Bulletin, Summer 1988

SEED EXCHANGE DIRECTIONS

Please note these guidelines.

1. Seed will be accepted only until **November 1, 1988.** No seed can be listed after that period because the list will then go to the printer.

2. While we appreciate any amount of seed you send, a minimum of 5 different packets of seed **suitable for rock gardens** is the requirement to receive donor privileges of 10 free packets.

3. Send clean, dry seed of suitable rock garden plants early. We are glad to have several mailings rather than have a large collection come all at once.

4. Use envelopes preferably approximately 2″ × 4″. One envelope of this size contains enough seed to fill our requirements.

5. Mark each envelope with the botanically correct name, where collected if wild, and all printed legibly.

6. Group envelopes together alphabetically with a rubber band, place in the mailing envelope with a legible list.

7. Write the name and address of the donor on the inside list and outside of the mailing envelope. Please print in **BLOCK CAPITALS.**

8. All members of the ARGS will receive a seed list.

SEND SEED TO

Carole Wilder
221 West 9th Street
Hastings, Minnesota 55033
U.S.A.

ARGS BOOKSTORE

Mail inquiries and orders to:
ARGS Bookstore, 3923 Rolling Hills Rd., Arden Hills, MN 55112

****NEW LISTING****

* SMALLER BULBS — Mathew	$34.00
* KALMIA THE LAUREL BOOK II — Jaynes	$21.00
WILD FLOWERS OF THE WESTERN CASCADES — Ross — Chambers	$15.00
VASCULAR PLANTS OF MONTANA — Dorn	$ 9.00
VASCULAR PLANTS OF WYOMING — Dorn	$15.00
THE HOSTA BOOK — Aden	$23.00
UTAH FLORA — Brigham Young University	$36.00
THE YEAR IN BLOOM — Lovejoy	$12.00

ADDITIONAL BOOKS

* ORCHIDS OF WESTERN GREAT LAKES REGION — Case	$28.00
WILD FLOWERS OF NORTH CAROLINA — Jusice and Bell	$13.00
* POROPHYLLUM SAXIFRAGES — Horny — Webr — Grounds	$43.00
* JEWELS OF THE PLAINS — Barr	$17.00
FLOWERS OF WYOMING'S BIG HORN MOUNTAINS AND BIG HORN BASIN — Jensen	$12.00
COLORADO FLORA WESTERN SLOPE — Weber	$16.00
* ENCYCLOPEDIA OF FERNS — Jones	$35.00
* A FIELD MANUAL OF THE FERNS AND FERN ALLIES OF THE US AND CANADA — Lellinger	$32.00
* THE OPINIONATED GARDENER — Charlesworth	$14.00
* FLORA OF THE GREAT PLAINS — University Press of Kansas	$36.00
* ROCKY MOUNTAIN ALPINES — Alpines 86 International Conference	$30.00
ROCK GARDENING — Foster	$18.00
* MANUAL OF ALPINE PLANTS — Ingwerson — reprint	$15.00
THE BERNARD HARKNESS SEEDLIST HANDBOOK — Harkness and D'Angelo	$23.00
* A SYNOPTIC GUIDE TO THE GENUS PRIMULA — Fenderson	$36.00

LIMITED SUPPLY

* PRIMULAS OLD AND NEW — Cooke	$22.00
* SAXIFRAGA AND RELATED GENERA — Kohlein	$25.00
* THE CULTIVATED HEMLOCKS — Swartley	$23.00
* ROCK PLANTS FOR SMALL GARDENS — Heath	$15.00
* ALPINES FOR YOUR GARDEN — Bloom	$13.00
THE NEW WILD FLOWERS AND HOW TO GROW THEM — Steffek	$13.00
WILDFLOWERS OF THE NORTHERN GREAT PLAINS — Vance—Jowsey—McLean	$12.00
HOW TO IDENTIFY FLOWERING PLANT FAMILIES — Baumgardt	$18.00
WILD FLOWERS OF SPAIN #1 — Innes	$ 5.00
WILD FLOWERS OF SPAIN #2 — Innes	$ 5.00
MYSTERY RIVERS OF TIBET — Ward — reprint	$ 8.00
A NATURALIST IN WESTERN CHINA — Wilson — reprint	$ 8.00
PLANTHUNTING ON THE EDGE OF THE WORLD — Ward — reprint	$ 8.00
THE DOLOMITES — Farrer — reprint	$ 8.00
RAINBOW BRIDGE — Farrer — reprint	$ 8.00

* denotes hardcover books

*** Postage and Handling — $1.50 for 1st book — $.75 each additional book ***
Overseas and Canada — $2.00 for 1st book — $1.00 each additional book

.... BULLETINS ....

Many past issues available — let us know what you're looking for — maybe we can help.

Following items postage paid

DECAL — ARGS Dodecatheon	*$1.25*	*SEEDS — 3 Methods*	*$2.50*
LAPEL PIN	*$3.35*	*TROUGHS — Construction and plants*	*$3.50*
ARGS SHOULDER PATCH	*$4.50*	*LIBRARY BINDERS*	*$6.00*
		Overseas and Canada	*$7.00*

ALL Orders must be prepaid in U.S. Funds, made out to ARGS Bookstore
ZIP Code must be given

AMERICAN ROCK GARDEN SOCIETY DIRECTORATE

OFFICERS

President . . . . . Lee M. Raden, Alpineflora, 1 Alpine Way, Phoenixville, PA 19460
Vice President . . . . . Sandra Ladendorf, 123 High Hickory Road, Chapel Hill, NC 27516
Secretary . . . . . Buffy Parker, 15 Fairmead Road, Darien, CT 06820
Treasurer . . . . . Diane D. Kern, P.O. Box 53, Spencertown, NY 12165
President Emeritus . . . . . Harold Epstein, 5 Forest Court, Larchmont, NY 10538

DIRECTORS

Term expires 1988 . . . . . William S. Folkman, Andrew Pierce, Waid R. Vanderpoel
Term expires 1989 . . . . . Don Jacobs, Paul Palomino, Dennis Thompson
Term expires 1990 . . . . . Nan Ballard, Pat Bender, Andrew Osyany

MANAGERS

Editor of Bulletin . . . . . Sharon Sutton, P.O. Box 1371, Port Townsend, WA 98368
Seed Exchange . . . . . Carole Wilder, 221 West 9th Street, Hastings, MN 55033
Slide Collection . . . . . Lois E. Ecklund, Route #5, River Haven, St. Cloud, MN 56301
ARGS Bookstore . . . . . Jean Stevens, Carole Wilder, 3923 Rolling Hills Road, Arden Hills, MN 55112
Advertising . . . . . Anita Kistler, 1421 Ship Road, West Chester, PA 19380
ARGS–PHS Library Service . . . . . PHS Library, 325 Walnut Street, Philadelphia, PA 19106
Archivist . . . . . Marnie Flook, 1906 Academy Place, Wilmington, DE 19806

CHAPTER CHAIRPERSONS

Adirondack . . . . . Joan Keefe, Deep Spring Road, Earlville, NY 13332
Allegheny . . . . . Walter C. Betzold, 131 Rochester Road, Pittsburgh, PA 15229
Arizona . . . . . Sonia Lowzow, R.R. 3, Box M365, Lakeside, AZ 85929
Berkshire . . . . . Norman Singer, HC 66, Box 114, Sandisfield, MA 01255
Columbia–Willamette . . . . . David Palmer, 19083 Walling Circle, West Linn, OR 97068
Connecticut . . . . . Howard Pfeifer, 27 Beech Mountain Road, Mansfield Center, CT 06250
Delaware Valley . . . . . Chuck E. Ulmann, 1320 Ashbridge Rd., West Chester, PA 19380
Emerald . . . . . Eugene Sebring, 463 Lindley Lane, Eugene, OR 97401
Great Lakes . . . . . Jim Briggs, 3270 E. Lansing Road, Bancroft, MI 48414
Hudson Valley . . . . . Edith Young, Box 332, RFD 3, McDougal Lane, Peekskill, NY 10566
Long Island . . . . . Joann & Fred Knapp, 56 Kaintuck Lane, Locust Valley, NY 11560
Manhattan . . . . . Lawrence Thomas, 340 E. 74th, New York, NY 10021
Minnesota . . . . . Jean Stevens, 3923 Rolling Hills Road, Arden Hills, MN 55112
New England . . . . . Faith Magoun, 6 Spy Rock Hill, Manchester, MA 01944
Newfoundland . . . . . Bodil Larsen, Site 78, Box 36, St. John's, Newfoundland A1C 5H4
Northwestern . . . . . Dennis Thompson, 124 N. 181 Street, Seattle, WA 98133
Ohio Valley . . . . . Dorothy Parker, 3 West Page Avenue, Trenton, OH 45067
Ontario RGS . . . . . Joerg Leiss, 1462 Dundas Crescent, Mississauga, Ontario L5C 1E9
Piedmont . . . . . Paul Jones, 148 Stagg Road, Hillsborough, NC 27278
Pike's Peak . . . . . Gary Mueller, 2103 Essex Lane, Colorado Springs, CO 80909
Potomac Valley . . . . . George Phair, 14700 River Road, Potomac, MD 20854
Rocky Mountain . . . . . Sandy Snyder, 1952 Ridge Road, Littleton, CO 80120
Siskiyou . . . . . Phyllis Gustafson, 250 Maple Street, Central Point, OR 97502
Southern Appalachian . . . . . Ev Whittemore, P.O. Box 74, Penrose, NC 28766
Southwestern . . . . . Laura Jezik, P.O. Box 1382, Los Angeles, CA 90053
Tacoma . . . . . Candy Strickland, 2722 East 84th, Tacoma, WA 98445
Watnong . . . . . Ruby Weinberg, Beavers Road, RR 3, Box 69, Califon, NJ 07830
Western . . . . . William S. Folkman, 2640 San Benito Drive, Walnut Creek, CA 94598
Wisconsin–Illinois . . . . . Deon Prell, 1160 Austin Road, East Troy, WI 53120