

ROCK GARDEN



QUARTERLY

VOLUME 57 NUMBER 2

SPRING 1999

COVER: *Helleborus orientalis*

by Lori Chips, Norwalk, Connecticut

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Printed by AgPress, 1531 Yuma Street, Manhattan, Kansas 66502

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BULLETIN OF THE NORTH AMERICAN ROCK GARDEN SOCIETY

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FEATURES

- A Baker's Dozen, by Baldassare Mineo 83
- Sweet Little Buns, by Phyllis Gustafson 93
- Some are Easy...Some are Not, by Kirk Fieseler 99
- On the Edge, by Jeff Wagner 109
- Summer Vignettes: Towards a Year-Round Rock Garden,
by Panayoti Kelaidis 119
- Raised Beds in Shade, a Novel, Humus-Building Technique,
by Jim McClements 129
- Cocos nucifera*: Is This Plant for Your Rock Garden?,
by Barney Barnett 133
- The Worst Plants: You'll Wish You Never Let Them In,
A Symposium 136

DEPARTMENTS

- Errata 139
- In Memoriam: Harland Hand 140
- Musings 143
- Books 145



Siskiyou Rare Plant Nursery crevice garden

photo, Baldassare Mineo

A BAKER'S DOZEN

by Baldassare Mineo

Here is a baker's dozen of my favorite plants. My remarks are from my experiences growing these plants in a garden setting, not in nursery production, which includes different circumstances and variables.

I would not be without these outstanding plants in my rock garden. They are special to me because each have qualities that make them valuable. All are well-behaved plants that do not crowd their neighbors. All are quite dwarf, many miniature enough for a trough garden. Some are special because they have an outstanding combination of foliage and flowers, such as *Androsace sempervivoides* and the *Daphnes*; some because of their special flowers and long season of bloom, as with *Alyssum tortuosum* and *Armeria maritima* 'Rubrifolia'. Others are outstanding for their strong character and shape, as *Ulmus parvifolia* 'Hokkaido'.

My rock garden is the display garden for my nursery, Siskiyou Rare Plant Nursery. I grow hundreds of plants in the garden. Besides acting as a living showroom, the garden provides an ideal place to observe, test, learn about, photograph, collect seeds and cuttings, and make divisions for the nursery.

The favorite plants I have chosen have proven successful and hardy for me; they are considered, in most cases, to be adapted to Zones 5-9. Our region of southwestern Oregon, known as the Rogue River Valley, is USDA Zone 7b.

By and large I am grateful to live and garden in this climatic zone. I admit that our climate is quite mild and forgiving in comparison to the colder climates of many of you reading this article, but some peculiar weather conditions here take a bit of getting used to. Gardening and running a nursery in southern Oregon for more than twenty years has accustomed me to variable weather from year to year. As far as winter lows are concerned, one year we can enjoy being a mild Zone 9 and the following year we can drop a bit below 0°F and experience a period of Zone 6. Often these dips in our normally mild winters arrive with little warning. For instance, the pleasant Indian Summer of 1998 extended well into November, and then suddenly we dropped to single digits (°F). With such temperature swings, even plants well suited for Zone 7 succumbed. To make matters worse, and increase my garden losses, I rarely learn from the past cold spells. After a few consecutive warm winters, I routinely plant many Zone 8 and Zone 9 plants, enjoying them temporarily, foolishly ignoring the inevitable killing frost

that eventually comes. I have killed and replanted many plants in my rock garden, but the following lists of favorites have proven themselves capable of easily handling our changeable climate.

Summer heat with low humidity is one weather condition we can count on locally. Because of this I often find it helpful to provide a bit of shade or a shaded root run even for many plants that are considered heat- and drought-tolerant. This is not to say that my favorites listed below are xeric plants. But it is to their credit that they are so adaptable that they will take our warm summers, and yet grow in cooler and moister regions quite well, too. Reports of success with these plants have been received from many customers over the years. Reference books confirm the hardiness and reliability of these selections.

I make some effort to choose plants according to my climatic conditions, but I am more diligent when I locate the plants within the many microclimates of my garden. I feel that if I have failed with a plant, it is simply because I have not planted it in the proper conditions yet; I have not found the right combination of soil and exposure. The occasional success resulting from using this method of trial and error has encouraged me to try and try again until I find the situation that suits a species. In the right location a plant will live through many seasons, and, hopefully, it will thrive, growing and flowering as it would in its native habitat.

I feel it is safe to make the following rash generalization: if I want the plants to live long and prosper, I provide "poor" conditions. "Poor" is perhaps a misleading word, meaning here that the soil is well-drained with a good amount of sand, gravel, or both added to a loam or humus-based mix. "Rich" conditions—where the soil includes excessive amounts of organic matter which provides plentiful nutrients—cause most rock garden plants to quickly grow themselves to death.

Just completing my upcoming book, *Rock Garden Plants—A Color Encyclopedia*, has expanded, for me, the long list of plants for the rock garden. The writing was a seven-year project, with much of the early years' work devoted to the task of selecting which 1300-1400 plants to discuss and accompany with color photos. There are so many plants that are excellent candidates for the rock garden. To be honest, I could make a list of a dozen different favorite rock garden plants monthly. Whatever the season, there are shining stars of the moment. For instance, I am making this list on a cold, blustery day in mid-February, and these plants are all looking good in the garden. No doubt many of you have favorites that I did not include in this short list; I bet they are on another list of mine. I haven't even mentioned any species of *Eriogonum*, *Ptilotrichum*, and *Origanum*. Those will have to wait for another article. Without a doubt the following are the outstanding "old friends" that never fail to delight me in every season.

For each of the following plants I have provided the catalog description from the Siskiyou Rare Plant Nursery catalog. The descriptions have been somewhat reworded and rearranged to fit this format. Dimensions include height in flower, then the width in about three years, unless mentioned otherwise. Following the catalog description I have added my personal comments to explain my personal fascination with each plant. Try as I may to make the catalog descriptions as complete and interesting as possible, they are rarely enough to paint a complete picture. Of course that is what prompted my new color-photo book.

Alyssum tortuosum (photo, p. 91)

Catalog description: 3" x 12". From E. Europe comes this charming species with familiar yellow flowers in spring set on a tangled mat of contorted woody stems of neat silver-gray foliage. For sun and scree soil in the rock garden or trough. Zones 4-10.

Comments: Consistently a good, hardy performer taking hot sun and full exposure to all the elements while providing a spreading cushion of delightful silvery foliage with a strong blue-green cast that always looks fresh even in winter. The unique foliage color looks especially handsome hanging over the split concrete block surface that edges its bed in my garden. It is nearly the same color as the concrete. As most alyssums prefer an alkaline soil, the slight leaching of lime from the concrete block may explain the health and longevity of my garden stock plant. The soft yellow flowers smother the foliage for a long season in spring.

Androsace sempervivoides

Catalog description: Rock Jasmine. 3" x 6". *Androsace* is a large genus of refined and desirable alpine plants in the primrose family. This species is choice, yet easy, with the spreading habit and look of a miniature hen-and-chickens. Small, green rosette foliage, red runners, and bright clusters of pink flowers on short stems in late spring. For sun or part shade in fertile, well-drained soil or scree. Kashmir and Tibet. Zone 4-8.

Comments: What more can a rock gardener ask for than a diminutive *Sempervivum* look alike?

Armeria maritima 'Rubrifolia' (photo, p. 90)

Catalog description: Thrift, Sea Pink. 8" x 12". A colorful foliage selection of this easy and popular group of plants. Attractive year-'round, but especially when literally covered with the spherical heads of rosy-pink flowers which sit just above the foliage. Flowers in spring and, if spent bloom sheared, through the summer. The species is widespread through the N. Hemisphere and southern S. America, but this form is unique with short, grassy foliage colored rich purplish-red most of the year. For sun and any good soil. Zones 3-9.

Comments: A striking combination of foliage and flower color. When not in bloom the foliage looks great contrasting with the predominant greens and grays of the rock garden. In a cold winter, this beauty's foliage turns purple-black and is stunning in my garden because I happened to combine it with the deep green *Cotoneaster microphyllus* var. *cooperi* and *Sempervivum dolomiticum*. Both of these companions have complementary, purple-brown-edged foliage in winter. This little micro-scene warms the heart during a long, dreary winter. *Armeria maritima* 'Rubrifolia' was a rarely seen cultivar when I first saw it in Norman Singer's Massachusetts garden in 1991. Now it is becoming quite widespread with wholesale growers distributing it.

Asperula gussonii

Catalog description: 1" x 8". Many of the hardy, Mediterranean species of *Asperula* are choice plants for the rock garden or trough. They like it bright and sunny, but not too hot and dry. Late spring flowers. *A. gussonii* has emerald-green leaves and stemless clusters of flesh-pink flowers in late spring. It is good in scree, trough, or tufa rock. From Sicily. Zones 5-8.

Comments: This charmer eventually spreads to form a 12"-round spot of Berber-carpet-like foliage consisting of pinched clusters of needle leaves. These leaves, when fully exposed to winter's cold, turn a warm red-brown. An interesting sight in my garden happens when an edge of the mat nestles against a warm, sun-basking rock, for there the foliage retains its rich green, even in the coldest weather.

Daphne arbuscula

Catalog description: 6" x 12". One of the choicest of dwarf shrubs. Small, narrow, evergreen leaves of dark glossy-green on somewhat prostrate branches covered in rich rose-pink, intensely fragrant flowers in spring. Best in part shade but takes considerable sunshine. A rich loamy soil with good drainage is required. Carpathian Mts. of e. Europe. Zones 5-8.

Comments: An evergreen gem that should be in every rock garden or trough garden collection. It has perfect scale of foliage and flowers and epitomizes a dwarf shrub from alpine habitats. In the nursery crevice garden this *Daphne* and the next enjoy a home on a northeast-facing, sloping wall, where their woody branches are interwoven with the gray foliage of *Androsace lanuginosa*. A delightful combination of foliage and flowers results. Covering the remaining exposed soil is *Thymus polytrichus* 'Pink Chintz' which serves as a perfect, flat-growing foil for its neighbors.

Daphne cneorum 'Pygmaea Alba' (photo, p. 91)

Catalog description: Dwarf White Garland Flower. 3" x 12". As above, this cultivar has the classic look of an alpine shrub, but here with smaller foliage and flowers. This cultivar is very floriferous with milky white fragrant blooms in April and May, often again in fall. A sturdy, dwarf grower, good in troughs. Grows well in sun to part-shade and, as above, requires a rich, loamy soil with good drainage. The species is native to central and s. Europe to Russia. Zones 5-9.

Comments: On the same sloping wall described above, this vigorous, miniature shrub has developed into a small cushion of matte, olive-green foliage. Beginning in winter, the center of each foliage rosette forms resting flower buds, waiting to burst into spring bloom.

Gentiana acaulis hybrids

Catalog description: 3" x 12". From creeping, evergreen mats rise gorgeous, deep-blue trumpets in late spring. Easy to grow in fertile garden soil, shaded only from hot sun. A widespread and somewhat variable plant found in the European Alps, Carpathians, N. Spain, Italy, and Croatia. Zones 3-8.

Comments: I have never elaborated in the catalog when describing this rock garden plant standard. It never seemed necessary. It is the logo plant for the Alpine Garden Society of England. Need I say more?

Globularia repens

Catalog description: Globe Daisy. 3" x 8". Mediterranean natives for sunny locations. Easy, spreading plants that root as they creep. Mostly summer-flowering with showy, rounded pompon clusters of blue flowers. Zones 5-10. *G. repens* (also known as *G. repens* 'Nana', *G. cordifolia* 'Nana', or *G. nana*) is a micro-species

with minute, leathery leaves. Round heads of deep lavender-blue flowers. Good in troughs. For sun or a little shade and good, well-drained soil; limy scree for best flowering.

Comments: In the nursery garden this fine plant is displayed in many locations, but my favorite is in a large *jardiniere* planted with many choice plants and arranged with native pumice rock by Zdenek Zvolanek. Here this species grows as *Petrophytum caespitosum* does in many high elevations of our western mountains, flat, cliff-hugging, and absolutely charming. The dark, shiny, spoon-shaped leaves are arranged in star-burst-like rosettes. Often the bluish flowers are complemented by the neighboring bright yellow flowers of the following *Helianthemum* subspecies, which weaves its woody branches among the mat of the *Globularia*.

Helianthemum oelandicum ssp. *alpestre* 'Serpyllifolium'

Catalog description: 2" x 10". There are many excellent, but lesser known, species of *Helianthemum* in addition to the popular *H. nummularium*. This cultivar is another case of the more Lilliputian the plant, the more Gargantuan the name. Here's the whole *Helianthemum* package in a nutshell. Perfect for the smallest garden or trough. Tiny, dark green, thyme-like foliage and vivid yellow flowers late spring into summer. For sun and any good, well-drained soil or scree. Central and southern Europe. Zones 5-10.

Comments: An effective contrast of very dark foliage and bright yellow flowers. The blossoms seem to jump out at you. Typical *Helianthemum* care is suggested even for this dwarf subspecies; that is, give a light shearing after each flowering to encourage repeat bloom and a compact, neat habit.

Juniperus communis 'Echiniformis'

Catalog description (last sold in Spring 1992): 6" x 12" in five years. A bun-shaped miniature for the rockery or trough, deriving its name from a supposed resemblance to a sea urchin. Normally light green, ours is a particularly gray form. For full sun and any good, well-drained soil. A real "hedgehog" to propagate. Zones 3-10.

Comment: This bumpy throw-pillow of a conifer is perfect for the rock garden. It is a true miniature and will take a lifetime, maybe two, to outgrow its welcome. The rich, blue-green foliage so dense that no branchlets can be seen. As mentioned, it is difficult to propagate, which we do from cuttings, rarely getting enough plants to list in our catalog. We have a good crop of hefty-rooted cuttings at the moment, so watch for this beauty in a year or more in our catalog or a supplement list.

Primula juliana (x *pruhoniciana*) 'Dorothy'

Catalog description: 4" x 12". The julianas are now correctly placed under the hybrid name *Primula x pruhoniciana*. All are very hardy, long-spring-blooming perennials. 'Dorothy' forms neat mounds of small foliage and pretty heads of soft yellow flowers. Best grown in part shade and humus-rich, well-drained soil. Zones 4-8.

Comments: Tolerating cold, wet soil all winter, this group of plants emerges out of the ground every year around mid-February regardless of the weather. It has neat, small, saw-toothed leaves that emerge so minute but gradually grow larger,

reaching 2-4" in length. Clusters of flowers emerge before most other plants start, often continuing long after the late-comers have finished. 'Dorothy' grows happily in a peat bed on the east side of our office building, where its pale, creamy flowers complement yellow-striped foliage of variegated *Carex* species and the background planting of *Kerria japonica* 'Variegata' (prostrate form) with its emerging cream-edged foliage.

Teucrium aroanium

Catalog description: Germander. 2" x 6". Compact tufts of small, round, aromatic, silver leaves. Delicate, purple-veined flowers in July. The gem of the genus, native to S. Greece. A sun-loving plant, best planted in scree soil. Zones 5-9.

Comments: Old plants on the southwest slope of my crevice garden have grown up to 16" across, with a somewhat sprawling habit due to branchlets that form roots as they spread. Even in nasty, cold winters, the foliage is still attractive, consisting of crinkled leaves, palest olive-green above and edged and backed in silver. The dynamic flowers are held just above the foliage having all the delicate charm of small, pastel orchids. They are white, tinted lavender, heavily veined purple, and they have four small petals and one exaggerated, large lower petal, all overhung with a cluster of long, arching, purple stamens.

Ulmus parvifolia 'Hokkaido' (photo, p. 90)

Catalog description: Miniature Elm or Princess Elm. 12" x 8" in 20 years. This is the very slow-growing, miniature cultivar of the species native to China and Korea. It forms a tiny tree with a corky trunk and minute, serrate leaves. Quite an attraction in a trough or special spot in the garden. For sun or part-shade in any good soil. Zones 5-9.

Comments: Wherever this is used it gives the feeling of a mighty tree reduced to Lilliputian proportions. It grows in many spots in our display garden, but a favorite setting is in one of Zdenek's *jardinieres*, where it happily grows out of the top of a pumice rock, acting as a tiny sentry guarding the miniature garden below.

Baldassare Mineo is proprietor of the Siskiyou Rare Plant Nursery in Medford, Oregon; see ad pg. 153. His new book, *Rock Garden Plants—A Color Encyclopedia*, will soon be available from the NARGS Bookstore (no price has been set yet). His childhood list of favorite plants included tulips, zinnias, calla lilies, canna lilies, daylilies, sunflowers, and *Oenothera rosea*. He grew up spending summers in Dana Pt., California, with his grandparents, who lived next to a nursery, and walking along the coast admiring the oenotheras. This area is now largely devoted to parking lots and the only oenotheras are planted in beds and are *O. speciosa* 'Siskiyou', named after a plant selected from Siskiyou Rare Plant Nursery stock.



Arenaria species from the Wallowa Mts., Washington (p. 93)

Phyllis Gustafson

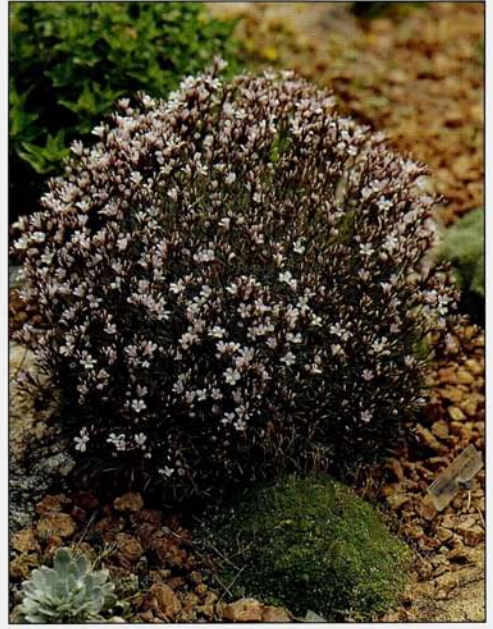
Draba rigida (syn. *D. bryoides* ssp. *imbricata* , p. 95)

Panayoti Kelaidis





Dianthus erinaceus (p. 94)
Phyllis Gustafson

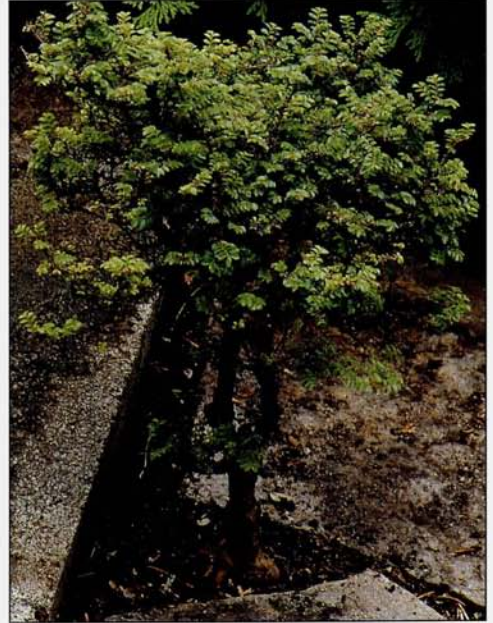


Acantholimon litwinovii
Panayoti Kelaidis

Armeria maritima 'Rubrifolia' (p. 85)
Baldassare Mineo



Ulmus parvifolia 'Hokkaido' (p. 88)
Baldassare Mineo





Alyssum tortuosum (p. 85)

Daphne cneorum 'Pygmaea Alba' (p. 86)





Siskiyou Rare Plant Nursery (pp. 83–88)
92 Baldassare Mineo

SWEET LITTLE BUNS

by Phyllis Gustafson

Two mornings a week for a few months each year I jump in and out of the old van, hands full of gallon cans and in 45 minutes create a perennial border. This garden has tall grasses and full pots of huge flowers of every color harmonizing or shouting at the world. I even create little paths and island beds—all in two spaces of a parking lot. The "garden" is a maze of color and brightness created to catch the buyer's eye. In the afternoon, I fold up the camp chair and wander home to remove the earrings and gypsy clothes, and I enter another garden. No blowzy grass or over-hybridized meadow plants are found here but plants from a higher place. This is my love, the rock garden.

Here are the delicate, small but tough plants from the ridges and steppes, the high plains and mountain tops. The most admired among these plants are the buns. Now I suppose you could have too many buns; all lined up in rows as if sitting on a huge baking sheet. But growing with the rosettes, mats, tufts and yes, even the tiny tangles, they are the joy of every rock gardener. The most patted and photographed bun in my garden is a

20-year-old at the apex of life, an *Arenaria* species (photo, p. 89) from the Wallowa Mountains in northeast Oregon. Twenty-five years ago Boyd Kline found this plant and, thinking it was a non-blooming form of *Silene acaulis*, brought it into the rock garden trade. This rock-hard mound of solid, glistening green is 9" high and 14" across. Only now that it is at the pinnacle of its life does it bloom. A few short, wiry stems in one patch or another on the undulating mound hold tiny, no-account, white flowers. In fact, they are best cut off. Never have I dropped one piece of sand or chipping down in the plant to make it mound up and act like a bun. It knew how to act from the beginning. Now that it is starting to show the stress of growing for nine months each year and never really getting to rest as it would under snow on its high peaks, I do feed it lightly a couple of times each spring.

For the hottest and driest place in the garden, the rock-hard acantholimon excels. With stiff, sharp-pointed leaves—no love pats for these—they come in every shade of gray-green to white. The thin-leafed

Acantholimon venustum must be watched in spring when the weather warms and is moist at the same time. This is the season when every blade of grass in this valley has red, rusty spores hanging on it. A sudden change in color will show that the stem of acantholimon is withering, and it must be taken off that very hour. I remove any litter that is around, clean up the chippings to add new ones, and dust with fungicide. With this care the 15-year-old has turned into three rock-hard buns that are covered with stems of pink bloom each spring. The other acantholimons do not suffer from this indisposition. I love the bowling-ball-shaped *A. hohenackeri* that holds the 6–8" stems of deep pink flowers in a graceful arch. The golf-ball size *A. acaerosum* with its bright pink flowers seems to adore the top ridge in a trough. With their long tap roots reaching down a foot or more the plants can go for long periods without water. All my plants are the size of dinner plates or smaller. On Ala Dag, that giant mountain that arises from the plains of southcentral Turkey, I saw plants the size of a man's head, and many were as big as a donkey's behind.

The genus *Dianthus* has given us some wonderful buns for the open garden. There are too many to choose from, so buy at least one of each or order seed. The 4" bun of *D. erinaceus* (photo, p. 90) has small, hard, sharp-pointed leaves mimicking an *Acantholimon* until it blooms. The small, rosy flowers are held singly just above the foliage. Even smaller, the beloved *D. anatolicus* (once distributed as *D. simulans*) is wonderful in a trough or the garden. The pink flowers are toothed, have a dark beard, and on each petal are small, pale spots.

Dianthus microlepis is a tiny bun with wider leaves. The solitary, clear-pink

flowers are toothed and bearded. The 'Alba' form is sparkling white and a nice change from the usual pinks. In 1997 I grew seed of *D. microlepis* in the subspecies form called *degenii*. This is even smaller and is the smallest of the plants in the troughs. *Dianthus pavonius* is one of the very first buns I grew, under the old name *D. neglectus*. It can take the form of buns or mats or pads from 1–3" across with pale to deep, rich pink flowers. The large flowers often have a central circle of pale dots but always have a buff coloring on the backs of the petals. *Dianthus x roysii* is a large-flowered variant or possibly a hybrid, and it also has the buff coloring on the undersides of the petals. *Dianthus haematocalyx*, with its blood-stain-colored calyx, is bun shaped only in its subspecies *pindicola*. In this form the cushion is very tight and the flowering stem is very short, the flower almost sessile. While I get away with growing it in the open, zone-7 garden, it will be lost in a severe winter. There are many more small *Dianthus* in forms of little mats and tufts—but we're talking buns, here.

'Sax Hill' is a small raised area in a cooler area in the garden with high shade from deciduous trees. The small, firm buns from the *Porophyllum* section of *Saxifraga* live in holes drilled through pumice rocks. I sprinkle a little lime on them once a year to counter any acid in the rocks. These tiny buns sit atop and between the rocks, high and dry. Yet the roots can penetrate the soft rock and go into the soil below for all the water and nutrients they need. In a mild spell in February these mounds are covered with color.

Some are truly buns, such as 'Clarissa', with huge pure white flowers, and 'Luna', the color of the full moon. 'Wendy' and 'Walter Irving' from the *x irvingii* subsection cover the tiny buns with pink flowers, 'Wendy's

are larger and paler pink while 'Walter Irving' has intense-colored, smaller flowers over very fine foliage. My favorite, if I must choose, is *x boydilacina* 'Penelope'. The tiny, tight bun is covered with soft orange flowers. The throat is deep maroon-red, and it bleeds right up the petals. The total effect is the most appealing apricot color. All these hardy folks are living in the open garden.

In early spring my attention is often caught by the intense yellow of the drabas. The slow-growing buns regale in tiny crevices in the garden or trough. Some of the best tiny buns have fantastic foliage with long, stiff hairs along the edges of the leaves or covering the whole leaf. I get seed every year from numerous sources and am not sure the names are always correct. But I put them in every little crevice in the garden and in January can already see the buds of yellow in the earliest flowering sorts. I still mourn *D. polytricha*, a soft cushion so hairy that it looked frosted with sugar all winter and early spring. It seeded ever so gently, and the few offspring were cherished. But they were cherished by the birds as well as by me, and so they were torn to shreds and died. I've never gotten a good strain of this species going again. So do try with me, because the joy of seeing the early flowers of this pad stays with everyone who has grown it. *Draba hispanica*, *D. parnassica*, and *D. zapateri* and all the similar plants are great in the open garden as well. The rosettes of hairy, toothed, stiff leaves stack tight to one another, making expanding little buns in any crevice in which you put them. The dense racemes of bright yellow flowers are welcome in the earliest spring. I like them best in vertical walls.

Draba rigida from Armenia is the perfect, little, congested bun (photo, p. 101). One plant on a south-facing garden is 7 years old and 2" across. It is

loved and patted by everyone, the optimal bun for small crevices or troughs. The fine stems carry single, bright yellow flowers. Two more very tiny buns for even the smallest trough are *D. bruniifolia* ssp. *olympica* from Turkey and *D. paysonii* var. *treleasii*. This native of the Olympics is the tiniest draba in the garden but as hardy as any. Both are tight buns and doing well in holes in a feather rock used as some growers use tufa.

All the drabas I grow are in neutral soil with good drainage. The only extra care is to make sure that the tiny slugs and snails do not devour the growing tips and buds in early spring. This is, as it is everywhere, an on-going battle.

One new-to-me bun-like plant, perhaps not as touchable as most, is *Silene caryophylloides* ssp. *echinus*. The very long, thin leaves point upward to protect the growing point in the center of each stem much as in some acantholimon. Grown from seed collected in Turkey by Vojtech Holubec, my three-year-old plants are about to flower! I can hardly wait! This is a plant that needs some lime.

Cuttings are a great way to have more of all your favorite buns. I take the cuttings of the saxifrages in February or March, if grown in a greenhouse, or up to May if grown outside. If you watch them very closely, you will often see small roots along the stems. If roots are already present the cuttings will easily continue rooting in a pot of pure, very clean sand or sand and perlite. Use up to two parts perlite to one part sand. If no roots are showing, go ahead and take the cuttings, but make sure to get as long a stem as possible. Most cutting losses of all these small buns are the result of the stems drying out before the roots can form.

I like to use a very sharp knife for cuttings; my favorite is a craft knife



with changeable blades. Cut the stems from the fastest growing parts, usually the edges, of the plants. Put each species with its own tag in a separate plastic bag. I then take the cuttings to a pleasant place to work and remove all dead leaves, etc. without injuring the stem. Cut the stem very straight and clean and dip into any hormone that you are using. I like the liquid types best and just follow the instructions on the bottle. Put them back into a bag until you have all of them done. You can then line them out into your rooting mix. If you are doing a lot it may be best to use a flat. I sometimes line the flats with one layer of newspaper to keep the mix from falling through. Or you can use a large plastic pot. Make sure that the mix is damp and tamped very firmly into the container. Make a sharp cut into the mix with a knife or a hole with a pencil. Stick the cutting in as deep as possible, up to 1/2". Then firm the mix around the cutting so there is good contact between the cutting and the mix. No air pockets or no plants!

When the container is filled, water in the lot with a light spray. If you have a heating mat, the containers can go right on it, but keep the temperature below 72°F and watch that the cuttings do not dry out. If you have no heating mat, cover the container with a plastic bag or put it in a closed greenhouse. The idea is to keep the humidity up so that the leaves of the plant do not transpire but can put all their effort into the rooting process. I find that saxifrages take three months or more before they are ready to pot on. I do not like to pot on plants until the roots are at least 3/4-1" long. In our dry climate it is too easy for the plants to dry out when the roots aren't well established.

Draba cuttings are done the same way, but I like to wait until after the plants flower, when they are in full growth. In fact a good rule of thumb for all cuttings is to take them from young plants in full growth. If you need to take cuttings of older plants that are in less than good health, try feeding first and then take stems with

the resulting fresh growth. Do not take just the fresh young ends, but the full stem.

Dianthus are also cut after blooming. They need more moisture than most plants while they are rooting. They do very well under a mist system, where it is too wet for most other rock garden plants. Keep them very damp at all times.

Although this sounds contrary to maintaining high humidity, it is also a good idea to keep ventilation across your cuttings at the same time. I like to open my little at-home, covered propagation area everyday for a while. If you see mold starting, open up your apparatus, and then clean up all the molding parts of plants. Spray with a fungicide if you like, and cut back on the humidity a little.

Acantholimon, like some cats, are hard to work with just because they are so claw-like and will bite you the whole time you work with them. It is very hard to get the old dead leaves off, and you may have to cut each one with the sharp knife. I like to make the stems a little extra long, because the leaves curl back and tend to push the cuttings right out of the mix. Be sure to insert them well and deep. I do them between May and July when they are in full growth. Acantholimon need the least humidity of any of the plants discussed. I like to pot them on as soon as the roots are close to 2" long. If the cuttings are left in the medium too long they will rot or not grow on. So move them along, and then let them have some nice, open air.

While I've suggested the time of year when I usually cut these plants, it is not necessarily so where you live. We all have different climates and different situations. So if the cuttings do not work for you at one time, think

about it and try again. Just remember that the less stress from temperature, humidity, and pests, the more likely the cuttings will take. It is hard for many gardeners who are just beginning to grow from cuttings to understand that you will not get 100% of your cuttings to grow. In fact with acantholimon and some species of *Dianthus*, you can consider it a good crop if you get 50%. So cut enough. You will want plenty for your garden and some for the chapter and some to give garden visitors and some for the neighbors, too.

Growing new plants from cuttings will be one of the most joyful things you can do. Before you know it, you too will be selling plants at the market in the parking lot.



Now relieved of selling plants on the street, Phyllis propagates more plants for the retail and mail order nursery 'Meadow View Farms'. She also spends much time in the mountains studying the flora of the Siskiyou Mountains and collecting seed for her one-woman operation, Rogue House Seed.



Clematis hirsutissima

Androsace primuloides var. *chumbyi*



SOME ARE EASY...

SOME ARE NOT

by Kirk Fieseler

My interest in and love of plants lead me to become a horticulturist. As a horticulturist I've become acquainted through the years with different groups of plants as determined by my career path. First, it was the woody ornamentals, then bedding plants, then western natives, border perennials, and finally, rock garden plants. I still appreciate and value the former groups of plants, but it is now these rock garden plants that really get my juices flowing. Why? Probably because most of these species still retain their original nature without the selective hand of man guiding their genetic "improvement." Also, they all have origins and natural habitats that I can read about or, better yet, visit to explore and learn how I might replicate and actually grow these wild creations in my rock garden. My greatest pleasures have been hunting for plants in the wild that I'd either read about or actually grown, but never actually observed growing in their native haunts. Remembering a hike in the Pyrenees a few years back brings to mind the different gentians, daphnes, and androsaces that I finally saw in their natural splendor.

So you get the picture. I like species-type rock garden plants and experimenting with how to grow them best. I've had four growing seasons now with my rock garden; before that I mainly grew plants in pots and troughs. My rock garden is approximately 30' x 50', constructed with sandstone rocks and imported topsoil to a height of about 3'. It is mainly a display and testing garden for the various 250 to 300 different plants that we grow for mail-order sales here at Laporte Avenue Nursery in Fort Collins, Colorado. During the four seasons I've experienced with this garden, I've had many successes with plants and a few disappointments. With this article I will first describe five plants I've found to be very adaptable, with permanence in my garden, and then five others that I'm still trying to figure out how to grow.

Androsace primuloides var. *chumbyi*—Silky Rock Jasmine (photo, p. 101)

This is a low growing plant that consists of fuzzy rosettes of silvery foliage. It blooms in the early spring with bright pink, yellow-eyed, sweetly fragrant flowers in 2"-wide clusters. I've been propagating this plant by cuttings for over ten years from plants purchased originally from Marty Jones at Colorado Alpines Inc. This plant is a real keeper; it seems to do well in average garden soils with adequate moisture in sites that receive some afternoon shade. It is vigorous enough to choke out weeds but never invasive. I originally planted six plants about six inches apart and they have completely filled in an area three feet by three feet. Because of its evergreen fuzzy rosettes it provides interest year round in the garden. This plant seems to love the cold weather. We overwinter flats of it outdoors with very little protection. It can be propagated from pups borne on the end of stolons in late spring. Just wait until the roots start to form and then cut the rosette from the stolon of the mother plant and handle it like you would a strawberry pup. The big thing about this plant is afternoon shade and evenly supplied moisture throughout the growing season. Let it dry out (somewhat) in the hot summer months and winter months when growth stops.

Amsonia jonesii—Blue Star (photo, p. 102)

I first discovered this plant, a member of the dogbane family (Apocynaceae), while mountain biking around Moab, Utah. It grows naturally in runoff-fed draws in the sandstone desert areas of western Colorado and southeastern Utah. Blue star is upright, growing to 18", with long, willowy leaves and long-lasting, light blue, funnel-shaped flowers in terminal clusters. The flowers are borne just above the foliage. This plant can take a lot of sun and drought. It has deep roots, so double dig its planting site and expect it to be around for a long time. I like this plant because it provides great bloom, excellent foliage characteristics, and a very tidy growth habit. After the first frosts the foliage turns yellow, and it dies completely to the ground, so just prune it off flush with the soil. It overwinters as plump, red buds just at ground level, similar to those of peonies.

Propagate it by saving its distinctively shaped, brown seeds in the fall, and sow them in early winter so that they can experience two to three months of cold temperatures. Even though this species is found growing in the slightly warmer desert areas of Colorado and Utah, it seems to be cold hardy here.

Clematis hirsutissima—Sugarbowls

This is just a great plant in my opinion, one that gets better with age. It takes two to three years to bloom from seed, but with every passing year you will be rewarded with more growth and more flowers. It is a non-vining, herbaceous native of the Rocky Mountains found from Montana to New Mexico. Because of this large range it has many forms and flower colors. The populations of plants where I collect seed have lacy, fuzzy, grayish foliage and dark purple, nodding flowers backed with silky hairs. Plants form herbaceous clumps 12-18" tall, depending on the moisture that year. On the slopes of Snowbird ski resort in Utah I've seen this plant 3' in large clumps, and I have some plants from New Mexico that stay below 12" and have hairless, bluish foliage. Choose a site with full sun, and double-dig the hole, because this species has deep roots and will



Dicentra peregrina (p. 106)

Aquilegia jonesii (p. 106)

photos, Kirk Fieseler





Euryops decumbens (p. 106)

Amsonia jonesii (p. 100)





Pelargonium endlicherianum (pp. 105, 120)

Telesonix jamesii (p. 107)

photos, Kirk Fieseler





Clematis columbiana var. *tenuiloba* 'Bighorns' (p. 105)

Androsace primuloides ssp. *chumbyi* (p. 100)

photos, Kirk Fieseler



become a permanent fixture in your garden. If you have a xeric area, this plant should also succeed there.

To propagate, collect seed in late summer, let dry for a couple months, and then sow in early fall in order for the seed to experience the changing temperatures of the next six months. Germination will occur the following spring. I always look forward to the emergence of the white, hairy, highly dissected foliage and the dark purple inner flower color of this plant in the spring. This is a true western American wildflower with tons of personality.

Clematis columbiana ssp. *tenuiloba*—Rocky Mountain Clematis (photo, p. 104)

I love almost every clematis. Well-grown examples of the hybrid vines send shivers up my spine, but I've never been really successful with those in Colorado. Sure, they grow but never seem to flourish as in England or the Pacific Northwest, and they're difficult to use in a rock garden situation. *Clematis columbiana* ssp. *tenuiloba* is the perfect weakly creeping woody vine for the rock garden. It loves to scramble through your rocks and screes, slowly moving from one place to another through the years. The delicate foliage gets about 10" off the ground, and it bears pendulous, violet-blue flowers whose color my camera film never seems to capture quite right. I've found native colonies of this plant in the Pikes Peak area and also throughout the Bighorns in Wyoming. I'm told it's thick in the Black Hills area. The best flower color I've seen is the dark blue from the Bighorns—which is where I've collected most of my seed.

Propagation is easy by seed. Collect in late summer (August), when the seed is ripe, and then let it dry for maybe three to four weeks. Next, sow it in September and let it go through the fall and winter in a protected area outside. Your seedlings will start to bloom the second year after germination. This species needs a gravelly soil with plenty of larger rocks to grow amongst. In the wild I've found the largest colonies growing on open, north- and east-facing rocky, grassy slopes. This is such a great plant that I don't mind its habit of moving around in my garden, even though it slightly damages my German sense of order.

Pelargonium endlicherianum—Rabbit Ears Pelargonium (photo, p. 103)

This is an outstanding plant that has been an unexpected star in my rock garden. I'm not sure where I got the original seed (probably Panayoti Kelaidis), but my doubts because it's a *Pelargonium* (and they're not hardy here) were never fulfilled. My original plants were planted on a south-facing slope with a large boulder behind to block north winds and provide increased solar radiation due to reflection of the sun's rays. These plants have rewarded me with abundant, deep-pink flowers veined with red that consist of just two upper petals. It also has wonderful, rounded, dark green foliage that stays close to the ground hiding its thick, fleshy crown. I have since planted seedlings of this plant in other places in my garden, and I have yet to lose one, even those planted in shaded areas. Of course, all of these sites have excellent drainage, but cold hardiness has not been a problem.

I propagate *Pelargonium endlicherianum* by seed, which has to be collected promptly when ripe, or it will shoot throughout the garden. The seed needs a bit of sandpaper scarification before sowing. Again, seed this one early so it gets a cold, moist period of stratification. This native of South Asia Minor has really

carried my rock garden throughout late summer and early fall with its clean growth habit and showy, dark pink, two-petalled flowers.

SOME SUCCESS, USUALLY IN POTS: A STRUGGLE IN MY ROCK GARDEN

Aquilegia jonesii—Blue Cushion Columbine (photo, p. 101)

When I first saw a picture of this plant 14 years ago, I knew I had to have it. It took me a few years to get up to the Bighorns, first to locate and photograph it, and later to find seed and start to grow it. Through my ten years of growing this plant, I've tried various cultural regimes to establish it in my garden. Yes, I've been able to flower it, but after two or three years the plants seem to go downhill and vanish in my rock garden. I'm sure my failures revolve around not providing enough limestone and drainage for its root system. I can propagate and grow them by the thousands from seed in pots, but once I get them in the open garden, look out. I think the best way to cultivate this plant is in a crevice-style trough with lots of limestone.

To get the seed to germinate you must sow it in July and let it experience the warmth of the summer and then the cold of the winter. Seed stores well; I'm still getting excellent germination with seven-year-old seed. I just took a peek at both of my plants in the open garden and those in my newly constructed crevice trough, and those in the trough look much happier.

Dicentra peregrina—Dwarf Japanese Bleeding Heart (photo, p. 101)

I had to wait about five years for this little beauty to bloom in my garden from seed and, boy, was it worth the wait. What a treasure! Of course, my wonderful plants, carefully sited in an east-facing, scree-like, sloping exposure, promptly died after flowering, all ten of them. I know the books recommend a gritty, humusy soil with perfect drainage in a sunny location. I did all that, and my plants all thrived until after flowering, then they were gone—really gone. This is another plant I plan to try in a crevice trough, but with an acid soil instead of a limy one. A plant with as much charm as this one, dwarf growth habit, delicate, bluish foliage and full-sized, pink bleeding-heart flowers, definitely deserves at least three (possibly seven) tries before calling it out.

Euryops decumbens (photo, p. 102)

I usually don't get too excited about members of the sunflower family, but this plant was an exception to my rule. It's from South Africa and was given to me by Panayoti Kelaidis with assurances that it was worth trying. I planted it in an area that got full sun in the winter but some shade in the summer, where it slowly increased in size. I really didn't notice it until the following early spring when it started to bud up. It turned out to have great, lacy, dark green, evergreen foliage that plastered itself to the ground and cheery, bright yellow, daisy-like flowers nestled in the foliage. I thought to myself, "what a winner!" I took gobs of cuttings that spring, which rooted easily. I started envisioning a new wheelbarrow (my old one has a flat tire) to take all of my profits from this plant to the bank. Of course, the plant started going downhill during the mugs of the summer that year. I still have it in my garden but it is certainly not thriving. I think it needs a cooler growing situation, especially in the summer. I've had the best luck where plants are tucked in on the north side of good-sized rocks. My plants are all

derived from one plant. Perhaps seed might be the way to go to select for garden permanence.

Primula angustifolia—Alpine Primrose

This is a true alpine primrose, with narrow leaves and bright pink flowers with yellow eyes. I've been photographing this plant for 15 years with mixed results, because it grows mostly in north-facing areas that rarely see full sun, and my camera doesn't have a flash.

Primula angustifolia is a very slow grower that takes a good solid year to fill a 2" pot—and that's a strong one: most need two years. I propagate it from seed that has a lovely, emerald green color. Germination is good, if sown in late fall or early winter and left outside to experience natural temperature fluctuations. In the ten years I've been growing this plant, I've only bloomed it once, and that was a three- or four-year-old, potted plant that I had in my shaded plunge bed. The plants that I've planted in my rock garden have lived but never prospered or flowered. This might be another candidate for trough culture. For garden success, I would recommend planting a large number of seedlings (10–20) close together on the north side of a large rock. Be careful to keep them evenly moist throughout the growing season. Who knows...you might succeed, and if you do, I just hope your camera flash is working.

Telesonix jamesii—James Saxifrage (photo, p. 101)

There are three areas in Colorado and Wyoming that I'm familiar with where this plant grows wild: Rocky Mountain National Park, Pikes Peak, and the Bighorn Mountains. The plants in Colorado were found in granite-based soils, and those in Wyoming were growing on vertical faces of crumbly limestone, so it should be pH-tolerant. I've never been impressed with flowers of these native populations, sort of a dull red, although I admired its tight growth habit. The first five years of growing this plant I was moderately successful, seed germination was adequate, and plants adapted well to container culture, even flowering after their second year, but flower color was still a dull red. So I was just amazed when my first clump flowered in my rock garden. The flowers were huge and a vibrant, dark pink. Another winner, I thought. I had planted this individual in full sun, and it didn't seem too fussy. The beautiful spring display continued for about three years, but this year my prized clump gave up the ghost after flowering. It probably succumbed to its steady diet of extra water and rich garden soil. Once again, a crevice trough or crevice garden could be the answer to a longer, leaner life under cultivation.

Kirk Fieseler is proprietor of LaPorte Avenue Nursery in Fort Collins, Colorado, a mail-order nursery specializing in alpine and rock garden plants (see ad, p. 157). He got interested in plants when he took a botany class in high school. He started as a landscape contractor and became more and more interested in unusual plants, then started his own nursery in the early 1980s.



ON THE EDGE

by Jeff Wagner

I am always noticing the edges and borders wherever I go. I think that must be one of the qualities of mountains and of the sea that spellbinds me. The jagged ridge of the mountain is etched against the sky. Forest gives way to tundra or to coastline. There are obvious edges of climate, habitat, geology, and less visible edges of genetics and ecology, and they are all exciting. Plants adapt to the conditions of these edges and exploit every available niche using strategies they have evolved over the millennia. I am more acutely aware of edges now as I have recently moved to the northeastern States from the Rockies, and here they are less defined.

My good friend, Søren Ødum, director of the Danish National Arboretum in Copenhagen, has shared this fascination with me. He has studied treeline ecology all over the world, and I have accompanied him on occasion as he has scouted for new material for the Arboretum's special project in Greenland. Søren has taken it upon himself to establish viable forests on the thin edge between the icecap and the sea there, and his best seedlings have come from, among other places,

the unexpected edges along the tree-lines of New Hampshire, Canada, Alaska, Wyoming, and Colorado.

My experience of the sea is mostly of the northeastern Atlantic. The edges there, along Britain's coast from Devon, Cornwall, and Wales, and up to Scotland, as well as of the North Sea along Denmark's and Norway's coasts, have qualities of light and form and atmosphere that shape the scope of every living thing. Wind and water and stone and sky all merge to make a landscape that has edges where these diverse elements meet—as the edge I have seen on the tundra in the Rockies, or the Jotunheimen, or in northwest Scotland, Wales, or the Lake District. My sense of the wind in seaside grasses or of alpine sedges and of the light in their burnished fall color is much the same, and I am always conscious of a wildness and wideness in these regions. Each of them has its own genius inhabiting the place, which makes it unique, but their effect on me is always breathtaking wonder and admiration.

Plants, of course, are one of the components of these landscapes that binds them all together, and that

inspires us as gardeners to in some way participate in their spirit. The response of plants along the borders of the sea or the mountain tundra is similar: to shelter in the lee of rocks or hillocks, to become small or compact, to collect the sunlight and concentrate it, and to store up energy for a quick burst of growth, bloom, and seed production. They have adapted to living on the edge, and they are formed by it.

We find gems from both habitats that take our fancy and provide opportunities in the rock garden, including *Vaccinium*, *Thymus*, *Erica*, *Calluna*, *Empetrum*, *Rhododendron*, *Campanula*, *Jasione*, *Lotus*, *Eryngium*, *Eriophorum*, *Carex*, and more. These are all plants that have survived and evolved on the edge and stayed there ever since the ice retreated to higher elevations and latitudes. They form interesting and exciting communities with complex and intricate borders.

I am mesmerized by the contours of trees at treeline, of willows in high alpine valleys, of the peaks and valleys in the changing light of the seasons, and of the way in which alpine and seaside plants fill in the niches surrounding them. Were I to stay I would never garden, but these wild places are their haunts, and I am a mere wanderer in it.

Frank Kingdon-Ward, a well known explorer of edges, writes in his popular book, *Common Sense Rock Gardening*, that we will never garden to copy nature. The garden is artifice and art, and that is precisely why it succeeds at all. We may recreate the feeling of nature in the garden, and we work with nature's stuff, but our efforts are wholly artificial. He also has not a few things to say about the good fortunes of the British to be living in islands that invite exuberant invention and experimentation. Indeed, speaking of true gardeners

and their ilk, he goes further: "It was such men as these who in the Twentieth Century made English gardens and English gardeners the envy and pride of the world, who put the hardy rock plant in the van of horticulture, designed the rock garden, and the landscape garden, discovered the alpine, and showed the world how gardening might bring peace and contentment to a ravaged generation." Now you know why we garden!

While the only aspect of nature's immensity that we can bring into the garden may be the memories and reflections associated with certain plants and places (and this is a very big part of the satisfaction of gardening), we can nonetheless learn from nature and study nature for inspiration.

Aksel Olsen, a famous Danish nurseryman and plant illustrator who experimented with most of the temperate plant world in the 70 years he grew and sold plants at his nursery, Brandkjærhøj, travelled in the 1920s with two companions to Switzerland, not only to experience its flora firsthand, but to study how rocks lie in the landscape.

They took photographs, and Olsen filled pages in his journal with notes and drawings. This experience most certainly contributed to the successful rock gardens he later built in the flat Danish landscape.

Kingdon-Ward has many common-sense things to say about all of this, but in a sentence he puts his finger on the essence of it. We begin as gardeners with the two dimensional—the vegetable garden, the lawn, the flower bed—and as we gain experience and knowledge, our interest may carry us on to three dimensions. The rock garden, when it succeeds, is a high expression of this art form.

Incorporating a rock garden into a landscape is nearly always a challenge.

It can be easier if we live in the mountains (Kingdon-Ward points out that this can be "a work of supererogation," while admitting that the best rock garden he ever made was in his camp in the Burmese Mountains). I have seen summer herders' camps, seters, cottages, cabins, and small sod-roofed houses in mountain districts that happily existed in the midst of veritable plant hoards, but for most of us time spent in these regions is borrowed. Yet I suspect there lurks a shepherd in every gardener's soul.

Cultivating rock plants somewhere in our backyards or in our urban environments is an ongoing experiment. In rock gardens one finds variations on nature that work very effectively, not only in providing suitable growing conditions for the plants, but also in providing a certain aesthetic that lets the rock garden work as artifice. These variations include such parts as the rock outcrop, the peat wall, the scree, the excavated valley or depression, and even, in miniature, the trough or alpine house full of pans. This must seem obvious to many readers, but it is an awareness that one gains in learning the art—in going from gardening in two dimensions to gardening in three. And all of these variations are artificial constructs that on some level attempt to reproduce growing conditions, the look and feel, or their natural counterparts. These, as we find them in nature, are typical edges, where plant communities stop and start, where the terrain changes, and where the effects of the elements seem more pronounced.

It is also possible in rock gardening to completely abandon all our nature-imitating principles. Kingdon-Ward gives a full description for building a "paved" or formal rock garden in his book. It is rather like certain herb gardens, of geometrical form and with symmetry, and withal approaching the

two dimensional. It is immediately suitable to urban gardening. The rocks are all pavers of natural stone or even of concrete, and the plant choices are of low or flat-growing kinds, with allowance for larger plants in the center and on the edges. This is a radical idea, and Kingdon-Ward points out, "it actually frees the gardener from worrying about relationships between rock and plants, or striving toward even remotely resembling mountain scenery." I have seen failed attempts at rock garden construction that would have been quite successful had they been built along these lines. Their surroundings clamored for just such a solution, but it is so foreign to our ideal of a rock garden that we do not think of it.

On the other hand, a more traditional rock garden can exist even in small and alien backyard environments, and more successfully I think, if the garden is restrained in its form. The edges provided by nature in a wild landscape are obliterated by all the city, the suburb, and the mono-cultivated fields of modern humanity. Bringing them back into the garden as art and artifice lends a harmony and tranquillity to the surroundings, even if what we are building is a certain "striving towards mountain scenery." In an urban environment there will nearly always be a transition to make that is so demanding, if we are to take the rock garden on its own terms, that edges are not only called for, but demanded. A new horizon may be made by building the garden up above its surroundings (as at Denver Botanic Gardens Rock Alpine Garden), or sinking it lower than the surroundings (as at Kew); or barriers in the form of hedges or larger, coarser plants may be used to separate the garden from farther views. All are devices that are successfully employed by rock gardeners.

Next, within the garden itself, it is possible to make artificial plant communities that still echo their natural counterparts. One example is a meadow of one kind or another, or a stream, whose meandering line is given with or without water. Using different soils in various areas within the rock garden, too, will yield edges of plant communities or groups adapted to just those situations. As for copying nature, abandon hope of imitating the alpine meadows rich with primula, paintbrush, shooting star, lupine, etc., that are wonderful to behold and completely a part of the scale and conditions in which they occur. These plants and their communities are vast and centuries old. Anyone who has taken a stroll in such meadows in the Rockies, right at and above treeline, or seen them high in the mountains of China or Europe knows that here is a miracle of plants. Even higher still above tree-line, such impossible beauties as *Meconopsis*, *Saussurea*, *Semiaquilegia*, *Eritrichium*, and many other seemingly untamable plants grow. These are "outside our reach," as Kingdon-Ward puts it, and we can only imitate the edge, the pattern, and the perspective we see in their native haunts.

On the edges of plant communities it is remarkable to see how the plants adapt to the altered conditions; they hug rocks and depressions, and where they do venture out into the wind and cold, these elements have an extreme effect on the plants' growth. In the garden, plants can be placed in similar situations and will wrap themselves around the rocks and tuck themselves up in much the same way.

I always marvel at the triumphs of rock gardeners in bringing the most reticent wildlings to grow in their gardens, but I am equally taken with "ordinary" plants. I enjoy seeing those circumpolar denizens of the tundra

and shoreline that are found growing on several continents—*Lloydia*, *Potentilla*, *Arctostaphylos*, *Dryas*, *Salix*, *Betula*, and more. They grow in spite of the elements and would probably take on a new ice age as just another long winter. They dominate their landscapes; jewelled in flower in spring and summer, and dazzling in their fall tones on a high September day. In cultivating these and similar plants, we soon learn the affinity between rock and soil and plant, and we come to appreciate the pattern that evolves in this stimulating interaction.

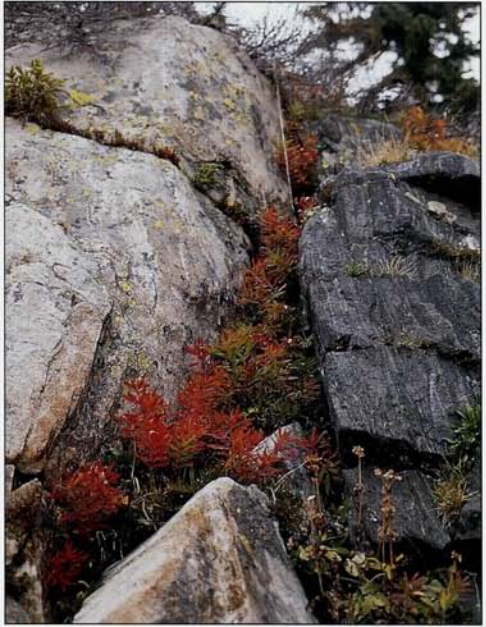
Rose beds, perennial borders, rows of bulbs or annuals in myriad schemes, all have their rightful place in horticulture, but the rock garden with its unique spatial relationships and wilder plants is a challenge defined by its third dimension and by the untamed nature of its plants, most not far removed from their wild antecedents. We are not used to many cultivars, hybrids, or bizarre sports in rock gardening—all these are the stuff of the vegetable garden, the annual bed, and the prize-winning flower garden.

There are numerous examples in rock gardens of the interaction of different species of plants creating edges with each other—tiny species tulips glowing gold on an emerald pillow of thyme; small "rivulets" of *Eranthis* creeping out from a woodland and onto a lawn; encrusted saxifrages set silver against a well-worked rock scree; turquoise or kingfisher-blue gentians radiant as an alpine sky in their flower at the crest of a ridge backlit by the evening sun, or nestled in a valley of rock holding their proud trumpets against some stolid boulder, dazzling all their surroundings with their color, habit, and contrast.

Even through color, edges' effects in the garden can seem satisfyingly "natural"—even bold. In nature, the edges



Indian Peaks, Colorado



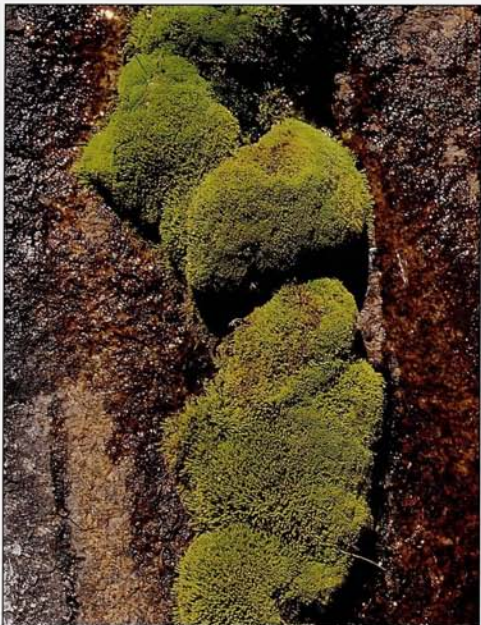
Eagles Nest Wilderness, Colorado
photos, Jeff Wagner

Mimulus species, on Mt. Sherman, Colorado

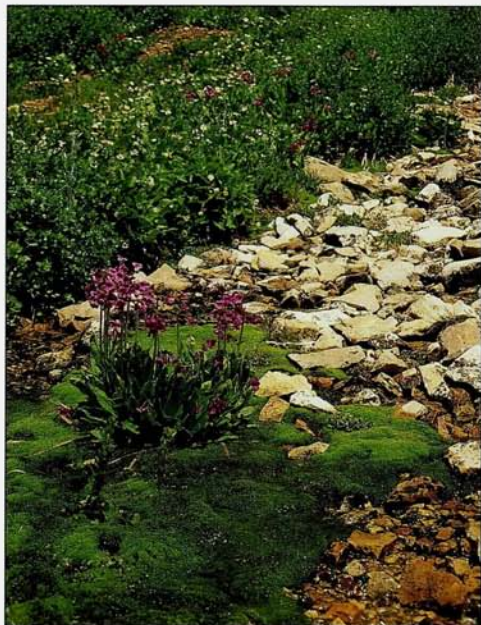


In the Mosquito Range, Colorado





Moss in stream,
Indian Peaks Wilderness, Colorado



Primula parryi on Mt. Sherman, Colorado

Snow, water, and shadows
Rocky Mt. National Park



Paronychia pulvinata on Loveland Pass



Wenimuche Wilderness

Rock outcrop above Boreas Pass

photos, Jeff Wagner





Polemonium confertum above Boreas Pass, Colorado

Erica cinerea in Lake District, England

photos, Jeff Wagner



of plant communities are clearly defined, sometimes most strongly in their autumnal color—and the light at that time of the year emphasizes the lines further. Gwen Kelaidis' famous eye-stopping garden of *Zauschneria* and *Eriogonum* built over a front yard in Denver is a direct assault on convention, on the two-dimensional, and on the expected. This garden's lines are elegant and simple. Its rise from the sidewalk and the street is ever so slight, but exquisitely dramatic and unforgettable in the setting-sun combination of orange-scarlet, sulfur yellow, and burnt orange. Perspective, movement, restrained plant choice, and a well-constructed foundation make this garden work. Edges abound: in the transition from street to garden, in the choice of naturally eroded brown granite, and in the full-flower, full color effect of fairly large groups of each species. Light, too, is very skillfully exploited to maximize all the other elements.

The formerly traffic-disrupting, now asphalt-covered display garden of Colorado Alpines Nursery between Avon and Vail, Colorado, had this quality, too. The lower edges, gaudy with chrome-yellow *Alyssum* in the spring, caused a congestion of cars right out on the interstate highway. Next came a band of *Campanula* and *Penstemon*, with patches of *Oenothera caespitosa*. All these grew with abandon right in a heap of boulders and bulldozed hillocks of soil next to Colorado's busiest highway. But the real rock garden crowned the summit of the steep bank and was, despite its outrageous assemblage of alpiners from every mountainous region ever pored and drooled over by rock gardeners in their reading and touring, a complete deception. It was basically a pile of gravel, on top of an even bigger pile of gravel, sandwiched in between

a major electric installation and a strip mall, but the plants thrived so well together that they formed their own effective habitat. This was essentially an artificial moraine and imitated the function and look of a moraine very effectively. By its very nature, a moraine is an edge where the ice finally halted its advance and began its retreat. All of the great milling of its centuries of grinding everything in its path make up the moraine. Sometimes, if it is far enough down the valley it becomes overgrown with forest. Higher up the mountainside one always notices them—they stick out. Now this can be a very two-edged sword in the garden as it comes perilously close to the Victorian rockery or ugly rock pile, such as Farrer viciously attacked in his rock gardening books. The moraine garden of the Colorado Alpines nursery did work, though, mostly because it had no surroundings that it had to pretend to fit into, but also because it was very well constructed with myriad variations of soil type, light exposure, and water availability. So the plants thrived together and formed their own community. *Penstemon caespitosus* crept about the depressions and over the sandstone edges. On the cooler, shadier north side, the shrubby penstemons came back winter after winter and tempted the staff to grow more than the crowds of Eagle Valley could possibly ever appreciate. Right next to these, geraniums filled a pocket between two boulders with bright flowers for much of the summer. There were *Oenothera caespitosus*, *Gentiana lawrencei* var. *farreri*, *Opuntia*, *Armeria*, *Aquilegia*, *Acantholimon*, *Scutellaria*, *Dianthus*, *Draba*, *Astragalus*—so many and so varied that the richness and impossibility of it were magical. The edges of moisture, light, rock, and plant made this garden not only

believable but entirely successful, even in its improbable surroundings. The edges in this garden were not only in the abrupt physical changes surrounding it, but in the very abundance of variety that all thrived in one construction. Rock choice and aspect also played their part and allowed for the diversity of plant choice.

Visit any good private collection, or any of the renowned public collections—UBC Vancouver, Denver Botanic, Kew, Edinburgh, Göteborg, Copenhagen, Hamburg—they are all connoisseurs of edges. They take what nature has provided and imitate what

nature does in some significant respect, and their rock gardens function well on many different levels.

Edges abound in nature and in the garden, and their secrets are fascinating. They define the world around us in subtle and in more obvious ways. They evolve over time, and they yield a grace, a strength, and a wonder to life that has much to teach us if we will begin to appreciate them. They bring everything into perspective and give a relief, a curve, a form, an entire world of plants and people that makes life rich and vital.

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Jeff Wagner lives in Rochester, New York. His interest in plants goes back to the pansies, periwinkles, and crepe myrtles of Dallas, Texas, where he grew up. He has lived and worked in New York, Colorado, Denmark, Great Britain, and Sweden, always exploring their wild and their cultivated places. Photos by the author. Below, the Flattops, Colorado.



SUMMER VIGNETTES: TOWARDS A YEAR-'ROUND ROCK GARDEN

by Panayoti Kelaidis

Once the last pinks of spring are fading in the heat of June, and irises are truly flagging, most rock gardeners sink into a sort of torpor that can last for months, only to be roused again with the first colchicums and cyclamen of fall. Surely, there must be something that can salvage the summer months?

For years I have been chagrined to watch the Rock Alpine Garden drown in a sea of verdure and seedpods while the annual beds, water gardens, and perennial borders at Denver Botanic Gardens came into their summer stride. And yet, when I took midsummer field trips into the mountains of Arizona and New Mexico, most years I found an unbelievable bounty of flowers in bloom. Of course, if you think of *Penstemon pinifolius* and *Heuchera sanguinea*, *Zinnia grandiflora*, *Talinum*, *Melampodium*, and *Psilostrophe*, to name a few fabulous wildflowers of the Chihuahuan and Sonoran provinces, all are plants that bloom and rebloom in summer. Few rock gardeners realize that in the Southwest Uplands and Chihuahua peak bloom is in the late summer months.

On my visit to the magical mountains of the East Cape of South Africa in March (the equivalent of North Temperate September), I walked through meadows and tundra with untold hundreds of spectacular flowers in full bloom—obviously another autumnal flora. The North American Southwest, the East Cape, and the massive Himalayan chain are three regions supporting great monsoonal floras that occur at low latitudes, where summer is a relatively protracted season, much as it is in our gardens.

Alpines in the snowy Sierra and Cascade ranges, on the Alps, and in the Arctic (where so many of our rock garden plants originate) rush madly into bloom as soon as snow melts, because the season is often very short where they occur in the wild; in our gardens they are often in seed by the time warm weather arrives. But montane and alpine plants from monsoonal regions are triggered into active growth and bloom only once warmer temperatures are accompanied by rain.

The great monsoonal flora of the American Southwest (part of the rich Madrean province of plant geographers), the Sino-Himalayas, and the East Cape and Natal Drakensberg of South Africa represent three of the greatest centers of

floristic diversity available to rock gardeners. Along with the Andes, these contain a vast repository of un-introduced rock plants for our gardens. If we brought together plants from these regions and combined them with late-blooming plants from the Alps and better-known mountain ranges, could we then have a rock garden as rich and interesting in the summer months as it is in April and May?

I cannot say I have achieved this ambitious goal, but each year more and more summer-blooming plants come into our ken. I foresee that a time will come when the rock garden will have a summer interest to match the wealth of spring bloom: then the rock garden will double its rich promise and become a focus of landscape design throughout the warm months.

EURASIAN GEMS THAT STAND ALONE

Although plants high on the mountain crags of Europe may bloom quickly in the Alpine spring, there is a late-summer flowering effect even in the Alps. Owing to the endless succession of larger perennials and bulbs that bloom in the hay meadows. Most are too large to feature in a crevice garden, but in a wild garden or a large-scale rock garden, they provide wonderful fodder for the design of the summer garden.

Although usually thought of as fillers and blenders, the wonderfully shaped and colored leaves of the genus *Geranium* provide excellent foil for the perennial border (as well as a long season of flowers in the whole range of tasteful pastel pinks and blues or an occasional screaming magenta); and they are fascinating to examine individually. There is a suite of alpine geraniums that produce comparable effects on a more modest scale in the rock garden. Most bloom heavily in early summer, but few species are without some flowers even late in the summer. Although usually featured in the border, some of the hybrids, like *Geranium* 'Ann Folkard' (photo, p. 121), take on an entirely different look once planted in among rocks. So often, rock gardens provide us with the perfect niche to show off a single plant, crowned in an outcrop almost like a jewel in its setting.

Few gardeners think of pelargoniums as providing plants hardy in the colder states and provinces of North America, but several have proved much hardier than people suspect. *Pelargonium endlicherianum* (photos, pp. 103, 121), widespread in the high, cold and dry mountains of Anatolia, is surely one of the spectacles of the summer garden. This can bloom for the better part of July and August with flight after flight of its hot pink, butterfly flowers. The dense mound of dark green foliage is attractive in its own right and nearly evergreen. There are garden artists who may seek to combine this extraordinary plant with others for combination effect, but why bother? Few plants look better on their own. We find it does well in loam, peat, or scree, provided it is neither too wet nor too dry.

A SHADY MENAGE

One corner of the Rock Alpine Garden with deep loam and a bit of shade in the hottest part of the day combines various lush-growing meadow plants from the various monsoonal climates in a particularly satisfying mix. Although the flowers may only last for a few weeks in June, *Veronica latifolia* (also known as *V. teucrium*) produces a column of brilliant cobalt blue that combines effectively with almost any other color. The foliage is attractive even when the flowers are past



Eriogonum umbellatum var. *porteri* (p. 128)

Pelargonium endlicherianum (pp. 105, 120)



Geranium 'Ann Folkard' (p. 120)





Agastache X rupestris, *Aesculus glabra*
(p. 128)



Agastache 'Pink Panther', *Kniphofia parviflora*
(p. 127) photos, Panayoti Kelaidis

Scabiosa lucida, *Digitalis obscura* (p. 125)



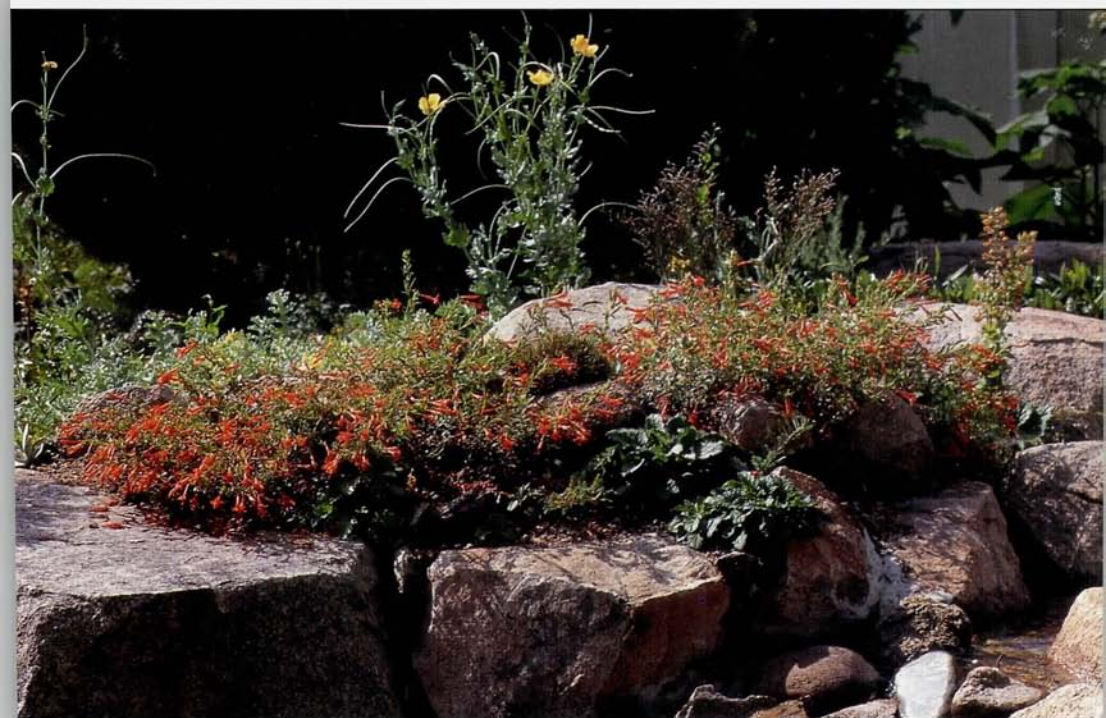
Bupleurum spinosum, *Silene shafta* (p. 125)





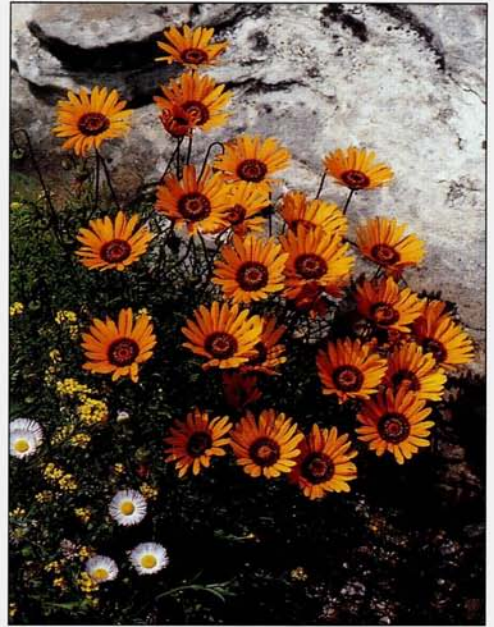
Salvia macrochlamys (p. 127)

Zauschneria garrettii, *Glaucidium corniculatum* (p. 128)





Lilium martagon (p. 125)

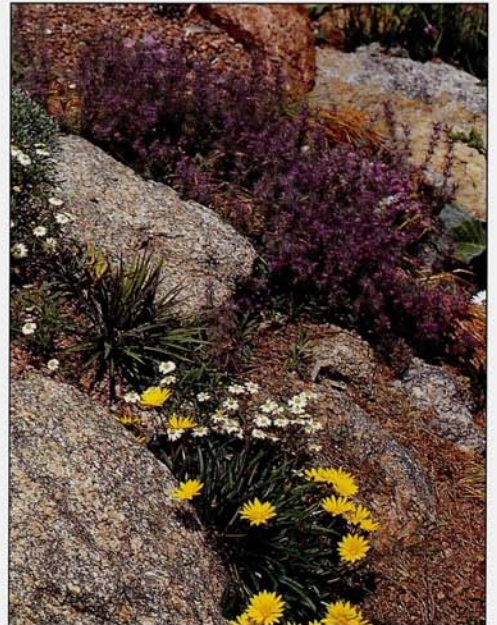


Ursinia calenduliflora (p. 126)
photos, Panayoti Kelaidis

Monardella macrantha



Stachys lavandulifolia, *Gazania linearis*
(p. 126)



(we deadhead shortly after peak bloom to encourage a lovely mound of leaves), and the plant survives almost any vicissitude of weather and watering with no attention. Plant it near deep purple *Lilium martagon* (photo, p. 124)—that forgiving and flashy Eurasian gem—for a cool combination. Nearby we have *Euphorbia longifolia*, a tall, meadow plant from the Himalayas with an endless procession of shimmering chartreuse bracts. This is much hardier and more permanent than other euphorbias in our experience, and it produces only the occasional seedling. *Callirhoe involucreta* var. *tenuisecta* is a more subtly colored form of the poppy mallow of the Great Plains that grows far to the south in the mountains of northern Mexico. Despite its southerly origin, it is indestructibly hardy and tolerant of greater moisture and shade than its Plains' cousin. It has bright rose cups of bloom all summer over deeply dissected leaves. *Cimicifuga simplex* 'Bronze' intensifies the theme of purple into extravagant, nearly purple-black fountains of fern-like foliage, a startling contrast to the ivory spires of late summer bloom.

SUN-LOVING COMBINATIONS FOR SUMMER-LONG COLOR

Few plants have proved as mixed a blessing as *Scabiosa lucida*. Most of us grow it or something comparable in a border or wilder corner of the rock garden. Once this enters the garden gate, you may have difficulty extricating it, for some strains of this irrepressible European meadow plant verge on becoming bona-fide weeds. They begin blooming quite early in the spring and continue quite heavily until autumn frost, every flowerhead producing a tuft of fertile seed that will gleefully amplify the performance. It is impossible to deadhead this plant thoroughly: the flowers come too hard and fast. If you choose to grow it, put it somewhere among similarly vigorous plants where seedlings can't do much damage. Although not weedy by any stretch of the imagination, the brilliant orange foxglove of southern Spain, *Digitalis obscura* (photo, p. 122), combines ever so subtly with the scabiosa. It has nearly as long a bloom period, and the subtle, burnt sienna flowers are a perfect foil for the cool lavender of the scabiosa—a smoldering Spanish sunset streaked with lavender clouds. Every bit as vigorous as the scabiosa, *Euphorbia niciciana* var. *seguieriana* produces its sunny chartreuse-bracted inflorescence for months over finely filigreed masses of foliage, a pleasant counterpoint to add to the mix.

On the highest peaks of the western Mediterranean grows the most beautiful and permanent of shrubby umbellifers, *Bupleurum spinosum* (photo, p. 122) makes a substantial ever-silver shrub with trim leaves, superficially very much like *Ptilotrichum spinosum* and *Vella spinosa*, which accompany it in the wild in both Spain and Morocco. Whereas the two shrubby crucifers provide their deep purple and biscuit-yellow flowers in early summer, the *Bupleurum* waits to bloom until August and September, when it makes a fabulous and intricate mound suggesting some exotic *Euphorbia*. I find the acid-yellow flowers provide a perfect counterpoint to the hot pink of the indestructible *Silene schafta* (photo, p. 122) from the Caucasus, which makes mats of narrow leaves with flaring, pink blossoms exactly overlapping the season of the *Bupleurum*. The two produce a wonderful, cheerful combination. I know, the color police don't approve of yellow and bright pink, but those same police have never seen oceans of *Diascia* and *Euryops* in the Drakensberg, or hot pink paintbrush and *Senecio* painting the Rockies. For me, the proper tints of these two colors instantly recall lush montane meadows, and I can almost feel a fresh, moist breeze across my face.

No continent has more to offer the rock garden than South Africa. Here is a flora all the more alluring for being so complex and adaptable in cultivation—once you determine whether you have plants from winter or summer rainfall regimes. The endemic genus *Ursinia* can be found in the lush Mediterranean *fynbos* near Capetown, on the high, dry ridges of the semi-arid karroo, and in the wet meadows of the high Drakensberg, the various species from each habitat requiring quite different conditions. *Ursinia calenduliflora* (photo, p. 124) germinates its seed in the cool winter months: We grow it as an annual in the greenhouse and plant it out early in the season. Perhaps one day this will naturalize, but in the meanwhile the brilliant orange, sun-like flowers with their darker markings make a breathtaking show from May well into July on cool exposures. *Erigeron divergens*, an extremely abundant native plant of the Great Plains, grew naturally on the site of the Rock Alpine Garden. It is still present, sowing itself here and there (but is not hard to pull out), its lilac-white daisies providing color for months each summer. It combines particularly well with the hot orange of *Ursinia* and the vibrant, soft yellow of *Alyssum petraeum*. The last is a biennial or short-lived perennial *Alyssum* from the Mediterranean that provides much the same color and impact to the summer rock garden that basket-of-gold does in April.

The high alpine African *Gazania linearis* (photo, p. 124) is rarely out of bloom in Colorado. We have had flowers every month this past winter, despite lows approaching -20°F in December! The dark, evergreen tuft of foliage is a wonderful contrast to the sunny, bright flowers.

The blackfoot daisy, *Melampodium leucanthum*, which grows from Colorado Springs down to West Texas and throughout much of the Southwest and on deep into Mexico, is an essential element of western rock gardens. Provided the soil is well drained and the position sunny and hot, it will produce a nearly shrubby dome of brilliant white flowers from spring late into the autumn. Who needs annuals when a native perennial produces as much floral show and lives forever in the bargain? This is a dwarf shrub, really, that looks best when trimmed quite far back after winter has taken its toll.

Stachys lavandulifolia (photo, p. 124) only blooms for a few weeks in early summer, but the brilliant flashes of red and lilac in its smoky inflorescence are irresistible to sophisticated tastes. This spreads rhizomatously and will cover a large area, so don't plant it near tiny treasures.

A multitude of sins is covered by the name *Yucca harrimanniae*, a treasure from the Uinta Basin of Colorado and Utah grows south far into the Canyonlands. Every few hundred miles over its range it morphs dramatically from forms approximating the Great Plains' *Yucca glauca* in size and vigor to miniature doll-house forms with foliage not much bigger than a softball, accompanied by tiny flower stems a foot or less in height. Colonies with the shortest stems are often ignored by travellers who assume they are merely dwarfed by the Utah sun and drought. A tip: if you obtain a doll-house yucca, you will have an indestructible sculpture for a sunny rock garden and be the eternal fulminating envy of your gardening friends.

MINTS: HERBS OF SUMMER SPLENDOR

Surely no family of plants offers more to both our noses and our eyes than the endlessly variable mints. Barely a fraction of the wealth available in this huge

family of plants has been tapped. I hate to imagine what pink, lavender, and bright blue beauties in the forms of *Nepeta*, *Dracocephalum*, *Satureja*, *Teucrium*, and *Salvia* are languishing in Eurasia and western America waiting to grace our summer gardens.

Each June I enjoy one particularly poetic combination of *Salvia*, a veritable symphony that graces a slope in our old home: *Salvia jurisicii*, a rare plant from the Dalmatic coast in the former Yugoslavia, and next to this, the sumptuous Turkish delight called *Salvia macrochlamys* (photo, p. 123). The former provides a billowing mound of luminous lavender through June and early July. For gardeners blessed with curiosity its worth sitting down next to a clump of this and examining the flowers individually: each stem twists around such that the hood-like appendage on the flower is inverted, turning upside-down the normal *Salvia* flower. With prompt deadheading and a timely rain, this species repeats the flowering performance almost as enthusiastically in August and September. *Salvia macrochlamys* produces a sheaf of large, round leaves clasping the stems from a central tap root. The huge, gaping flowers are pink and white with yellow markings, fascinating up close even to *Salvia* skeptics like my wife, subtended by pale yellow-white bract-like leaves that are striking from a distance and form an elegant setting for the blossoms. This cream-and-pastel vision makes a breathtaking counterpoint to *S. X superba* 'May Night' growing alongside it. The vigorous and rather large selections of *S. X superba* are usually associated with perennial borders, but will make a striking spot of vivid color in the summer rock garden if you can find an appropriate nook for them. They are excellent survivors in the droughty rockery or xeriscape.

Gardeners who know only the rather dull herb *Agastache foeniculum* would hardly suspect this genus contained a wealth of native treasures that were essentially unknown to horticulture until the last decade. In recent years cutting-edge gardeners are igniting late summer gardens with hot magenta, orange, yellow, and deep bronze, paintbrush inflorescences. Together with their hybrids, the rabble of Southwestern *Agastache* species provide almost every fiery tint of the spectrum. Some, like the magnificent *A. mexicana*, are very tall and rather tender. Others, like *A. aurantiaca* and *A. rupestris*, are generally between a foot and two in height, compact enough to fit comfortably among larger rocks or in a wild xeriscape. The glorious blaze of color these provide at the end of the gardening season is justification enough to include them somewhere in the garden.

On one sunny bank on the North Ledge portion of the Rock Alpine Garden I had planted a single plant of Rich Dufresne's wonderful miniature *Agastache* 'Pink Panther' (photo, p. 122). This had bloomed so long and made such a picture that I thought it would be fun to amplify the bed, and out of curiosity I collected seed to see how true this hybrid would breed. To my surprise and satisfaction, the second generation seems remarkably similar to the hybrid parent, not appearing to segregate at all. I was surprised that one of the seedlings, however, produced flowers of a fascinating pale peach color that seems to be quite a color break for these showy new labiates. I have been referring to this selection as *Agastache* 'Flesh Pink Panther', propagating it from cuttings and trying it out in other spots. There is a picture that shows the strange and wonderful combination of these 'Pink Panther' progeny together with *Kniphofia parviflora* (photo, p. 122), a high alpine kniphofia from the East Cape that produces a strange, crook-necked blossom of pale yellow. Blending all these together, and echoing the

pinks of the agastaches, is *Talinum ozarkense*, a showy, long-blooming *Portulaca* relative that has been sweeping through rock gardens all over North America as *Talinum calycinum*. It blooms in flushes throughout the summer and thrives in more kinds of soil than almost any plant I know. It is one of those anomalies, a deciduous succulent; it dies down to an almost bulbous base in winter. The true *Talinum calycinum*, incidentally, has somewhat smaller flowers, and they are usually white.

I suspect my favorite agastache will remain *Agastache rupestris*. I remember Rich Dufresne describing its deep, sunset-orange flowers flashing with purple hints and yellow tints. I simply had to have it. The indefatigable Sally Walker obliged in the late autumn of 1994 with seed. The next spring I planted numerous seedlings in different spots, expecting great things in a few years. That very same autumn whole beds burst into fiery bloom, and I realized that this would be one of the great summer flowers. David Salman of High Country Gardens had obtained seed at the same time and was similarly smitten. We joined forces in a program called Plant Select® administered cooperatively with Colorado State University, and in the space of five years, nearly 100,000 plants of this outstanding native plant are being grown in gardens throughout the United States. I was struck one year when a bank of sunset hyssop reached full bloom in late September just as Ohio buckeye, *Aesculus glabra*, turned a similar tint of orangy bronze—a moment I captured on film (photo, p. 122).

I have no doubt that we are barely begun to tap the monsoonal floras of the great American Southwest. I suspect there will be dozens of selections one year of single polymorphic species, like the common sulfur flower, *Eriogonum umbellatum*. Most forms of this magnificent native are rather robust, more for the xeriscape or wild garden than intimate landscapes. But then there is *Eriogonum umbellatum* ssp. *porteri* (photo, p. 121), the tiny, high-alpine ecotype that is found from above treeline in the Colorado Saguache Range throughout the Intermountain Region to the Sierra Cascade divide. It begins bloom a brassy yellow and ends a fiery orange scarlet. In our home rock garden we combined this with *Melampodium leucanthum* for a long season of late-summer color.

Late summer is synonymous with *Zauschneria* throughout much of the western United States. There is one species, however, that can bloom quite early in the season. Moreover, it tolerates cooler conditions and has proven hardy throughout much of the Midwest and the East. *Zauschneria garrettii* (photo, p. 123) is found over a wide range in the Middle Rockies, from southern Utah through western Wyoming and even Idaho. It is usually quite green-leaved and prostrate. It often opens its first flowers for us before Independence Day and may be in full seed before some forms of *Z. californica* come into bloom. My favorite planting is above the principal waterfall in the Rock Alpine Garden, where *Glaucium corniculatum* (photo, p. 123) appears to almost dance above the sprawling orange tentacles of our own Rocky Mountain *faux-fuchsia*.

We live in an exciting epoch in which whole new genera, like *Delosperma* and *Agastache*, are appearing in our gardens. It's already hard to imagine what our gardens used to look like before the new wealth of native monsoonal plants and those from Africa and the Himalayas were delivered up onto our gardeners' palette. There is no end in sight for exotic, showy novelties, and decades will elapse before we even begin to exhaust the kaleidoscopic combinations we may try within our summer gardens.

RAISED BEDS IN SHADE:

A NOVEL, HUMUS-BUILDING TECHNIQUE

by Jim McClements

Growing plants successfully in shaded areas, either in woodlands or rock gardens, is often not as easy as it would seem. Even if the right plants are chosen, shady areas are often not as fertile as they appear. The soil beneath the surface may be poor or poorly drained, or both. Often there is significant root competition, particularly from shallow-rooted trees such as beech, maple, and tulip-poplar. While digging a small hole and dropping in a woodland plant will work in some situations, one often finds that more is needed if the plants are to thrive.

We have had a gradually enlarging woodland garden for about fifteen years, initially containing mostly wildflowers of the eastern United States, but now including many western and Asiatic species. Therefore, it came as a bit of a shock several years ago when I found out that I had been gardening all wrong!

This revelation was the result of reading a summary of an article by John Neumer, of Hockessin, Delaware, published originally in 1986 in *The Dodecatheon*, newsletter of the Delaware Valley Chapter. I think this article will be of interest to any garden-

er, but particularly to those who struggle to provide an ideal situation for plants in a woodland setting, namely, one free of tree-root competition that combines maximum organic material with good drainage. While my experience using Neumer's scheme is relatively short, I am much impressed and will describe Neumer's idea, my results thus far, a few modifications, and a recent update from Neumer.

The technique consists essentially of creating a peat-sand sandwich on top of a bed of leaves. Start in the late fall by piling up oak and other leaves to a depth of 2', more or less. These are left alone, uncovered, all winter, and are compacted by the weather and an occasional stamping. The pile is begun on ground that is undisturbed, except that any small shrubs will have been removed. The bed can be started on turf or bare ground; any tree roots should be left undisturbed. Neumer recommends high shade (the shade under a high canopy, with no branches lower than 10' above the ground), but this can be varied according to locale and plants to be grown.

In early spring a layer of coarse sand, 2-3" thick, is spread over the

now-compressed leaf pile, followed by some composted cow manure (160 lbs for a 50 sq. ft. bed), a 6-8"-deep layer of peat moss, and another, thinner layer of sand. The layers are not mixed. A top-dressing of ground leaves or other mulch may be added to cover the sand, for cosmetic reasons, but it is not necessary.

After the bed has been made thoroughly wet by spring rains, it is ready for planting. Neumer recommends putting a "collar of loam" around primulas and other new plantings to minimize frost-heaving. (Sand is so light and has so little cohesive texture that plants are quite subject to heaving until they are rooted in.) He adds leaves, peat, and coarse sand every year in the autumn.

Neumer describes rapid development of extensive root systems in this environment and finds it ideal for nurturing seedlings and cuttings, as well as mature plants.

I started the first of these beds by piling up leaves in December '95. The bed was completed in April, in time to receive most of the spring arrivals from various sources. By the middle of summer, I was so impressed with the way everything was thriving that I went ahead with another bed, using left-over, mulched leaves from the previous year as the base. Two more beds followed shortly thereafter, and more the following year, so that I now have thirteen and am working on more!

Almost everything has done well, from ferns to *Arisaema* species to *Phlox*, *Primula*, and *Trillium*. For instance, in May of '96 I transplanted into a peat bed new seedlings of *Glaucidium palmatum*, an act reputed to be a real no-no (but better than watching them damp off!) and was gratified to see them all survive. A dwarf *Kalmia*, bought at a meeting and found to have essentially no roots when unpotted,

was planted on the spot and flowered the following year. Ferns grown from spores and set out are soon mature plants. I can confirm Neumer's observations about the huge root systems that develop readily in these beds, the basis of their value both as nursery beds and for permanent plantings.

As for modifications, I have tried two. The first is to use a layer of the woven weed-excluding fabric under the base of the leaf pile for each bed. This is for further protection against the intrusion of tree roots, particularly those of tulip-poplars, which have in the past few years been the bane of our existence. After years of laboriously double-digging woodland beds and chiseling out roots, it dawned on me that what I was mainly doing was stimulating more root growth! It is important not to dig or disturb the ground where the peat bed is to be located. The bed can be placed at the base of a tree, but it should not cover more than a quarter or so of the tree's root area.

My second idea was to use some Turface (calcined clay) in the upper layer of sand. I discussed this with Neumer, and he agreed that it might help, particularly if one can't obtain coarse builders' sand. (Finesand or rounded masonry sand is not what you want.) However, I've stopped using the Turface, mainly because it made the consistency of the top layer too loose, which not only allows for more frost-heaving, but worse, encourages squirrel digging. I've recently started topping the beds with a composted pine bark obtained from Lowe's (a general building supply store). This acts as a moisture-retaining mulch, adds organic material, and is neat and attractive. Chopped leaves also work nicely as a top-dressing but require more work, of course.

I tried to pin Neumer down on the

thickness of the various layers, but he apparently varies them to some extent depending on what he has available. The bottom sand layer should be about 2-3", the peat layer 4-6", and the upper sand an inch or so. (I find that John's recommended 16 cu. ft. of peat for a 50 sq. ft bed is a bit much). He says that the real secret is NOT to skimp on the leaves, which will shrink considerably over a few years. His recommended yearly addition of leaves, peat, and coarse sand goes on in the late fall after plants go dormant.

I asked Neumer if he had rodent problems. The answer was "No," but I have recently found some vole activity behind the logs that I have been using to edge the beds. (Without edging they look somewhat as if elephants have recently been buried in them.) I think that the voles will be easily controlled with poison, but I may be overly optimistic.

My final question to Neumer, who has been using this approach for over ten years, was about long-term results and problems. He is still as enthusiastic as when he wrote the article and just completed a very large, new peat bed. He does say that some of the beds tend to become less beneficial for the plants in about five years, particularly if the initial leaf layer has not been generous enough, or if the yearly replenishment has not added enough organic material. When plants no longer thrive, he transfers them to another bed while rebuilding the first one.

I've constructed most of my beds over a short period of time, rather than over a winter. This is done by using already composted, chopped leaves and by taking the time to thoroughly wet the peat moss as the bed is being put together. Beds thus constructed can be planted immediately.

Is it possible to substitute something else for peat? There is serious

question as to whether advocating ANY use of peat in the garden is appropriate in the face of the rapid depletion of this resource, particularly in North America. Products made of coconut fiber have been suggested by some as a peat substitute, but reports of contamination with pathogenic organisms have made me hesitant to try. I'm currently experimenting with substituting the composted pine bark mentioned above for the peat layer in the sandwich. It's too soon to know, but I'm hopeful that results will be equally good.

These beds are easy to construct (especially compared to double-digging!), give wonderful results, and should be of special appeal to those who are forced to garden in clay soils, as are found in Delaware. They have certainly changed my approach to gardening.

I currently grow species of the following genera with great success in these beds: *Trillium*, *Arisaema*, *Hepatica*, *Cypripedium*, *Shortia*, *Glaucidium*, dwarf species of *Kalmia*, *Pieris*, and *Rhododendron*; *Paris*, *Podophyllum*, *Asarum*, *Epimedium*, *Helleborus*, *Jeffersonia*, *Primula*, *Polygonatum*, *Disporum*, *Thalictrum*, *Anemone*, *Anemonella*, *Phlox*, *Tanakea*, *Tricyrtis*, and *Uvularia*, plus many woodland ferns.

Revised from *A Rock Garden Handbook for Beginners*, 1999.

Jim McClements gardens in Dover, Delaware. Special interests include growing species of *Arisaema* and *Trillium*..

Characteristics of

Coir

Tropical Gold brand

<i>Organic Matter</i>	<i>98.8%</i>
<i>pH</i>	<i>5.0–5.8</i>
<i>Cation Exchange Capacity</i>	<i>61–126 meq/100g</i>
<i>Organic Carbon</i>	<i>46%</i>
<i>Lignin</i>	<i>69%</i>
<i>Cellulose/Hemicellulose</i>	<i>8%</i>
<i>Carbon/Nitrogen ratio</i>	<i>80:1</i>
<i>Water Holding Capacity</i>	<i>9 times dry weight</i>

Effective Water Holding Capacity

<i>Total Pore Space</i>	<i>96%</i>
<i>Air Filled Porosity</i>	<i>10.3%</i>
<i>Volume of Easily Available Water</i>	<i>27%</i>

COCOS NUCIFERA:

IS THIS PLANT FOR YOUR ROCK GARDEN?

by Barney Barnett

C*ocos nucifera* is a USDA-Hardiness-Zone-10 plant, often reaching 100' tall. It is primarily grown for its fruit rather than for an unusual flower, compact bun habit, or interesting foliage. This plant doesn't fit the normal requirements for an article in the *Rock Garden Quarterly*. However, time will tell whether or not many of us rock gardeners will use this plant in our gardens.

Cocos nucifera is the botanical name of the coconut palm. Much discussion has and will continue to take place over the next few years about its uses in the garden. This article is one of those discussions. My aim is to open up awareness of and possibilities for the use of coconut fiber dust in the gardening community.

I'll begin with some interesting trivia about the coconut palm. The coconut palm is called by many people Heavenly Tree or Tree of Life. It is grown in more than 90 countries worldwide in the humid tropics, primarily in Asia and the Pacific Region. The coconut palm takes seven years to mature and afterward can consistently produce fruit for 75 years. But it is not just the fruit that makes this tree so

valuable. Nearly every part of the tree is used by local people. The leaves are used for roofing, mats, and baskets, the trunk for timber and fuel, the nut for food and drink, the outer husk for brooms and rope. In Sri Lanka, to give one example, the per capita use of coconuts is 110 nuts per year.

Coconut products have become a major export of many Asian and Pacific Rim countries. The list of products made from *Cocos nucifera* is far greater than just those used by local people. Additional exported items include fibers from the outer husk used in furniture, mattresses, car seats, brushes, doormats, and erosion control blankets; the nut is also used for oils; the shell for charcoal; even the flower produces nectar for vinegars as well as alcoholic drinks.

Coconut fiber dust or coir dust is the product that we as gardeners are considering using. Coir is the name for the outer husk of the coconut. This outer husk is very fibrous. The fibers are extracted through various processes, and the coir dust is what is left after this process. For decades this dust has accumulated outside fiber mills with no apparent use.

In 1949, E.P. Hume wrote an article in the journal *Economic Botany* extolling the horticultural virtues of a by-product of the coconut fiber processing industry. He called it "coco peat" and suggested it should be seriously considered as a component of soil media. In the 1970s and 1980s, initial testing was done in Australia and Europe to determine if coir dust was suitable for use in horticulture. Several Dutch companies have been using coir dust extensively in their production of plants. The Royal Botanic Gardens at Kew is currently shifting much of its plant production to a coir-dust-based media.

There are a number of reasons that coir dust has not been readily embraced by growers and gardeners. First is the saying, "If it ain't broke, don't fix it." We become comfortable with a system of growing and the products that comprise that system. We have learned how to use peat moss, perlite, vermiculite, and compost-based products in our gardening. Why should we try something new? Second would come the unanswered questions about how to use coir dust in our soil media. What percentages of each component do we use? How do we adjust our watering and fertilizing practices? Should we use it in all of our gardening processes, or does it have certain applications only? The third reason we might be skeptical about coir dust has to do with the reliability and consistency of the sources of the product.

A commonly-voiced concern has to do with salt accumulation. I have been told and have read more than one reason for this situation. One story has to do with the washing of coir dust with salt water prior to dehydration, compression, and packaging. Another story suggests that if "green" coconuts have been harvested, the unripe nuts

require a salt water bath to extract the fruit from the husks, whereas fresh water is used with fully ripe coconuts. And a third story is that a number of fiber-milling factories are near the ocean, and the coir dust is exposed to the salts from the ocean. I do not know which of these stories are true, either in part or in full. I can say that our sources of coir dust have been free of excessive salt accumulation. With this concern in mind, check your sources wisely. Lower-priced coir dust may mean the quality and care of processing is also lower.

All of the previous questions and concerns are valid. This is a new product for many of us, and the only way to determine its value and use is by trial. My personal use and experience with coir dust have been an evolutionary process. At our nursery in Utah we began in 1996 by using it in our personal outdoor planters and baskets. We moved ahead and incorporated it in all of our planters and baskets for retail sales. We then began using coir dust as a soil amendment in all of our display garden beds. We now are using it in all of our production soils for annuals, perennials, and containers. We use it and recommend it for garden beds and have not sold or used peat moss for two complete seasons.

This did not happen overnight. We tested the product, understood how to use it, and now embrace it. Our basic soil mix for production is 50% pine and fir bark compost, 30% coir dust, and 20% pumice. For rockery, alpine, and similar plants we add extra pumice for drainage. We have found in our garden beds, including our rockeries, the coir dust incorporated with the soil allows us to water those beds less often. The fibers of the coir dust seem to hold the moisture away from the plant's roots until it is needed. In our outdoor garden containers,

we add extra coir dust to help with water-holding capacity. With our hot, dry summers we found in the past that our planters and baskets had to be watered daily; we are now able to water every other day. The moisture holding ability of the coir dust lessens the too-wet, too-dry syndrome common to garden containers.

Basic characteristics of a good potting mix are as follows: it is well drained, re-wets easily, does not shrink from the sides of the pot when it dries, has a suitable pH, is pest-free, can be stored for short periods without significant changes, is readily available, and is affordable. We have found that our mix meets these basic requirements.

Coir dust is becoming more available as growers and gardeners create demand. Coir dust from Sri Lanka seems to be the most consistent in terms of processing practices, physical properties, and availability. As far as I know, there are no exact standards for the product, which accounts for the variability you may find. We know that even with the Canadian Sphagnum Peat Moss Association's doing an admirable job, there is still variability in the quality and characteristics of commercially-mined peat moss.

To reduce shipping costs, coir dust has been compressed into bricks, blocks, or bales. It has to be hydrated or mechanically broken up to be used. Our experiences have shown that hydration is preferable. We use warm water where applicable, as it improves the hydration time. Mechanical processing tends to damage some of the compressed fibers. We have found that most gardeners actually enjoy watching the bricks or blocks expand before their eyes. We have noticed the ease of carrying two or three 10-pound blocks to the car versus two or three 40-plus-pound bales of peat moss.

Storage of the blocks in the garage or potting shed is also very convenient.

The soil along the Wasatch Front where we live is either sandy and well drained or heavy clay. Coir dust can have a positive effect in either instance. A 10-pound block takes 9 gallons of water to hydrate and will nearly fill a 4-cubic-foot wheelbarrow. A couple of wheelbarrows will have an organic moisture-holding effect on a sandy bed or create spongy aeration in a clay-soil bed. We have been so impressed with its versatility. Coir dust has the unique ability to hold large amounts of water in its pore spaces, then release moisture as it is needed.

Other than potassium, the nutrient value of coir dust is minimum, but its ability to hold nutrients is quite good. The pH is in the 5.0 to 5.8 range, which is acceptable. It has a color and texture similar to peat moss, but its almost spongy texture sets it apart from other soil media. Once a block has been hydrated and is ready to use, coir dust will not compact and will re-wet easily, even when it has dried out.

I believe that coir dust is here to stay. One of the common threads that ties us together as gardeners is our willingness to share our successes and failures. We can learn more about coir dust as we share our experiences. I certainly don't consider myself an expert on soils or coir dust. I am a fellow gardener sharing with you what I have learned about coir dust.

Barney Barnett and his wife Della own and operate Willard Bay Gardens, a retail herbaceous plant nursery in Willard, Utah. They garden when they can! Barney is also the Western Region Director of the Perennial Plant Association. Barney began his gardening interests as a boy scout at Camp Ben Delatour near Ft. Collins, Colorado.

THE WORST PLANTS: YOU'LL WISH YOU'D NEVER LET THEM IN A Symposium

My vote for the worst plant I ever let into the garden is *Viola verecunda* var. *yakusimana*. I well remember Sunday afternoons in Westfield, Massachusetts, when Bruce and I would head to the back patio with pails and dandelion diggers to attack this tiny monster that seeded between the rocks used for mulch and into the lawn. Each had to pick up half a pail before being allowed to eat supper. When we moved to North Carolina, this pest hid among other plants and came along. This viola will grow just about anywhere. Clay delights it; woodland soil is a favorite; it loves screes; rotted wood makes it very happy. When we moved to our new garden last year, it was not allowed to come with us! Then why is it living in a trough on the top of the new crescent bed?

—Ev Whittemore, Penrose, North Carolina

Plants I wish I had never let loose in my garden and wouldn't give to anybody I like? *Geranium sessiliflorum* var. *nigrum*, *Geranium thunbergii*, *Nepeta phyllocllamys*, *Aethionema cordifolium*, *Coronilla varia* (a plant I wish my neighbor had never let loose), *Oenothera serrulata* (*Calylophus serrulatus*), *Gutierrezia sarothrae*, *Linum lewisii* (a.k.a. *Linum perenne* ssp. *lewisii*, *Adenolinum lewisii*, etc.). Two plants I would give to people I like, with appropriate caveats and with signed waivers, etc.: *Townsendia grandiflora*, and *Scutellaria brittonii*. The observant will note that the last five are, in fact, for me, native plants. They are not native plants in the sense that they grow somewhere in Colorado; they are native plants in the sense that I used to be able to walk to populations of them, until they were bulldozed.

—Bob Nold, Lakewood, Colorado

I often envy passive gardeners. They seemingly do not have that compulsion to rule their gardens. Their submissiveness and lack of control over invasive plants isn't worrisome to them.

I wage more controlling wars than any other garden chore. The absolute worst one is against *Sedum acre*. Many terraces and walls have been constructed here at Wind-n-View to control erosion on the steep slope. I got the idea of

planting the walls with sedum. I originally bought twelve 4" pots of sedum, tore them apart, and stomped the pieces onto these banks. Needless to say, they all grew.

Within two years I had problems! Pieces of the sedum were always breaking off and washing into the terraced gardens—and, of course, the seeds are born pregnant! For over forty years I have been fighting this plant, and I still find pieces. Every little nubbin has to be picked out or you have inches of it in one season. Beware!

—Marlyn Sachtjen, Waunakee, Wisconsin

At first glance, *Oxalis corniculata* is dainty and charming, looking right at home in the rock garden. With its shamrock-like leaves and many deep yellow flowers, this oxalis will ropt along its multiple stems to quickly fill in any size crevice. Its long fleshy taproot just loves gritty, loose soil and will enable it to survive times of heat and drought. Sounds great; however, those flowers will very soon make many long seed pods filled with very viable seed. All too soon this single little cutie will become many far-ranging, smothering, overwhelming, ground-covering monsters! Worse yet, it fights back. When you grab it by its "throat" to yank it out, it spits out its seed at you, sometimes right in your eye!! Beware of this one.

—Rich Bishop, Denver, Colorado

I was very excited to get my first plant of *Tropeolum speciosum*. After all, it is brilliant scarlet and of exotic configuration. It can be a climber, up through a tree or shrub, exiting to display its flowers over the surface of its host.

I had seen it growing through the beautiful, slow-growing *Abies koreana* with its glaucous, blue needles in the Cluny garden in Scotland. There resting upon this small tree's beautiful foliage were large, crimson flowers displayed in great numbers. This guest appeared not to harm its companion in any way.

Whether hanging over a wall, climbing a trellis, or sprawling through the corner of a perennial border, it was always a lovely show.

I knew that some of the tropeolums could be over-enthusiastic, but if planted carefully, they are not too dangerous. Surrounded by lawn, enclosed in a foundation planting bordered by lawn or isolated by other means, most aggressive plants can be contained.

I planted my new acquisition at the garden on the coast in Oregon with a climate very similar to the maritime climate of 40–41°S. latitude in coastal Chile. There we had seen it hanging down from the shrubs bordering the road. The sight of its brilliant flowers stopped us immediately in our tracks. Our beach garden is perhaps only slightly cooler and slightly warmer at times. Perfect—or so I thought.

Ten years later I was to do a reassessment. I had placed the *Tropeolum* in a position from which it couldn't escape. It was trapped between the lawn and the concrete foundation of the house. Now it could only do its magic; but that is the only thing it didn't do. First it seemed to disappear, only to appear next season a few feet away. Surely it must be happy now, reemerging and looking healthy. It continued to do this year after year, gradually moving through the garden, through the lawn and over to the neighbors.

A couple of years later I was forced to enter the crawl space below the house.

This is a very unsavory place. The rafters are low enough to frequently crack you on the head (mine is bald with absolutely no padding). Rat and mouse skeletons and their "products" abound; it is dank and at times filled with puddles; but some matter to do with plumbing demanded my attention. I was unsure what I was seeing. My lantern light was cast upon a veritable jungle of the strangest foliage. It was an eerie sight. Like ghostly white, cachectic asparagus, there were hundreds of thread-like stems exiting the ground floor of the crawl space, striving to reach the light. They were thin, white, and finely nodding at the tips, searching vainly for sunshine. They had crawled under the foundation of the house and spread themselves throughout the crawl space.

Meanwhile outside, they continued their march throughout the garden and lawn, never blossoming, except once producing three or four flowers—naturally while I was in Europe on a plant-hunting trip.

—David Hale, Portland, Oregon

Several plants come to mind as scourges of the rock garden. Grass has destroyed many a garden, especially crabgrass, but most lawn grasses will do. The best way I've found to keep grass out is to trench around the rock garden, perhaps a trench 6" deep and filled with 1/4" gravel. The trench must be cleaned of grass at least twice a summer, perhaps more often in climates with more than 30" of rain. The grass rhizomes can't really attach themselves to the gravel and so pull out easily. Modern herbicides might be useful, the ones that are supposed to kill grass but not broad-leaved plants. But beware—these may be dangerous to handle, dangerous to pets, dangerous to other monocots.

Bindweed is the worst weed of all types of gardens in Denver. It is deep-rooted, and reportedly research shows that if it is cut to the ground once a week, it will only die after three years. Ruthless use of herbicide, in the higher concentrations recommended, is necessary. We spray it once a week, probably three to five times, before it is conquered.

Another noxious little pest is the spotted spurge (*Euphorbia maculata*). It goes to seed almost the day it comes up, and if unattended, it can overwhelm simply by sheer volume. It is hard to see against the gravel mulch, thus avoiding immediate dispatch. My favorite method of dealing it death is to ruffle the gravel once every week with a hand cultivator, killing the emerging seedlings almost before birth. Otherwise, it must be pulled by hand, during which process any ripe seeds drop everywhere.

—Gwen Kelaidis, Denver, Colorado

The worst thug of all, in all the years of gardening, is the relatively recent introduction from South Africa *Oxalis pes-caprae*. It can grow to a foot tall—Heaven forbid—in its native habitat. The thug thrives anywhere in my garden, in crevices, in walks, in screes, in, in, in, and by far worse in my seed pots. It roots just underneath the gravel topping; it roots along the bottom of the pot, thick, fleshy, or hairline, red roots. It has coppery-colored leaves and flowers a strong yellow. If it seeds before you get to it, then your cause is lost.

I use a kitchen fork as the best means of extraction, but one only hopes the fork tines get it all. Whoever introduced this to the North American continent should feel many sharp, vicious jabs of guilt.

—Daphne Guernsey, British Columbia

ERRATA

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Winter 1999 Vol. 57(1) p. 40, the two photo captions should be reversed.

The name *Kalmia fragrans* was used on p. 36 by the Editor, without reference to the author's preference. Apparently, this is an unpublished name, existing only in manuscript, and should not be used in printed material until a proper scientific description is published in a botanical journal. The following discussion indicates the debate over the proper name. Had the name been published, either name would be botanically acceptable and a matter of taxonomic opinion.—Ed.

The name *Kalmiopsis leachiana* was given to the plants from the area of original discovery, i.e., plants from Curry County, Oregon. This population is 12 miles northeast of Brookings, Oregon, or about 25 miles southwest of Grants Pass, in a mountainous area known as the 'Kalmiopsis Wilderness' area. The plants are scattered throughout this remote area, growing both on rocky slopes or in the high shade of conifers. The plants went through several generic incarnations, as *Rhododendron*, *Kalmia*, and finally as a unique genus: *Kalmiopsis*. The species was named for Mrs. Leach, of Portland, who with her husband found the plant while horseback riding in this primitive area.

After the coastal populations' discovery, another smaller population was discovered near the Umpqua River between Roseburg and Crater Lake (Douglas County) on the same rock formations as those on which the coastal population (Curry County) grew. The two populations are about 125 miles apart, the Umpqua area more inland and farther north; both areas are rather dry; oaks, pines, and junipers are common plants in areas where the *Kalmiopsis* grows.

The first plants introduced to horticulture came from Curry County, hence they were called the 'Curry County' form. Later plants from the Umpqua area were introduced as the 'Le Piniec' form, after Marcel Le Piniec and others visited that area and made cuttings available; plants from the same area were also known as the 'Umpqua' form.

I grow both forms and have researched the history of those associated with their introduction. The 'Curry County' form currently seen has a rather long spike of flowers with a darker color than average in the population in Curry County. This particular clone is by no means typical of the general population seen in the wilds of the Wilderness Area. I have observed a great variation between individual plants—various shades of flower color and shape, leaf shape and size. The population is quite variable, and the form in culture could be considered almost an anomaly to the average plant seen. On most plants the flowers are not in spikes.

The 'Le Piniec' form was taken from no particular plant, except that the cuttings were taken from a plant that was uprooted by a soil slide. When other plants were introduced from this area, they were labelled as the 'Umpqua Form'. This population also is tremendously variable (my specimens can be seen at the University of Washington Herbarium). The range in color, flower shape, size, leaves, etc., is wide.

Now as for the name *Kalmiopsis fragrans*, I feel that no justifiable reason exists to make a new species of *Kalmiopsis* to differentiate between these two disjunct populations. One hundred and twenty-five miles separate the two populations, but both colonies have a wide range of variation within their respective areas. The Umpqua population came to the attention of the scientific community after the description of the coastal plants, and now a case is being made that the two colonies are significantly different. The logic for this segregation is based on longer filaments on the stamens and some quality of fragrance, whether of flower or foliage I don't know, in the Umpqua population.

It is my belief that giving the Umpqua River area population the segregate name *Kalmiopsis fragrans* is motivated by a desire to get another wilderness area set aside for this "new" unique and rare species. The areas where the plants are growing on the Umpqua are not generally in any danger of logging or other man-made destruction. I would like to see the area preserved in its wild state and any further logging in close approximation to *Kalmiopsis* colonies on the Umpqua curtailed. The area is beautiful enough to be retained as it is without creating a new, endangered species as an excuse. All *Kalmiopsis* are already currently highly protected plants in Oregon.

—Steve Doonan

IN MEMORIAM

I Remember Harland Hand

I met Harland Hand in early 1982, on my first Western Chapter field trip. We were having a picnic at the Santa Cruz Arboretum when a tall, silver-haired man walked up to me and asked, by way of introduction, "What kind of car do you have?" Over the years, as a close friendship developed, I realized that Harland would often start in the middle of something, knowing the beginning in his own mind, but not voicing the preliminary thoughts.

When he learned that I had a hatchback car, Harland asked if I would take a painting from Santa Cruz to El Cerrito for him. I had no idea who this man was, as he had neglected to tell me, and I did not at the time have any reason to want to go to El Cerrito. After a time, I discovered I was in the presence of my horticultural hero, author of "The Color Garden" (*Pacific Horticulture*, Spring 1978). I had read this article many times, seeking guidance and inspiration as I struggled to develop a garden on my steep hillside in San Francisco.

The following day I made my first visit to Harland's garden. Full of rocks,

concrete, and thousands of plants, its design and emotional effect were inspired by the landscape of the High Sierra Nevada, in particular around Silver Lake (52 miles east of Jackson on Highway 88, on the Kit Carson Immigrant Trail). This was Harland's favorite place, the "most thrilling, intimate, and puzzling space" he had ever experienced. Harland described the lake as "a deep blue arabesque sunk in swirling masses of pale gray granite." By the lake were granite-floored "rooms" with shelves, benches, and boulders from which sprung trees gnarled by the alpine winds. Shrubs and flowers crept between the granite slabs, forming natural rock gardens,

In his rockeries Harland grew temperate and subtropical plants. He had a huge succulent collection, with many species and cultivars of *Echeveria* and *Sedum* tucked in among the rocks and concrete, often next to little roses or thymes. Harland did not like following rules, particularly in garden design. He would often say, "It works!" And that was what mattered, not that in nature one might never find such combinations of plants.

What struck me about Harland's garden were the beautiful color combinations, his rare plant collection, and the emotionally evocative sense of space. I was overwhelmed at my first visit and went home feeling depressed, wondering how I could ever approximate the beauty of color and space. Harland had a special genius for space, which was particularly evident to me when he remade my steep slope in 1988 and recycled the old brick and cobblestones from the paths and terrace to suggest the remains of a village near an ancient, unseen castle. In Pamela Harper's recent article in *Pacific Horticulture* ("Harland Hand: the Artist as Gardener, Spring 1999), she described various Hand gardens. Mine is the "nearly vertical garden in the small space behind an urban rowhouse, the garden's upper level higher than the roof."

I remember watching Harland from the upstairs window, as he worked directly on the land rather than from detailed drawings. Early in the morning he would walk around the mounds of dirt, absorbed in inner thought. When the workers arrived, he knew exactly where he wanted to place the rocks or the wet concrete. One time I arrived home after a long day in tedious depositions to find a little wall of San Francisco cobblestone outside the back door, a surprise wall not on the schematic drawing Harland had shown me before beginning construction. I telephoned him and mentioned the wall. "Isn't it wonderful!" he exclaimed, a statement more than a question.

Several years ago, as Harland was writing his book (which was bought by Chronicle Books and has not yet been published), he told me that the chapter he was having the hardest time with was the one on space. Articulating his theories and concepts of space was naturally difficult, as it is much easier to describe things, such as plants or colors, for which there is a large vocabulary. He rewrote the chapter on space many times, and recently, when I read the last version, I felt that he had indeed succeeded in describing how to think about space in the garden, and why some spaces are so inspiring to us, and others so dull.

Harland preferred the arabesque to the axis. He liked to repeat curves, layer horizontals, and mass verticals to create a sense of calm. He would contrast verticals and horizontals, angles and curves of various sizes, to invoke a sense of drama and power. Essentially, if one imagines curving lines flowing up from the earth to the sky and back, like giant figure 8's, contrasting with linear elements (benches, yew-like plants), one has a good head start toward creating that special sense of

space that is characteristic of Harland Hand gardens.

I recently observed a similar space when, two weeks after Harland passed away, I visited Lipan Point on the east rim of the Grand Canyon. Sitting on this rocky promontory that juts out over the Grand Canyon, I compared the awe-some effect of the canyon to the more intimate safety of this little natural garden where I sat, so reminiscent of Harlan's garden in El Cerrito—swirling space, lichen-covered rocks forming natural mounds, pleasing planes, wonderful plants, dark and light contrasts, a stunning, distant vista.

How Harland would have loved Lipan Point—perhaps he had been there, I do not know. But I felt his presence at that moment. To him the garden was a sanctuary in nature, a part of nature in which we can feel safe and connected to the whole of nature, without being subjected to the dangers of nature. After his trip to the highlands of Papua New Guinea, where he experienced tribal people's need for shelters, trails, and lookouts, he frequently spoke of the need for Western people to include these features in our gardens, for the emotional power they lend to the landscape. At that moment, looking out at the Grand Canyon, all of Harlan's teachings came together in my mind, and I felt his enduring presence.

Harland embodied a sense of wonderment, of joy in discovery and problem solving. When he created his gardens, there emerged the artist, the poet, the little boy, the adult who was both practical and spiritual. He put to the task everything he had or could grasp for, and his reach was long and persuasive. Harland was closely connected to limitless landscapes both external and internal. I told Harland that his garden was a "cosmic launching pad," and he smiled. He did not like talk about mystical things, but certainly he felt awe when he observed vast expanses of nature or works of art. He loved to think deeply about certain subjects, particularly man in relation to nature.

But gardens were not the only way in which Harland expressed his creativity. He painted, wrote poetry, taught others to think and create. He was the soul of generosity, always willing to share plants, thoughts on garden design, art, nature, philosophy, and politics. He was never bored. When he lay dying, having been told by his doctor that he only had at the most a few more days, he was eager to explore the experience of death. It was another adventure in a lifetime of adventures. He had trekked in mountainous jungles in Papua New Guinea and Meso-America, explored the ruins of classical Greece, survived the trenches of the Battle of the Bulge. For 76 years he had consciously examined the senses, emotions, and intellect. He had lived a full life, and he was not afraid of death. After all, as he often said, "It is all part of nature."

—Marjory Harris

MUSINGS

Cute Weeds

You can run across this somewhat oxymoronic phrase quite often in the rock gardening literature, and it may set you to thinking: how many such "cute weeds" do I have in my garden? And why are they cute if they are weeds?

Let's start with recognizing the fact that the meanings of both words are highly subjective. Your weed may be my treasure; and I won't even attempt to enumerate the ambiguities of the word "cute". Nevertheless, when the two words are used in conjunction, "cute" tends to soften the harshness and implied danger of the word "weed". Let me explain. All rock garden weeds share one or both of the following characteristics: a rapid horizontal growth and an utmost ease of reproduction. However, the rock gardener adds a third one: the difficulty of getting rid of them. Some weeds are handsome, even beautiful, but if you have to cope with hundreds of them appearing every other week, e.g., *Oxalis corniculata*, or if an entire section of your rock garden has to be dismantled to remove their wandering stolons, e.g., *Muehlenbeckia axillaris*, beauty takes second place after caution. Here is where cuteness comes on stage. We refuse to call the *Oxalis* or *Muehlenbeckia* "cute", preferring to reserve that term for those pretty weeds that a rock gardener can handle with relative ease in his rock garden.

The last four words in the previous sentence only seem superfluous. The reason for adding them touches upon many of the mysteries, disappointments, and delights of rock gardening. Although I don't expect any flak regarding the weedy oxalis, there is bound to be considerable opposition to calling the *Muehlenbeckia* a weed, and even to calling it a difficult one to eradicate. While it definitely is one in my gritty scree, it may not behave that way in yours. Many years ago, I had to dismantle, stone by stone, an entire rock wall infested by plumbago, *Ceratostigma plumbaginoides*, which my neighbor couldn't keep in a similar wall longer than a year or two. The mystery of taming a plant that hails from some lofty peak in the Southern Alps is no different from the mystery of a plant loving you to death. In New Zealand, my *Muehlenbeckia* forms only modest colonies, while a few paces away, various raoulias cover whole square meters of ground with a thick, moss-like carpet. Do I have to add that I've never succeeded in keeping any raoulia longer than three years and that their mini-carpetts seldom exceeded 10 cm in diameter?

But let's now take a look at some of the cute weeds, understand, *my* cute weeds. An excellent example is the Japanese loosestrife, *Lysimachia japonica* var. *minuta*. A ground-hugging, mat-forming, more-or-less evergreen perennial with oval, somewhat pointed, 5-mm-wide, deep green, crowded leaves, and stemless, yellow, 5-petalled flowers 8 mm wide, it starts its growth as a small, tight bun that slowly but surely enlarges and may reach 20 cm by year's end. Next year, if not challenged, it may double in size, and in the following years, I presume, it could swallow up your rock garden, given enough water and some shade.

Fortunately, it is a shallow-rooter that can be removed rather easily without disturbing near-by plants. Also, each blossom produces only one large seed hidden in the tight carpet—which, by the way, may be the reason why this plant is rarely offered in seed exchanges. When happy, it escapes into the lawn, where it competes successfully with grass to form a lovely, solid green spot dotted in late spring through early summer with many gold, starry flowers. But—and there always seems to be a “but”—while visiting a garden in Brno, in the Czech Republic, I noticed a miserable little patch of this plant, right next to a large, healthy carpet of *raoulia*, and was informed that they couldn't keep the *Lysimachia* “going.”

Similar to the *Lysimachia* in size and flower and also in its country of origin, is the smallest of all hypericums, *Hypericum pseudopetiolatum* var. *yakusimanum* (syn. *H. yakusimense*). This plant is a miniature shrub with a woody main stem. Nevertheless, in my garden, it disappears completely in winter. It is a late starter, and the new growth doesn't start from the old, withered stems but rather from the surrounding fibrous roots, sometimes as late as June or July. The oval, oblanceolate leaves are only some 3 mm long, and the slender branches grow horizontally from the crown, rooting as they progress. The 7-mm-wide, yellow, starry flowers on short stems keep appearing from July to October, but never in large numbers on any one plant. Toward the end of summer and in the fall, both foliage and seed pods turn different colors, from rusty brown to deep purple. In contrast to the *Lysimachia*, the seed pods contain hundreds of tiny seeds that perform a mean disappearing act whenever you try to collect them. Also, the hypericum's habit is much looser, but its growth is rapid enough to endanger some of its more sensitive, smaller neighbors by the end of summer. Although its roots are shallow, they are fibrous and form a wide, solid mass that is hard to remove. This lovely little *Hypericum* will not take over your rock garden, but once you have it, it will seed itself in any sunny or partially shaded scree with considerable gusto. It tolerates acidic or alkaline conditions and will withstand long periods of drought.

The weediness of the partridgeberry, *Mitchella repens*, is of a highly selective nature. In some locations, it refuses to do anything, except to wither away, but when happy, it will wiggle its way into its small and restrained neighbors, the long offshoots rooting along the way and, in time, will cover areas as large as several square meters. It seems to thrive on misery, becoming thickest on barren soil, where it can outcompete even crabgrass. At the same time, it is a thoroughly delightful plant with dark green, round leaves, only about 1 cm wide, and sometimes handsomely marked with white lines. Its long runners bear—in spring, and then sporadically throughout summer—deliciously scented, white, tubular flowers, 12 mm long and 8 mm wide, fuzzy on the inside, with a prominent stamen. Before opening, the buds, always in pairs, are streaked pink. On top of all this, brilliantly red (white in the form 'Leucophylla') berries appear a few weeks after the flowers fade. The berries are edible, but their taste indicates that if there ever were any birds in human ancestry, they couldn't have been partridges. Old and well-established clumps of *Mitchella* are difficult to dislodge, but younger plants are easy to control by cutting off the invading runners.

This short list, easily expanded and modified by any rock gardener, nevertheless allows some generalizations. “Cute weeds” are not to be dismissed lightly, and in all but the most austere and specialized collections they provide excellent

contrast to solitary plants and bushlets that we tend to call "jewels". Furthermore, they illustrate quite clearly the individuality of rock gardens and their keepers. Indeed, my cute weed may easily be your treasure.

—Alexej (Sasha) Borkovec

BOOKS

Stonework: Techniques and Projects, by Charles McRaven. Storey Communications, Inc.: Pownal, Vermont. 184 pp. ISBN 0-88266-976-1. \$18.95/\$26.95 Canadian.

It is a rarity in the world of books, in my opinion, to find a solid, useful book on working stone. One can now locate just such a book in this publication by Charles McRaven. *Stonework* was an inspiring and instructional read for me as a professional landscape designer and contractor. McRaven captured the charm, permanence, and value of well-crafted stonework for our homes and gardens. He also carefully details how to start and successfully complete construction of many stone features for the garden.

Before starting out on a Saturday with hopes of knocking out a few projects in stone, Mr. McRaven sets up novice and professional alike with the practical truth of stone. It's heavy. It requires some tools that are heavy. It requires paying attention to your body mechanics so that the ten tons you move that day allow for your moving painlessly the next day. Perhaps as importantly, he philosophizes that the real joy of working stone is in the necessity to slow down and move deliberately and thoughtfully, in placing stone so it can rest permanently, and possibly artfully, for many lifetimes. The real joy of stonework is placing each piece such that it creates the greatest possibility for the next piece. To do this well requires patience, practice, seeing,—and not settling for less than what satisfies you. These are practices that all aid each of us in developing the gardens of our dreams.

This manual will help the rock garden enthusiast in creating artistic features for the gardens such as effective paths, walls (mortared or dry-stacked), free-standing walls, steps, fireplaces, birdbaths, arched entries, and moon gates. All of these are photographed in black and white, not just line drawings, which has been a major deficiency in most of the earlier stonework tomes I've encountered. Along with each project McRaven compiles a list of tools and materials, as well as some sage advice for each project. McRaven also gives simple but solid advice about grouping boulders. This seems so basic, and yet how often do we see a simple grouping of rocks left looking hopelessly contrived. Enjoy, and plan for new rockwork projects soon.

—Michael Woods

Creating and Planting Garden Troughs, by Joyce Fingerut and Rex Murfitt. 1999. B.B. Mackey Books: Wayne PA. ISBN 1-893443-00-0.

Garden troughs are hot! They lurk in the corners of garden-magazine color spreads and stand alongside egg jars and Italian terra-cotta in garden centers. Planted troughs are popular items at chapter plant sales, and trough-building workshops are in demand at botanic gardens, home and garden shows, and at local extension-service fairs. For most of the new trough-owners, this will be their first exposure to alpine gardening. And for some serious gardeners, troughs may be the only place they admit alpines to their gardens.

There are many do-it-yourself articles on troughs in the recent garden literature, but almost all are highly derivative and many are dated. The near-universal use of "cottage-cheese consistency" in such articles suggests a genealogy of repetition that leads back at least to Lincoln Foster's *Rock Gardening*. The present book presents a thorough and first-hand account of trough gardening, and the methods advocated are almost failure-proof, even for the beginner. Though it is aimed at a more general audience, there is much to interest even the most experienced trough builders.

The strength of the book is Joyce Fingerut's clear and patient exposition of trough construction, and this exposition is greatly enhanced by the generous use of Jane Grushow's photographs of critical steps in the process. Fingerut's approach, in materials, forms, and procedures, is essentially the same as that described in Mike Slater's article "Trough Construction," in the Spring 1994 *Rock Garden Quarterly*, and reprinted in NARGS' *Handbook on Troughs*. However, a novice will find the present book more complete and easier to follow.

Fingerut believes that light weight, strength, and durability are, in approximately that order, the most important qualities for a hypertufa trough. For that reason, she concentrates entirely on the equal-parts peat and perlite "American hypertufa," mentioning heavier sand and peat formulations only as an historical oddity. (Though I, for instance, am currently working mostly in variants of the original medium.) There is the advantage of clarity in this approach, but it would have been nice to have alternative recipes, perhaps in an appendix. Even where light weight is a major goal, for instance, pumice is an attractive alternative for the perlite-averse.

For added strength, she advocates using both synthetic fibers and acrylic bonding agents to the hypertufa. This may be a belt-and-suspenders approach, since a well-cast and well-cured trough with no reinforcement rarely fails, but it is an approach that's close to fool-proof. She goes on to explain the need to decrease porosity to achieve the most durable, frost-resistant structure. The mix should contain only the amount of water required for hydration: any excess water (the whey in the "cottage-cheese") will leave frost-vulnerable voids in the hypertufa. This produces a stiff mix which is readily formed without an interior form, and which should be rammed into place to further reduce porosity. The resulting material is a long way from tufa and from the original concept of hypertufa: perhaps someone should rename it 'hyperlite'! I believe Fingerut is correct in denying any need for a very porous hypertufa, since porosity can and should be built into the soil mix.

In her discussion of curing the cast troughs, Fingerut has consulted the materials-science literature. She notes that the optimum temperature for curing con-

cretes is near 20°C, at which temperature the cure is complete in about four weeks. This is one place where I would have liked a little more detail: I'd like to know more about the relationship between strength and temperature over the range between 0° and 30°C. She notes that for most alpiners, the troughs can be planted directly after final curing, relying on the buffering capacity of the soil mix to compensate for excess alkalinity. In my experience she is correct here, despite the traditional recommendations of months of weathering or of acid or permanganate rinses before planting.

The section on plant choice, entitled "Recommended Plants for Troughs: A Lexicon," was contributed by Rex Murfitt. It begins with a discussion of buns and cushions and first discusses four genera exemplifying this growth form: *Androsace*, *Draba*, *Ptilotrichum*(!), and *Silene*, before going back to *Aquilegia* for a general alphabetical list of herbaceous genera. This is followed by lists of dwarf conifers, other evergreens, and deciduous woodies. This organization may confuse beginners. Because the listings are by genus, "non-bun" androsaces fall into the first group, and *Potentilla fruticosa* is mentioned in the treatment of herbaceous potentillas. The treatment is wide-ranging, often with anecdotes about the plants in the wild. It often lists difficult or hard-to-find plants, while omitting others that are more accessible to the beginner. Anyone's list of trough candidates could be criticized in similar manner, but here, for example, there are no lewisias, no daphnes, and *S. oppositifolia* is omitted from an extensive list of saxifrages. Among campanulas, *C. cochlearifolia* and *C. garganica* are suggested, with reservations, but such well-behaved campanulas as *C. saxifraga* and its relatives are not mentioned.

The last chapter, "Planting Plans for Troughs," is easier to follow, but it is not integrated with the plant list preceding it. Layouts for troughs for moist soil, mixed sun and shade, classic alpiners, and succulents are indicated here, with line drawings supplied by Murfitt. The plant lists in this section are short, but they are more to the point, and I would have liked to see this section on design (of a hypothetical patio garden) include detailed trough plantings, as was done in the NARGS *Handbook on Troughs*.

Moderately priced at \$21, this well-illustrated book is an excellent value for anyone, experienced or not, who is interested in trough-building. And may their tribe prosper!

—Loren Russell

A Field Guide to the Wild Flowers Kwazulu-Natal and the Eastern Region; Elsa Pooley. 1998. Natal Flora Publications Trust: Durban, South Africa. 630 pp.; 2400 color photographs, thousands of maps and diagrams. Available from ABC Bookshop (email: abc_book@tcs.co.za).

It is something of a mystery to me how South Africa, a nation in the throes of transformation, a fraction the size and population of the United States, manages nevertheless to consistently produce books and monographs of a size, scope, and quality that quite frankly puts us to shame. This book is nothing less than a rosetta stone for anyone interested in the readily cultivable flora of South Africa, for it focuses on the coldest and richest parts of the summer rainfall region—the southern Drakensberg and Natal uplands—where the lion's share of plants most likely to succeed in the Northern Hemisphere originates. Once you locate this book and buy it, prepare to spend hours poring over the stunning photographs, surprisingly concise dot maps, and the information-dense text. I have already used the book to parse those notorious South African seedlists, which are about as comprehensible and useful to a North Temperate gardener as a cuneiform Sumerian tablet.

Although a goodly proportion of the high Drakensberg plants are pictured (a rather different suite than is found in the many field guides treating that region, by the way), the book focuses more on the middle and lower elevation flora of Kwa-Zulu Natal: a region of extraordinary endemism and biodiversity, or what used to be called floral bounty. It is also the one region of South Africa that is likely to supply garden-worthy plants for southeastern Canada and the Atlantic Seaboard of the United States, the hotbed of North American horticulture.

Kwa-Zulu Natal contains the principal concentration of species in such genera as *Crocoshia*, *Clivia*, *Cyrtanthus*, *Diascia*, *Dierama*, *Helichrysum*, *Hesperantha*, *Kniphofia*, *Nerine*, *Plectranthus*, *Rhodohypoxis*, and *Streptocarpus* as well as a significant concentrations of hundreds of other genera (*Disa*, *Geranium*, *Hemizygia*, *Gladiolus*, *Haemanthus*, *Moraea*, *Sutera*). There are enough pictures and descriptions of little-known species in all these genera, and so many others you have never heard of, to disturb the sleep of the most complacent rock gardener.

Where else on earth in the space of 150 miles can you find climates that approximate both Florida, Colorado tundra, and everything in between? Anyone who has hiked the *Protea* covered hills of Mt. Currie, the lush farmland around Nottingham Road, or the escarpment just west of Underberg can tell you this landscape resembles a lush perennial border and well-planted rock garden as closely as any place you will find anywhere on earth. If biblical scholars were gardeners, they'd know the archetype for Paradise would surely be Kwa-Zulu Natal. This book makes an excellent pitch as its gospel.

—Panayoti Kelaidis

Highland Flowers of Yunnan, ed. Guan Kaiyan; contributors Guan Kaiyan, Zhou Zhekung, Sun Hang, Fei Yong, and Sun Weibang. 1998. Kunming Institute of Botany, The Chinese Academy of Sciences: Kunming, China. Yunnan Science and Technology Press. 252 pp.; 579 color photographs. ISBN 7-5416-1123-9/S. 184.

This book is the result of many years of field work by the authors. In their introduction the authors describe the geographic setting of Yunnan Province and its climate (which is complex, a monsoon regime with distinct wet and dry seasons. There is tremendous variation depending on elevation and other factors, all within a small, landlocked region at the southwestern corner of China. The authors give a brief geologic history of the province explaining how that has affected the composition of the present-day flora, noting the introduction of ancient Mediterranean, African, Indian, Malayan and East Asian species. Numerous relict populations of pre-Tertiary species found a refuge in Yunnan, and there was subsequent mixing together of northern, temperate flora with tropical and subtropical species, particularly in the northwest of the province. The authors state, "...the province has 15,000 species of higher plants accounting for half of China's total, although the province comprises only four percent of the country's total territory." The Hengduan Mountain Range alone, running parallel to the eastern Himalaya north of Myanmar, contains "...more than 5,000 species of highland plants..."

The illustrations are arranged by plant families, with the genera and species in each family presented in alphabetical order. There are excellent color photographs of 485 species in 193 genera and 67 families. Each photograph is accompanied by a short description in Mandarin Chinese and English, giving plant size, habitat, elevation range, flowering season, fruiting season in many cases, and location where photographed. There is an index of botanical names. Measurements are metric.

I stumbled on this wonderful book by accident a few months ago, not knowing initially what I had. Now, when I share *Highland Flowers of Yunnan* with people I meet, their reaction, one and all, is the same: wonder, delight, excitement, surprise—and we all wonder why we aren't raising these jewels in our gardens. Although many species will be familiar to experienced gardeners, there is a delayed effect from reading this book. I suddenly asked myself, "What about the other 4,500 species of high mountain plants not illustrated?" I want to see photos of all 15,000 species; I want an encyclopedia of the plants of Yunnan.

The only source I know of for this book is Transpacific Nursery, 16065 Oldsville Rd., McMinnville, OR 97128. Tel. 503-472-6215, fax 503-434-1505; e-mail gwroe@jack.macnet.com. The price is \$65, \$75 for an autographed copy, plus \$2 postage.

—Tom Hoffman



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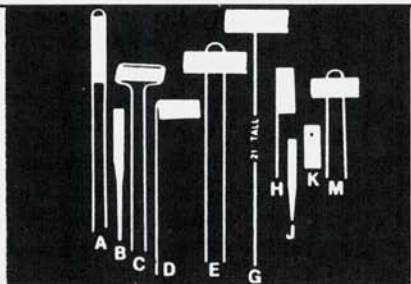
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Allegheny	Larry Hankowitz, 262 Horning Road, Bethel Park, PA 15102
Berkshire	Tamsin Goggin, Lovers Lane, Norfolk, CT 06058
Calgary/Alberta	Tom McCabe, 819 Durham Ave. SW, Calgary T2T 0P5 Canada
Columbia-Willamette	Neal Maillet, 6432 SW 35th Ave., Portland, OR 972221
Connecticut	Robert Benton, 71 Blueberry Ln., S. Glastonbury, CT 06073
Delaware Valley	Ann Rosenberg, 5 Westview Rd., Bryn Mawr 19010
Emerald	Eveleen Henry, 32961 W. Tate Rd., Creswell, OR 97426
Gateway	William Walley, 5643 Janet Ave., Jennings, MO 63136
Great Lakes	Susan Reznicek, 890 Wickfield Ct., Ann Arbor, MI 48105
Hudson Valley	Leon and Virginia Shen, 14 Arthur Ct., Montvale, NJ 07645
Long Island	Shelley Herlich, 43 Greenfield Lane, Commack, NY 11725
	Fred Knapp, 58 Kaintuck Lane, Locust Valley, NY 11560
Manhattan	Steve Whitesell, 150-67 Village Rd., #GD, Kew Grdn Hills, NY 11432
Mason-Dixon	Nicholas Klise, 127 Halls Rd., Red Lion, PA 17356
Minnesota	Florence Keller, 6412 Indian Hills Road, MN 55439
Mt. Tahoma	Candy Strickland, 6911 104th St. E., Puyallup, WA 98373
New England	Richard Stomberg, 56 Grimshaw St., Malden, MA 02148
Newfoundland	Todd Boland, 81 Stamp's Lane, St. John's, Newfoundland A1B 3H7
Northwestern	Hans Sauter, 12544 Ninth Ave. NW, Seattle, WA 98177
Ohio Valley	G. McDonough, 2116 N. Fountain Blvd., Springfield, OH 45504
Ontario	M. & S. Dolbey, 5 Glen Robert Dr., Toronto, Ont. M4B 1J4 Canada
Ottawa Valley	Ian Efford, 1909 Broadmoor Ave., Ottawa, Ont. K1H 5B3 Canada
Piedmont	Barbara Scott, 1321 Chaney Rd., Raleigh, NC 27606
Potomac Valley	Michael Bordelon, 3 Greentree Pl., Greenbelt, MD 20770
Rocky Mountain	Patricia Carter, 2449 S. Inverness Pl., Evergreen, CO 80439
Shasta	Sue Neuman, 3013 N. Hwy. 3, Etna, CA 96027
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Wasatch	David Joyner, 3356 S. Plaza Way, Salt Lake City, UT 84109
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QUARTERLY STAFF

Editor	Gwen Kelaidis	(303) 368-7530/kelaidis@central.com
	7530 E. Mississippi Dr., Denver, Colorado 80231-2504	
Advertising Manager	Al Deurbrouck	(412) 653-0281/adeurbrouck@juno.com
	6915 Hilldale Drive, Pittsburgh, Pennsylvania 15236	
Proofreading Assistance	Barbara and Ted Cochrane, Madison, Wisconsin	
Editorial Advisors	Dot Plyler, Phyllis Gustafson, Anne Spiegel	
Guest Artists	Lori Chips	Phyllis Gustafson
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