

ROCK GARDEN



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COVER: *Primula parryi*
by Dick Van Reyper

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Helichrysum trilineatum

AFRICAN EVERLASTINGS

SUMMER GOLD FOR THE GARDEN

by Panayoti Kelaidis

Much as primulas epitomize the Himalayas, or penstemons the American West, so do helichrysums dominate ecosystems throughout South Africa. Nowhere in that country are they more conspicuous or variable than on the high, cold summits of the Drakensberg. One would be lucky to find half dozen penstemons growing together anywhere in western North America, but on a hike up Sani Pass you can easily log twenty of these amazing everlastings.

There are a host of tiny cushion helichrysums that challenge *Haastia* and *Raoulia* in vegetable sheepishness. There are others that form rambling mats—more like the scab plant types of *Raoulia*: perhaps among major genera of rock plants, only *Saxifraga* approaches the genus *Helichrysum* when it comes to protean variability in foliage and plant form. The everlasting flowers are often dense corymbs like an *Achillea*—showy from a distance although not quite so compelling close up. But there are several sections of the genus that produce sizable everlasting involucre strikingly beautiful at any range. As I have grown more and more species of South African

everlastings I am impressed by their distinctive qualities: each species proffers some special feature for the garden in bloom, leaf, or form. Best of all, they have extraordinarily long bloom season, often in the hot summer months when sensible alpiners are long since finished flowering.

Let's take a stroll through a few groups in the genus *Helichrysum* in South Africa: a few species are well known in North Temperate gardens. Most are virtually unknown in gardens and in rock garden literature, although they are richly illustrated in many books on South African wild flowers and quite abundant in nature.

MAT-FORMING HELICHRYSUMS

A large number of helichrysums form wide mats in nature, much like an *Antennaria* or creeping phlox. Each of these species occurs in a slightly different environment, so it is useful to know a little about their provenance, since they respond quite differently in cultivation.

Helichrysum milfordiae (photos, pp. 178), possibly the best known helichrysum from South Africa in rock gardens. It makes a shaggy, white-hairy

mat of 2" rosettes with quite showy flowers over a long season in late spring. This is not the most common plant in nature, restricted to rather cool, moist, rocky habitats at rather high elevations (usually above 9000'). I have tried growing this in a wide variety of sites and soils over the years where other helichrysums thrive, and it has done well for me only on a steep, north-facing crevice garden—alongside Aretian androsaces and porophyllum saxifrages.

H. praecurrens. Another high altitude species, this forms bright blue-green mats of almost succulent rosettes that can be a yard or more across in nature. I have seen this growing in vast numbers on rather moist, rocky flats on Sani Top: the stemless flowers are often quite pink, produced early in the spring. This has been grown in British gardens for at least a decade. It is not as easy or indestructible as its abundance in nature might suggest.

H. flanaganii (photo, p. 180), one of the most common and widespread high elevation helichrysums of the Drakensberg: this forms dense, white mats like a tiny *Antennaria*, with bright yellow clusters of rayless flowers on stems a few inches tall. A good plant for a sunny peat bed or cool slope of the rock garden.

H. confertifolium (photo, p. 179) is a very widespread and abundant species from middle elevations in the Drakensberg. This occurs in two very distinct forms: in the South it makes a much smaller, more delicate mound of smaller rosettes. The flowers are only an inch or so across here, a dazzling white with a coppery reverse to the involucre bracts. In the north (I have seen it growing abundantly on Platberg), this forms much more robust mats with taller flower stems.

H. montanum, a compact, mat-form-

ing plant from middle elevations in the Drakensberg that grows among rocks and on cliffs. The foliage is white, forming trim rosettes. The flower stem is 4-8" long with dense clusters of papery, golden involucres that make a show from the distance, and yet are pleasing close up.

H. basalticum is a rather variable alpine that has densely white foliage on low stems and golden clusters of flowers giving the effect of an *Achillea* from a distance. This has a long season of summer interest, and the foliage is attractive through the year. Taller forms are over a foot in height, while a dwarf form only 4" in bloom is particularly valuable in the rock garden.

H. argyrophyllum ('Moe's Gold') This species, restricted in nature to a small district in the East Cape mountains, is surely one of the most stunning plants in the genus. The satiny silver mats spread several feet in a year, and the brilliant golden flowers last for weeks in late summer. It is not hardy in zone 5 Denver, but widely grown in Australia, California and at Kirstenbosch. Hilliard indicates that it occurs in the Drakensberg, where (presumably) hardier forms must exist.

TUFTED SPECIES (WHITE FLOWERED)

H. album (photo, p. 182) is a challenging high alpine, with attractive heads of bloom produced singly on stems 4-6" high. The reverse of the involucre bracts (which look like petals) are often stained a deep rose color. Wonderfully woolly rosettes are decorative through the year. A plant for a very choice crevice garden, alongside Aretian androsaces and *kabschia* saxifrages.

H. argentissimum has narrow, almost grassy leaves with very silvery hairs and is a mat-former. Stems 8-10" high bear dazzling white heads, the bracts sometimes stained pink on the reverse.

H. lingulatum (photo, p. 177) is at 6-8" similar to the last, but the leaves are somewhat wider and blunter. The flowers are highly variable in hue, but mostly white with darker staining on the back of the heads.

H. marginatum forms deep blue-green mats of nearly succulent leaves, with a pale outlining of the margins. Huge, pure white flowers in late June and through much of July are quite stunning in their size and substance (up to 2" across): a fine addition to the summer garden.

H. bellum forms hairy, deep bluish-green mats that can spread to over a 12" across in a few years, with 1-2" pure white blossoms that may be plucked as a wonderful addition to dried flower arrangements.

H. albobrunneum. The dense, gray-white mounds of large, rounded leaves are decorative in their own right (rather like an *Anaphalis* superficially). The clusters of 3-7 flower heads are quite congested at first, with beautiful reddish staining on the reverse.

SHRUBBY HELICHRYSUMS

H. trilineatum (photo, p. 182) is a very abundant shrub of the highest altitudes in the Drakensberg. This is usually a densely white-woolly plant with large clusters of papery bloom at the height of summer. A much congested, high alpine form has great appeal to rock gardeners, but the lowland form is likewise quite useful where a plant that attains a meter in height and width can be accommodated. The foliage has a very silvery white sheen, even in winter. The brassy yellow, button-like flowers come mostly in June and are quite trim and attractive.

H. splendidum, generally taller than *H. trilineatum*, has longer leaves and flowers that form impressive corymbs instead of tiny buttons at the end of branches.

H. retortoides (photo, p. 181) is a tiny, twiggy shrub with leaves whorled like a conifer, only an inch or so long. The terminal flowers are produced in May and June—1" across and usually a soft pink and white in color. This is a challenging species to grow—doing best in a gritty peat bed and not in too sunny an exposure.

CUSHION HELICHRYSUMS

H. sessiloides is a tiny, domed alpine with blue-gray leaves (with white undersurface) and shiny white, stemless blooms in May.

H. pagophilum (photo, p. 181), superficially like the last, has powdery white foliage on top, as well, and yellow button flowers in very early spring.

H. glaciale is a tiny, lax mat-former with white blooms on 4-6" stems. Not currently in cultivation.

H. confertum (photo, p. 177) forms dense, pulvinate vegetable sheep and hails from elevations above 6000'. It is a cushion with gray-green rosettes. The buds are deep rose-red, opening to tiny white daisies. This can grow to over a meter in extent—surely one of the most impressive cushion plants available to gardens. It blooms in March and April in the wild—corresponding to late August through October in the northern hemisphere—an unusual season for cushion plants to bloom.

H. sutherlandii. The typical forms are loose, candidates for the perennial garden. The lowland form is a lax bushlet, with stems up to a foot in length. However, there is also a very congested alpine form that approaches the last species in making large, dense cushions (photo, pp. 177-8).

COLOR BREAKS (MOSTLY TUFTED SPECIES)

Helichrysum aureum (photo, p. 182), One of the most variable and attractive

helichrysums. There are gigantic, low-land forms that can grow to 3' or more in height, but the several subspecies that occur in the higher Drakensberg are very trim, attractive plants with gray-green rosettes and huge, papery flower heads of a bright, brassy yellow on stems under a foot in height.

H. vernum, the earliest of the pink-to red-flowered helichrysums to flower, often starts blooming in September, and is usually in seed by November—which translates to late April or May in the Northern Hemisphere. The mats of foliage are a lustrous green, and stems can be 8-12" in height. The flowers are a vivid rose-pink, or even deep crimson in some forms. This is not currently in cultivation to my knowledge.

H. ecklonis (photo, p. 181). A larger, more robust plant, this forms low, hairy mats of gray foliage, with stems to 12". The flowers are as much as 2" across and vary from deep rose to paler shades. This follows on the heels of the last, blooming in December (May to June in the Northern Hemisphere). I was delighted to find a few late blossoms on my last trip, at the paler end of the range of flower color.

H. adenocarpum (photo, p. 179) is the latest of the pink helichrysums to bloom and makes small mats of green, hairy foliage topped with many stems, each with a number of large blossoms. The color is variable in this species as well—from pale pinks to deep crimson. It is most abundant in middle elevations in the Drakensberg—the so called "Little Berg" from 4000' to 8000'. It was in peak bloom in March of 1996—translating to September in Northern Hemisphere seasons—which would make it a highlight of the autumn rock garden.

There are dozens more species of desirable helichrysums in the

Drakensberg alone, and who knows how many in the high karroo or the mountains of the fynbos elsewhere in South Africa. They vary tremendously in flower color, in habit, and in size. As we have obtained a selection of these species at Denver Botanic Gardens, more and more corners of the Rock Alpine Garden are enlivened by them in the summer months. Since the flowers are everlasting, a clump of helichrysums can appear fresh and attractive for months at a time—making these champions for lovers of color in the garden. I have no doubt that one day soon the genus *Helichrysum* will assume a place in the pantheon of alpines, alongside the Labiates, *Campanula* and *Gentiana*, transforming and elevating the rock garden in the summer months..

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Panayoti Kelaidis gardens in Denver, Colorado, marginal USDA zone 5 and one of the sunnier, drier climates in the USA. He grows an improbably wide range of genera and has a particular interest in plants of dry continental climates all over the world.

BULBS FOR THE SOUTHEAST:

FALL AND WINTER

by Nancy Goodwin

My year begins in autumn as the garden and I recover from the stress of summer's heat and humidity. Cooler temperatures stimulate spring-flowering bulbs to grow new roots and fall-flowering ones to open their buds. Gardeners in the Southeast can have bulbs, corms, or tubers in bloom every day of the year. Here I will concentrate on plants which grow from bulbs and corms, mentioning those from tubers only in passing. These small treasures grow well in rock gardens, because small stones mixed with the surrounding soil discourage voles and other rodents from eating them.

Several bulbs with fall names bridge the gap between summer and fall. *Leucojum autumnale* and two scillas, *Scilla autumnalis* and *Scilla scilloides* begin blooming in late summer. The fall snowflake appears in August and continues into October. Narrow, grass-like leaves appear with pendulous, white flowers often tipped with pink. It is happy in dry shade or a sunny scree. Its fragrant, pink-flowered cousin, *Leucojum roseum*, blooms at the same time, but thus far I haven't tested it outside. *Scilla autumnalis* blooms from July through September, produc-

ing small, violet flowers with indigo-blue anthers. The flowers may be from dark to light violet or even white. *Scilla scilloides* (photo, p. 185) opens its pink-lilac flowers in late August. Taller stalks and feathery stamens on densely packed racemes produce a showier display than that of the other fall scillas. It, too, has an albino form that I've not yet seen.

Our first narcissus of the fall, opening a season that will last through spring, is tender *Narcissus serotinus*, sending up flowers as soon as nights are cool in late September or early October. *Serotinus* means late, but it seems early. White petals surround the shortest imaginable orange cup, best seen looking sideways across the flower. A solitary, somewhat rounded leaf, often bearing a narrow white line, appears after the flower and persists all winter. These bulbs must be dried off completely during summer and repotted in late summer or early fall.

Colchicums bloom from late August into winter at Montrose. I haven't succeeded with spring-flowering ones. Most have leaves in spring that are too large for many rock gardens. There are three small-flowered

ones we can grow in the middle and lower South. *Colchicum pusillum* and *C. cupanii* are similar, with pale lilac flowers and slender leaves that appear with the flowers. In early winter *C. burtii* (photo, p. 185) opens whitish flowers with dark purple anthers. Its narrow leaves qualify it for a rock garden, although I grow it in ordinary soil and light shade.

Allium thunbergii blooms in October and November with flower clusters in shades of purple-violet or in pure white. The choice cultivar 'Ozawa' is darker than the type. These onions are only 6-8" high, and though they like sun, they aren't fussy about soil, nor do they seed about. I increase my display by dividing the clumps and by sowing more seeds every year.

Fall is the end of a long season of bloom for *Habranthus* and *Zephyranthes*. White, up-facing cups of *Zephyranthes candida* and clear, pale yellow ones of *Z. smallii* appear from late summer until frost. These bulbs want sun but aren't demanding about soil. *Zephyranthes flavissima* with bright yellow, pointed petals blooms longer than any other amaryllid in my garden. I can find a few plants in flower from early summer until hard frost.

Fall heralds the long season of bloom of crocuses. I usually see the first one, *Crocus tournefortii*, by the end of September. Each pale, violet-blue flower remains fully open on cloudy days and at night and closes only after its time has passed. The fragrant, lilac flowers of *C. longiflorus* (photo, p. 186) appear from early October through much of November, requiring sunlight to open fully, but growing well under deciduous trees. It doesn't mind the usual droughts of summer.

Crocus speciosus (photo, p. 186) is another long-blooming species, available in many sizes and shades. Blue-violet flowers appear before the leaves

from September into December. The flowers are vase-shaped bowls atop long, pale tubes that collapse after pollination. The white cultivar, 'Albus', is smaller than the type but just as reliable. This easy species self-sows in unexpected places in both rock garden and woods. It is beautiful with the red-violet flowers of *Cyclamen graecum* or the pinker *Cyclamen hederifolium*. By selecting favorite forms of crocuses and moving them near other plants in flower at the same time, I have combinations impossible to create by design on paper. Unlike cyclamen, crocuses are forgiving. They don't mind transplanting while in active growth.

Crocus goulimyi (photo, p. 186) grows on the west side of my *Cedrus deodara* with pink-flowered *Cyclamen cilicium*. Both like the increased sunlight they receive as fall advances. This crocus often appears to be bi-colored with the outer three petals a different shade from that of the inner ones. Globular flowers open at the top of tall, slender tubes that don't collapse like those of *C. speciosus*.

In early October *Crocus cartwrightianus* blooms. *Crocus cartwrightianus* 'Albus' has white flowers that open to reveal a three-branched, scarlet stigma surrounded by three yellow anthers. The purple form is either *C. sativus*, the saffron crocus, or *C. cartwrightianus*. I found clumps in the garden at Montrose when I moved here and have found them easy to grow with winter sun. They increase quickly and bloom well after our intense summer heat.

Crocus tomasii, not to be confused with winter-flowering *C. tommasinianus*, has lilac flowers with a white throat. It blooms with the latest forms of *Cyclamen graecum*. Before the last *C. tomasii* opens, *Crocus medius* produces its red-violet flowers with vivid orange stigmas. The intense color of this crocus makes it one of the best to

grow with *Cyclamen mirabile*. Corms increase slowly in the garden but are worth every effort to obtain and increase.

Beneath the deodara cedar I grow the delicate-looking *Crocus veneris* with slender, pointed, white petals striped with violet-blue. I have read that it is really not garden-worthy—but I cannot even imagine a crocus not worthy of my garden. I cherish this one because it blooms late in fall.

Close examination of *Crocus banaticus* reveals, in part, why crocuses are placed in the family Iridaceae. The three inner petals are erect and often feathered, while the larger, outer three are darker lilac-blue. At one time this crocus was known as *C. iridiflorus*. The beautiful, albino form is less vigorous. Though hardy, this species needs some moisture in summer and fall to bloom well. The relatively broad leaves grow in spring.

Crocus pulchellus 'Zephyr' blooms about the same time as *C. speciosus* and looks more delicate with its smaller, more cupped flowers. These don't collapse as readily as those of *C. speciosus*. The species may have white or dark lilac-blue flowers, but the cultivar, 'Zephyr' has pale lilac ones.

Two other white-flowered crocuses bloom in midautumn. *Crocus niveus* has large flowers that open wide to reveal yellow anthers and a yellow throat. The flowers of *C. boryi* are more goblet-shaped, never fully opened. White anthers and a finely branched orange stigma distinguish it from other white crocuses.

Crocus nudiflorus blooms, as its name implies, without its leaves. Mine has deep purple perianth segments and an orange stigma protruding above the upward-facing cup.

Terror-of-shepherds, *Crocus salzmännii*, begins to bloom as days and nights get colder. The terror is of the

approaching winter. I have grown many seeds of this species and find that though some forms bloom in mid-season, most wait until late fall. All of mine have lilac-purple flowers with yellow anthers and orange stigmas.

In late fall *Crocus laevigatus* 'Fontenayi' produces lilac-purple flowers with feathered, darker purple exteriors. Kneeling to them reveals the most delicious fragrance, rather like that of freesias.

To have a narcissus in autumn is to have a bit of spring before winter. We have several species in flower before Christmas in the open garden and more in a tiny greenhouse. *Narcissus cantabricus*, the first one to put up leaves and flowers, is a hoop petticoat type with a flared, pale cream or white corona and narrow, pointed corolla segments. Unlike *N. bulbocodium*, it keeps its stamens within the corona.

Closely related *N. romieuxii* (photo, p. 185) has also proved hardy for me. Pale yellow flowers appear from late fall through winter. Although we lose fully open flowers when severe weather comes, more buds appear and open on mild days. In some forms the long, narrow corolla segments seem to cover the corona like a jagged cloak.

We see *Galanthus reginae-olgae* by the middle or end of October. When I see the first blue-gray point of a flower bud above ground, I rejoice that snow-drop season has begun. Blue-gray leaves with a gray stripe down the center grow after the flowers die away, and these persist all winter.

By Thanksgiving other snowdrops are in bloom. *Galanthus caucasicus* var. *hiemalis* has broad, blue-gray leaves, one enfolding the other as they emerge. *Galanthus nivalis* blooms in January and February at Montrose with a great variety of forms and sizes.

It is the happiest species I have, producing seeds in abundance every year. Its one spot of green at the base of the cup makes it easy to identify. *Galanthus elwesii*, the endangered one and the one often sent out by unscrupulous bulb merchants, is easily distinguished by two green markings on the cups. *Galanthus ikariae* has broad, green leaves and a relatively broad band of green at the mouth of the cup. We have double forms of both *G. nivalis* and *G. elwesii*, the largest and most vigorous being a cultivar of the latter, 'Lady Beatrix Stanley'. The flower stalk of most snowdrops emerges from the earth like an arrow, with the flower bud pointing upwards, bearing a green stripe along one side as if to give it the strength necessary to push through the earth. As the pedicel elongates, the stripe, now a translucent spathe bordered by two green bracteoles, breaks away to hover over the flower like a narrow umbrella, finally drooping to one side. When fully open, the flower is pendulous with three outer petals sometimes held away so that one can see the inner cup in its entirety when walking through the garden. Some snowdrops hang their outer petals over the cup, insisting that we kneel on cold, wet earth to appreciate the beauty and variety of their markings. It's worth the view, and I kneel before each one and feel sad when the last has disappeared. *Galanthus* are easy from seeds. I watch closely as the capsule swells and finally turns a yellowish beige. Then I extract the seeds and scratch them into the dirt nearby. After only a few years I have my own seedlings in flower and more germinating each winter.

Sternbergia lutea brightens the garden in mid-fall. Cupped bright yellow flowers open in September and October, and shiny green leaves per-

sist all winter. They increase most quickly in sun but also bloom well in the light shade of deciduous trees. I divide them as they appear; they transplant easily when coming into growth.

Sternbergia sicula is more appropriate for most rock gardens. Slender, green leaves appear with medium-yellow flowers that have pointed segments. It grows well in sun or shade.

In winter, crocuses continue to provide our gardening excitement. Around Christmas *Crocus sieberi* blooms with flowers in white or shades of lilac and purple, always with yellow throats. One sees the yellow of the throat even in the bud stage. In the form *tricolor* there are bands of lilac-purple, white and yellow. A natural hybrid of two subspecies, 'Hubert Edelsten' has streaks of purple with white. Before *C. sieberi* has finished, *C. tommasinianus* begins. Purple, white or pale lavender flowers on long white tubes with white throats appear in the paths as well as throughout the woods and rock garden. The outer segments are often silver or pale lavender. I divide both *C. sieberi* and *tommasinianus* in full bloom, putting them with *Cyclamen coum* and early, green-flowered hellebores, such as *H. viridis*. We believe many of the named cultivars with larger flowers and deeper colors are hybrids. Look for 'Barr's Purple,' 'Ruby Giant,' 'Whitewell Purple' and 'Lilac Beauty' and plant them with cyclamen and *Iris reticulata*. I will always want the wispy wild forms as well and cherish the near-white one, 'Albus'.

Crocus veluchensis blooms before *C. sieberi* finishes. Mine are large with purple flowers, tipped with darker purple and held like upright funnels. Their throats are light violet and contain long, golden-yellow stamens sur-

rounding the stigma.

Crocus imperati has lilac-purple interiors and buff exteriors sometimes striped with dark purple. The readily available cultivar of subspecies *suaveolens*, 'De Jager', is fragrant and has a yellow-orange stigma. The larger subspecies *C. imperati* ssp. *imperati* is not fragrant. It has an orange scarlet stigma, and mine, from seed, lack any markings on the exterior of the segments. This is one of the most dramatic, showy species in my garden.

The outer petals of *Crocus etruscus* 'Rosalind' are yellowish-beige with slender, dark purple lines extending from the perianth tube. The inner petals with pale lilac ones makes it look two-toned before it opens fully. A three-branched orange stigma rises above three vertical, golden-yellow stamens. The medium-lilac interior of the perianth segments shades to near white and finally to yellow at the base of the throat. This crocus blooms with *Cyclamen coum*.

Several yellow-flowered species bloom in early winter, often in January. My first, *C. korolkowii*, has bright yellow, fragrant flowers with dark brown patches and streaks on the exterior of the petals. *C. korolkowii* 'Kiss of Spring' is only one of many fine, readily available cultivars. Following shortly thereafter, *C. olivieri* opens its small, bright yellow, cupped flowers. Anthers, stigma, and perianth segments are all about the same color. Its bright, nearly orange relative, *C. olivieri* ssp. *balansae*, is vigorous with brown stripes on the outside of the petals. *Crocus angustifolius*, the cloth-of-gold crocus [formerly *Crocus susianus*] has bright yellow flowers with brown stripes and feathering. They show up boldly against our occasional snow and the dark leaf mulch. This crocus usually begins flowering in February and happily finishes

before the pink-flowering almond, *Prunus triloba*, growing near it, begins to bloom. I found several clumps of *Crocus flavus* already in the garden at Montrose when I moved here 20 years ago. Relatively large, bright yellow, fragrant flowers open wide to the sun. This species is vigorous, increasing quickly, and blooming in mid-February. Two other yellow crocuses appear in January and February, but I find it difficult to distinguish them from each other. *Crocus gargaricus* and *C. ancyrensis* differ primarily below ground, with the former preferring moist soil and increasing by producing corms at the ends of stolons. A man running for his life would never notice the difference!

In January I often see the long, bright orange-scarlet stigma of *C. fleischeri* extending beyond its pure white, unopened buds. After it opens the widely-branched stigma seems too long for the petals and droops over the side. This species is happy enough to seed around and hardy enough to open after nights well below freezing. *Crocus alatavicus*, a mostly white species, has nearly black stippling on the exterior of the petals and a bright yellow throat. It is wonderful interplanted with *Ophiopogon planiscapus* 'Nigrescens'.

Many forms of *C. biflorus* (photo, p. 186) grow in my rock garden. Most have white interiors and blue or purple exteriors. Subspecies *alexandri* has a broad purple patch with a narrow edge of white, but in subspecies *biflorus* the purple appears as stripes and feathering. The bluest crocus I grow, *C. biflorus* ssp. *adamii*, is medium blue inside and out. *Crocus biflorus* ssp. *weldenii* has some blue on the exterior of the petals, usually extending from the tube into the lower part of the petals. *Crocus biflorus* ssp. *weldenii* 'Albus' is, of course, pure white.

Crocus biflorus crosses readily with *C. chrysanthus*, a bright yellow crocus that blooms in February. E. A. Bowles made many selections, naming them for people and birds. These are the snow crocuses, and they are easy to buy and grow. The names imply their colors. 'Blue Pearl', 'Canary Bird', 'Cream Beauty', 'Gipsy Girl', 'Snow Bunting', 'Zwanenburg Bronze', and 'Ladykiller' are just a few. I can no longer distinguish between those and the hybrid seedlings occurring in my rock garden. I select the best in late winter and move them in bloom near other early flowering bulbs and tubers.

While it is true that my favorite crocus is the one before me at the moment, I must admit that when I am not in the garden I think two of my favorites are *Crocus corsicus* and its miniature, *C. minimus*. Their dual personalities delight me. In the evening *C. corsicus*, is buff colored with dark purple featherings, and in daylight the opened flower is bright violet with an orange style and yellow stamens. The smaller *C. minimus* has a similar bright violet interior but a broad purple patch over the buff exterior of the petals. It blooms later than *C. corsicus*, thus extending the display into March.

My last spring crocus is *C. vernus*. Happily it comes in several forms, and they don't all bloom at the same time. The first one for me is variety or subspecies *scepusciensis* with violet flowers streaked with purple. I also have violet-purple forms, that came as *heuffelianus* [now *heuffelianus* group], and bloom a little later. The white subspecies *albiflorus* (photo, p. 185) rarely has pure white flowers. They are often suffused with pale violet-blue. *Crocus vernus* is the parent of most of the large, named crocuses available in most bulb catalogs. I prefer the elegance of wild "unimproved" plants.

I feel sorry when the last crocus

blooms in spring. They begin flowering in September and last into April. A bit of magic leaves the garden when they are over. I don't have all the species that will grow in North Carolina but continue searching seed lists for them. They grow easily from seed. I transplant young seedlings into the garden after only a year in a seed flat, and they bloom two or three years later.

My earliest trumpet narcissus in the garden is *N. minor* 'Cedric Morris.' I grew it outside for several years with temperatures dipping to single digits before finally losing it. I'll try again. The smaller and only slightly later-flowering *N. asturiensis* is a treasure. Although fully hardy, it looks delicate, with clear yellow petals drooping over its slightly flared trumpet. Seed-grown forms differ in size and blooming time. They don't want drying off in summer.

By early February my first jonquil, *Narcissus fernandesii*, blooms in the scree garden. Each stalk has several fragrant flowers with bright yellow corollas surrounding their short cups. *Narcissus cuatrecasasii* blooms in mid-winter with leaves erect and bright yellow, short-cupped flowers. These come usually only one to a stalk.

Bulbous irises usually show the tips of their silvery, blue-green leaves in January but wait until February to bloom. My earliest ones, *I. histrio*, *I. histrioides* and *I. danfordiae* seldom persist for more than two or three years. 'George,' a hybrid of *I. histrioides* and *I. reticulata*, blooms well with broad-petaled, dark red-violet flowers in early February. Another hybrid, gray-blue 'Katharine Hodgkin' is fully hardy, blooming in February and requiring no special soil or care. 'Sheila Ann Germaney', a cross between *I. histrioides* and *I. winogradowii*, blooms in late winter, projecting its flower well above its young gray-green leaves. Broad, pale blue petals

have streaks of darker blue and a central, bright yellow line. Its pale blue standards are narrow. *Iris reticulata* grows happily in sun or shade usually in places that are dry in summer. I divide them in full bloom, and they return year after year. It is worth buying every cultivar from the near-white 'Natasha', through blue 'Cantab,' red-violet 'Hercules' and 'Pauline', to dark purple 'Purple Gem.' By collecting all of them one can have them in bloom for six weeks or more. I select *Crocus tommasinianus* forms that blend or match and move them nearby.

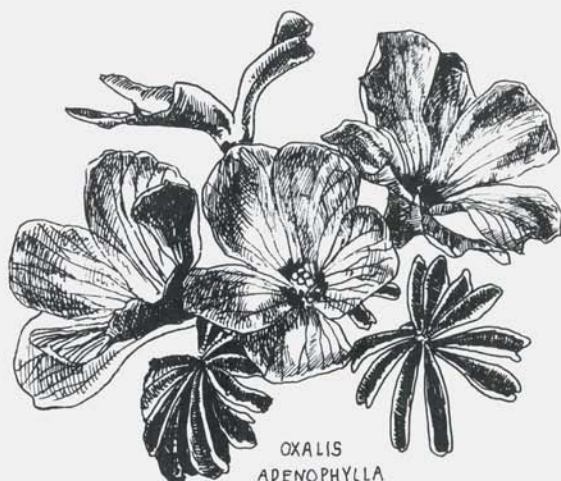
Iris pamphylica (photo, p. 187), a species grouped with the *reticulata* irises, came to me by accident about eighteen years ago. It is a slender plant that sends up narrow, gray-blue leaves in very early winter. The flower is an extraordinary color—rather like an imaginary butterfly. Maroon-purple

falls have a bright yellow patch dotted with dark purple. The lower part of the falls is green with purple veins. Medium-blue standards shade to chartreuse-yellow with dark purple spots. This iris has increased slowly from one to three bulbs in eighteen years, and I dare not move them. They grow in a sunny place that is hot and dry in summer.

Scillas, *Cyclamen pseudibericum*, and anemones bloom in March, and we declare it spring. The weather fluctuates between winter and spring with an occasional summer's day, but I want the cool temperatures to linger and sustain the little bulbs of winter. I want the leafless trees to let in the gentle sun of spring. As the season changes I rejoice in the reappearance of spring and summer bulbs while I secretly long for fall and winter to begin all over again.

Drawing by Francesca deCsiipkay

Nancy Goodwin is an enthusiastic gardener who is curious about plants and enjoys growing and combining them in her garden in central North Carolina. She is interested in many genera, especially hellebores, epimediums, aroids of all sorts, heucheras, tiarellas, primulas, salvias, and geraniums. She will be speaking at the '99 Western Study Weekend on the subject of bulbs.



NEW EPIMEDIUMS FROM CHINA

by Darrell R. Probst

When I get serious about collecting a particular genus of plants, it is usually because I am intending to hybridize them. The first group that I worked with were bi-generic hybrids, *x Pardancanda norrisii* crosses between two different monotypic genera (*Pardanthopsis dichotoma* *x* *Belamcanda chinensis*, each with only a single species). Both species were known and well documented before the turn of the century, and no additional species have been found. Other genera that I have collected have been similarly stagnant in terms of new species. In a breeding program, it is ideal to have all the species be already known to science. I learn about the species possessing the traits I desire, then set out to acquire the plants and use them to my advantage.

My most recent work has been with epimediums. I was not aware of any intensive breeding programs for these plants going on anywhere. Plus there were only a few varieties available to the general public. It seemed as if the field was wide open. I began acquiring plants for testing in 1990 and in 1992 I made my first attempts at hand pollination. A trip to the home of Harold

Epstein (crowned king of epimediums) to view his collection in 1993 provided even more excitement about the possibilities. Prepared to get serious, I needed more information about those species not in cultivation. The search was on.

The only book on epimediums is the 1938 monograph *Epimedium and Vancouveria* by William T. Stearn, a special extraction from the Linnean Society's *Journal of Botany*, and now a very rare book. He described 22 species along with known hybrids. More recent references such as *Hortus Third* and the *New York Botanic Garden Encyclopedia of Horticulture* confirmed this number. Only two of the twelve known species from China were in cultivation, *E. sagittatum* and *E. acuminatum*. I grew both. Then I received word from Jim Rugh about a trip to collect epimediums, with an offer to purchase shares. So I bought three shares. Without my realizing it, my world was about to change.

I was already deep into researching the genus when the plants from my shares began to bloom. The first species that bloomed resembled the tiny-flowered *E. sagittatum* yet was

obviously different. The second came close to fitting the description for *E. leptorrhizum*. However, this species was definitely clump-forming, whereas *E. leptorrhizum*, as the name implies, has long, spreading rhizomes. Meanwhile, I had located descriptions for 18 new species discovered since 1975. My frustration built when these descriptions didn't fit either plant.

Over the next year my collection of epimediums grew to several hundred different clones. This included more species from China and created more questions. Finally, the third and last species came into bloom. It was a knockout. Thirty or more large flowers to a stem, with extra wide, pure white inner sepals, reddish-purple spurs and a cup. This was certainly a unique combination, and obviously a new species, even to my untrained eye. With slides for proof, I mustered the courage to write to Professor W. T. Stearn in England to ask his opinion.

Professor Stearn agreed that this was indeed a new species and that the other two might be as well, but he required pressed specimens for further study. He informed me that one of the other species in question (from my collection) was also a new species that he had just described, *E. franchetii* (photo, p. 188). Until living plants were brought into cultivation and studied, this species was believed to be a yellow-flowered form of *E. acuminatum*, because it had similar hairs on the leaflets. *Epimedium franchetii* differs in having larger leaflets that are shaped differently, only one flower per pedicel, and glandular hairs on the pedicel. The flowers are also large with light green inner-sepals and sulfur-yellow spurs.

Hairs are an important characteristic used in keying out epimediums. The leaflets of some species are covered on the underside with erect, long,

multicellular hairs; some have minute, appressed, single-celled hairs, and still others have leaflets that are rather woolly or have short, erect hairs. The shape and size of the leaflets, as well as the quantity of flowers per stem, can often change with level of vigor. However, characteristics of the leaf hairs do not, making them one of the most stable characteristics to look at for identifying a species at any time of year.

Along with the pressed specimens I mailed to Professor Stearn, I sent a special request. I asked that should one of the more showy species turn out to be new to science, he consider naming it after a friend of mine. I expounded upon the virtues of why this person should deserve such an honor. A month later I read his reply with great excitement. Prof. Stearn believed all three to be new species. The first, with tiny flowers, he has tentatively named *E. myrianthum* for its myriad of small flowers, often 150 or more per stem. Living plants are necessary for study before the description will be published. Descriptions and illustrations for the other two will probably be published in the July 1997 issue of *Kew Bulletin*. The species related to *E. leptorrhizum* with large, rose-pink flowers (photo, p. 188) he will name *E. brachyrrhizum*. The plants of this species growing here at Cobblewood, now mature, have proven to be extremely floriferous, low-growing plants that are 8-12" tall. I was very pleased to read that he was to name the third and most showy species (photo, p. 188) after my friend, whom Professor Stearn had known for some time. In addition to the strikingly beautiful flowers, it also produces handsome, glossy, dark green, medium-sized leaves and is 6-8" tall. The rhizomes are spreading, and together with the abundance of leaves they

form a mass thick enough to choke out most weeds. Because of its many superior ornamental qualities, this species should prove valuable as a parent for many hybrids to come. It gives me great pleasure to announce that such a fine species will be named *Epimedium epsteinii*, honoring Harold Epstein, long-time trumpeter of this most interesting genus of valuable garden plants.

So where did this leave me, a person interested in hybridizing? Befuddled might be a good description. *Epimedium epsteinii* is almost exactly like what I pictured in my mind as the plant I wanted to create when I began hybridizing epimediums. With as many as 24 new species discovered in China and published since 1975, and so much variation between them, it made me wonder if it wouldn't make more sense to just go to China and explore for myself. So I went.

My first attempt in Sichuan Province during October and November of 1996 proved successful. Four species were found, three of which have bloomed over winter under lights. One is the naturally occurring hybrid *E. x omeiense* with a spray of 60 or more large flowers on stems 2' tall. Another is a new variation of *E. davidii*, and the third is yet another new species. How many more are still out there, endemic to a single valley? I am attempting to organize and fund additional trips for Chinese botanists to do

responsible collecting. I am eager to return again soon, perhaps in the spring of 1998. With so many mountains, valleys, dripping wet cliffs, and waterfalls left unexplored, there have got to be dozens or more species left undiscovered. I can't sleep!

Darrell Probst gardens in Hubbardston, Massachusetts at Cobblewood. He first got interested in gardening as soon as he could walk. He would dig up the seeds in his father's vegetable garden every day to see if they were growing. He got interested in plant breeding as a teenager, growing in the gardens of people he worked for taking care of their gardens. Other interests in addition to epimediums include *Tricyrtis*, miniature astilbes, *Disporum*, and *Polygonatum*.



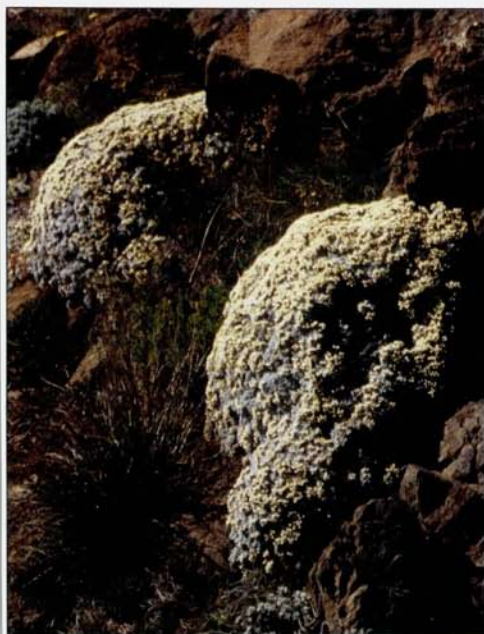


Helichrysum sutherlandii var. *semiglabrum*
(p. 165) Panayoti Kelaidis



Helichrysum sutherlandii var. *semiglabrum* in
bud (p. 165) Dick Bartlett

Helichrysum confertum, Sani Cliff (p. 165)
Panayoti Kelaidis



Helichrysum lingulatum (p. 165)
Dick Bartlett





Helichrysum sutherlandii var. *sutherlandii* (p. 166)

Panayoti Kelaidis

Helichrysum milfordiae (p. 163)

Dick Bartlett





Helichrysum adenocarpum (p. 166)

Panayoti Kelaidis

Helichrysum confertifolium (p. 164)

Panayoti Kelaidis





Helichrysum flanaganii (p. 163)

photos, Dick Bartlett

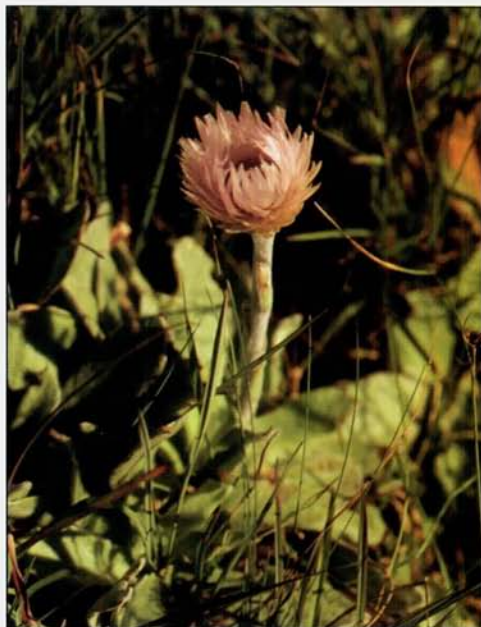
Helichrysum sp.





Helichrysum bellidiastrum

Dick Bartlett



Helichrysum ecklonis (p. 166)

Panayoti Kelaidis

Helichrysum pagophilum (p. 165)

Panayoti Kelaidis

Helichrysum retortoides (p. 165)

Dick Bartlett





Helichrysum album at Sentinel Pass (p. 164)
Panayoti Kelaidis



Helichrysum aureum (p. 166)
Dick Bartlett

Helichrysum trilineatum (p. 165)
Dick Bartlett

Helichrysum trilineatum (p. 165)
Dick Bartlett





Lamium eriocephalum (p. 228)

photos, Panayoti Kelaidis

Lamium garganicum var. *incanum* (p. 228)





Lamium armenum (p. 227)

Panayoti Kelaidis



Narcissus romietuxii (p. 169)
Nancy Goodwin



Colchicum burtii (p. 168)
Nancy Goodwin

Scilla scilloides (p. 167)
Nancy Goodwin



Crocus vernus ssp. *albiflorus* (p. 172)
Panayoti Kelaidis



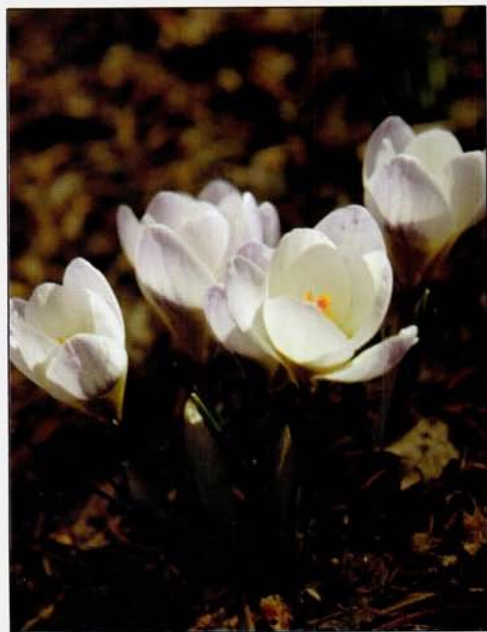


Crocus speciosus (p. 168)
Panayoti Kelaidis



Crocus goulimyi (p. 168)
Panayoti Kelaidis

Crocus biflorus (p. 171)
Panayoti Kelaidis



Crocus longiflorus (p. 168)
Panayoti Kelaidis





Crocus caspius
Nancy Goodwin



Iris pamphylica (p. 173)
Nancy Goodwin

Sternbergia clusiana
Panayoti Kelaidis



Crocus baytopiorum
Panayoti Kelaidis





Epimedium brachyrrhizum (p. 175)

photos, Darrell Probst

Epimedium epsteinii (p. 175)

Epimedium franchettii (p. 175)





Dwarf Conifers

photos, Joseph G. Strauch, Jr.

Dwarf Conifers





Ranunculus ficaria (pp. 193-196)

Panayoti Kelaidis

Ranunculus ficaria 'Montacute' (p. 194)
J.R.L. Carter

Ranunculus ficaria 'Sheldon Silver'
J.R.L. Carter





Ranunculus ficaria 'Lambrook Variety'



Ranunculus ficaria 'Hollygreen'



Ranunculus ficaria 'Randall's White' (p. 195)



Ranunculus ficaria 'Fried Egg' (p. 195)



Ranunculus ficaria 'Collarette' (p. 194)
photos, J.R.L. Carter



Ranunculus ficaria 'Ken Aslet' (p. 194)



Dwarf Conifers photo, Joseph G. Strauch, Jr.

THE LESSER CELANDINE

IN ITS INFINITE VARIETY

by John R. L. Carter

When one considers the unbelievable number of garden plants we have, the collectors who have filled our gardens with flowers from all over the world, and the results of the plant breeder's efforts in producing thousands upon thousands more, it is a wonder that there should be something new. It is particularly wonderful that an interesting new plant should appear under our very noses.

The little lesser celandine (photo, p. 190) has been completely disregarded as a garden plant until very recently. Thought of as a dreadful weed, it has cheerfully filled hedgerows throughout its range with sheets of gold each spring. Despite being viciously attacked by every weed killer known to man, it merrily persists in untold millions, exuberantly and successfully surviving in spite of everything people do to it.

Gardeners have been so obsessed with exterminating it that they have rarely, if ever, taken the trouble to look at it properly. However searching through wild colonies, where plants grow at a density of around 45 to the square foot, can be very rewarding.

It may be, too, that the unrelenting-

ly awful use of lesser celandine in medieval medicine put people off. One of its vernacular names is pilewort—which says it all. Beggars used it to make sores on their bodies in order to attract sympathy (and coins) from a gullible public. The appearance of the tubers, which were thought by Scottish farmers to resemble cow's teats, led to them being hung in the cow byres to improve milk production. Though this is indeed a more pleasant use for the plant, one is moved to think that there must have been some very odd looking cows in Scotland.

Ranunculus ficaria itself figures in the classics, in Gerald's Herbal in the 16th Century and Parkinson's *Paradisus* in the 17th. The first variety recorded seems to be an herbarium specimen in Leiden collected by van Royen around the middle of the 18th Century. Van Royen's plant is clearly a double-flowered form resembling a tight little pompom. He called it 'Flore-Pleno', and we should, too. After this there is no mention of any variability until the present century. Another double form having several rows of flat, strap-shaped

petals, yellow with green-bronze reverses, was shown to the Scientific Committee of the Royal Horticultural Society in 1912. This particular plant is almost certainly the ancestor of the form we know today as *Ranunculus ficaria* 'Double Bronze'. Further variants were mentioned once or twice in the 1930s, but named forms didn't appear in horticulture until after World War II. These were introduced due to the enthusiasm of the great Walter Ingwersen, and included *R. ficaria* 'Primrose', with beautiful, pale yellow flowers, as its name implies; *R. ficaria* 'Green Petal', where the petals appear as slightly contorted green petaloids forming a small, brush-shaped, double inflorescence; *R. ficaria* 'Flore-Pleno', bearing small, double pompoms alluded to above; *R. ficaria* 'Collarette' (photo, p. 191), described as like a Victorian posy, with yellow outer petals framing a central boss of staminoids, which start out green in color and age to orange; and finally *R. ficaria* 'Aurantiacus', with striking, bright orange flowers.

In the 1980s Christopher Lloyd discovered the first good foliage variant, the daring and yet entrancing 'Brazen Hussy'. This has the normal brassy yellow flowers of the species, enhanced by deep purple-bronze, shiny leaves.

Until the beginning of this decade these were the only variants available, and it is extraordinary that this small number is all that had been found in 500 years. By 1995 there were over 100 recorded variants! While not all these are garden-worthy by any means, the figure does indicate a great increase in interest. Already there are problems of nomenclature, with muddling synonyms floating about. There has been, for instance, commercial exploitation of the name of E. A. Bowles, who undoubtedly had a close association

with at least three variants but never described any himself. Then there are the not-unexpected commercial come-ons like 'Lemon Dazzler'. However, it is probable that this name explosion can be got under control. The national collections for the NCCPG in England hold definitive and traced material of all named clones, and their registration is imminent.

There are now five named clones within the 'Flore-Pleno' group. These differ only as far as the specialist is concerned, in the size of the central green eye, the shape of the petal, and the color of the petal reverse. As they are all infertile they are not a nuisance in a garden. The more daisy type of double is, however, fertile and seems to come largely true from seed. There is one variant having a much brighter yellow petal surface than 'Double Bronze', and more chestnut reverses: 'Montacute' (photo, p. 190). The white doubles have flowers more or less intermediate between these two in form, more open than 'Flore-Pleno', but not so open as 'Double Bronze'. The one tentatively called *R. ficaria* 'Albus Flore-Pleno' has flowers opening rather pale cream and reverses tinged green; *R. ficaria* 'Double Mud' is similar, but the reverses are darker and the center of the flower is distinctly more yellow. Probably the best double white to have been isolated so far is *R. ficaria* 'Ken Aslet' (photo, p. 191), with beautiful, small, star-shaped, double flowers, which age to a pure enamel-white. However, there are further magnificent forms in the pipeline, derived from informal happenings in a Somerset garden, including wondrous whites with dark pewter, bronze, and deep green petal reverses which enhance the quality of the flower tremendously. They look as though they have been carved out of moonstones by a Chinese craftsman.

The single-flowered variants need a bit of watching, as they are fertile and exhibit a careless promiscuity that can play havoc. However, dead-heading easily controls this, and they are also well suited to pot culture. The petal colors discovered to date vary from the normal yellow, both darkening to orange and paling to white. Apart from this, the color of the petal reverse can vary from almost nothing through shades of green to gray, blue, indigo, brown, chestnut, khaki, and bronze. The white, or 'Albus', group has flowers which open pale straw, turning white on the second day. This has led to a number of false names describing them as cream and sometimes lemon. There are three clones in the group, *R. ficaria* 'Randall's White' (photo, p. 191), named after Alan Robinson's cat, having slate-colored reverses and a marked central black vein on the leaf; *R. ficaria* 'Salmon's White', where the opening flower has pale green reverses that darken with age to indigo and a leaf devoid of a central stripe; and *R. ficaria* 'Bregover White', with distinctively narrow petals. 'Albus' itself has the black line on the leaf, but the petal reverses remain gray-green throughout the life of the flower.

Ranunculus ficaria 'Aurantiacus', which was a great favorite of Will Inghwersen's, is a smallish plant with brilliant orange flowers and is quite unmistakable. The flower color is so desirable that this was the first plant used in hybridizing. It was crossed with 'Brazen Hussy' to produce *R. ficaria* 'Coppernob', which places the orange flower above bronze foliage.

The primrose group is comprised of plants with flowers that vary in the color of the petal reverses. If these are dark, the effect is to enrich the petal color. 'Coffee Cream' appears to have petals of a rich brown, tinged cream color due to the dark brown reverse.

In contrast *R. ficaria* 'Ashen', having a reverse of iron gray, presents a much crisper appearance.

It is impossible to leave out of any account of the singles the beautiful *R. ficaria* 'Limelight', which opens lime green and ages to a translucent, acid yellow, and the perhaps curious *R. ficaria* 'Fried Egg' (photo, p. 191). When 'Aurantiacus' flowers age, they turn quite white with an orange center. 'Fried Egg' opens already like this.

A third general category contains those plants that E. A. Bowles would certainly have kept in his Lunatic Asylum at Myddleton House. It is convenient to call this the green group, and it contains plants with chlorophyll in odd places. The old *R. ficaria* 'Green Petal' fits in here. Recently an improved form was found near Plymouth in Devon. Called *R. ficaria* 'Ragamuffin', it is much larger, less tidy, striking, and mad. 'Salad Bowl' is more symmetrical, having an outer bowl of lettuce-green petals. This bowl is filled with pale green petaloids which each have a yellow stripe. From these extremes of greenness we have plants with an increasing amount of yellow. 'Yaffle' fools the observer initially. Its first flowers look as though they are just malformed, normal yellow ones. However, after a week or so the plant gets into its stride and produces flowers with reflexed green sepals and yellow petals streaked with green. 'Budgerigar' is not dissimilar, except that the petals are not reflexed, and there is more yellow remaining on the petal.

The kaleidoscope can now be shaken again, and this time reveals celandines which vary in size. One suspected that miniatures ought to exist, but wild-collected material that seemed to exhibit dwarfism has had to be grown on for several seasons to ensure that diminutive size was not just the result of exist-

tence in a poor environment. As far as these selections are concerned, there are so far proven dwarfs such as *R. ficaria* 'Hoskin's Miniature', which is just a small but normal celandine, and *R. ficaria* 'Torquay Elf', which is a miniature with a primrose-colored flower. At the other end of the scale we have been able to abandon—if that really is the right word—*R. ficaria* 'Major'. This large plant, up to 40 cm tall, is now to be thought of as *R. ficaria* ssp. *chrysocephalus*, a subspecies in its own right. The only remaining giant form that is garden worthy is *R. ficaria* 'Dollar', which reaches over 30 cm and has a large golden bloom some 2-3 cm across.

And then there are the foliage variants. Imagine a plant rivaling both cyclamen and hosta for foliage color pattern and shape, then you come near an understanding of the possibilities this little weed presents. I hope, too, that you will understand how difficult it is to write about! Consider the plain, shiny bronze of 'Brazen Hussy'. Now, imagine a little shrinking around the edge to create a green rim. Then break the rim, and perhaps add some spots of green over the whole leaf. Now go back to square one and just increase the width of the rim; if you do this in significantly large enough steps, you will have several very different leaves with an increasingly small, bronze blob. If you now complicate things by overlaying this series with silver or lichen-green filigree you will have another series of possibilities. Now do it all over again with silver instead of bronze. Or try yellow or cream as well. At this stage, when you may be getting just a little bemused, may I remark that all these color possibilities can be put onto differently shaped leaves, also? And recombined with variously colored flowers

So many variants have turned up in

the wild already that there hardly seems to be a need for artificial breeding, but this has already started. I have mentioned 'Coppernob'; however, the pale 'Albus' flower has also been put onto 'Brazen Hussy' quite deliberately twice and has occurred twice more as a happy accident. One waits with great anticipation for a double bred onto some of the foliage variants.

Forms demonstrating 'Variegatus' types of foliage marking also exist. The first to emerge was a sorry thing, having few leaves showing sectorial white patches and being very difficult to maintain. However *R. ficaria* 'Hoskin's Variegated' is good. The color of the variegation is pale cream and can cover the whole leaf, but general viability is assured because this usually fades to green with age. Thus the central, young foliage is pale cream, while the outer leaves are pleasingly green in contrast. *Ranunculus ficaria* 'Clouded Yellow' is an excellent variegated form. The leaves are quite large and heavily splashed with buttercup yellow.

This review of the lesser celandine shows to what delights we can now look forward. What other plant can offer such a wonderful display of both flower and foliage so early in the year? *Ranunculus ficaria* is ideally suited to being planted in huge drifts like crocus and daffodils, or grown in small specimen clumps in the rock garden. It is an interesting subject to grow in patio tubs and troughs and makes an intriguing pot plant.

John R. L. Carter is proprietor of Rowden Gardens, specializing in aquatic and rare plants, at Brentor, Nr. Tavistock, Devon PL19 ONG, in England. He holds a collection of *Ranunculus ficaria* for the NCCPG.

CONIFERS

IN THE ROCK GARDEN

by Clark D. West

With many highly desirable plants available for the rock garden, dwarf conifers need not be included in the plant lists of exclusive alpine growers. In areas with cool summers where true alpiners flourish, and the garden can be adorned with choice herbaceous gems, omitting dwarf conifers might be understandable. But in other parts of the country the climate, with its high day- and nighttime temperatures and humidity, is not so suitable for mountain plants. In these areas, dwarf conifers can fill a number of needs.

In any climate dwarf evergreens can provide unique textures different from those of herbaceous plants, textures which persist throughout the year. They can provide foliage color—yellows, grays, blues and various shades of green—both winter and summer. They give the garden structure, vertical lift and permanent plant shape, particularly appreciated in winter. A well-grown specimen or a group of dwarfs can provide a focal point and give a sense of permanence. And if there are hot, dry areas where other plants grow poorly, there are well-behaved junipers available, happy in such a location, to clothe the spot. Once they've grown dwarf conifers, many gardeners would not be without them. In fact, the rarity of some of the smaller, slow-growing cultivars, together with their gem-like quality, can whet one's desire to possess. Thus are rabid collectors born.

Dwarf conifers come in a number of shapes. Many are petite buns. Some, like *Tsuga canadensis* 'Minuta', are so small that they could be easily overlooked and lost in a large rock garden. A few are columnar and provide a dimension of height among more horizontally oriented plants. Examples are *Juniperus communis* 'Compressa' and *J. c.* 'Pencil Point'. Those which are prostrate provide interest in their unusual textures and position. A prime example (and one readily available to all) is *Tsuga canadensis* 'Cole's Prostrate'. Prostrate conifers are perhaps best displayed hanging over rocks.

In addition to shape and size, foliage color is an important consideration in selecting dwarf conifers. Whereas in some gardens, bright foliage would be an asset, would you really want a golden yellow or blue-needled conifer in a garden designed to resemble a natural area? For those lucky gardeners who can simulate mountain meadows or screes, gaudy plants would constitute a travesty. On

the other hand, where intense summer heat precludes a garden of true alpiners, colorful conifers may be just what's wanted on a rock-strewn slope.

There are practical aspects to consider in including dwarf conifers in the rock garden. Although a conifer may be a cute little dwarf when purchased, it will obviously grow. A rule of thumb of the late James Cross was to plant only those which will stay within their allotted space for ten years. Yearly growth rates or the 10- or 20-year size are usually available, except for very new introductions. A rock gardener should only consider the two smallest size categories: miniatures (less than 3" growth yearly) and dwarfs (3"-6" yearly).

Yet very slow growth does have several disadvantages. First, conifers in the miniature category are not widely available. Nurserymen have difficulty making a profit raising the very slow growers, because by the time they are large enough to sell, they represent a large investment and therefore fetch a high price. Most miniatures are obtainable only from specialized mail order nurseries or at plant auctions such as those sponsored by the American Conifer Society. Whatever their source, they may be little more than twigs, and considerable patience will be required before they reveal their true beauty.

Secondly, as a plant matures into beauty, it often outgrows its rocky niche. Then there may be problems in moving it to a more appropriate place. If the rocks cannot be moved, too many roots may be destroyed, and the plant is lost. Such deaths are minimized by the right choice of plants. Thirdly, conifers which are genetically very dwarf tend to have less vigor than their mother species. Siting them properly with respect to sun, shade, soil, and moisture may be critical for their health. Despite great care in choosing the location, there will be disappointments. But more than compensating for these problems is the satisfaction of watching a plant develop into a unique and exceedingly attractive character specimen that provides texture, structure, and color all year long.

Another consideration when investing in dwarf conifers is hardiness. In the list which follows, hardiness zones based on minimum winter temperatures are given. Yet a number of other factors also determine hardiness, and authorities may not even agree on the hardiness zone for some cultivars. For instance, it is important a plant acclimates or hardens off, changing its metabolism to withstand cold, in autumn. Even moderate cold before hardening off can cause injury equal to that produced by severe midwinter temperature. Better known is damage produced by late freezes in the spring after a plant has begun new growth. There is little one can do to prevent this kind of damage done by weather out of sync. Another factor affecting survival is the provenance of the plant. Plants with a wide distribution in nature should be selected from the northern extreme of the range to do well in the North, for instance, from the western extremes to do well in the West.

When, despite these caveats, you decide to take the plunge and include dwarf conifers in your garden, how can you make conditions optimum? First consider the orientation of the site. As with traditional alpiners, an east- or north-facing slope will allow you to grow the most choice varieties. However, a garden facing south or west, even in a part of the country with hot summers, can still be successful. Cultivars of arborvitae, junipers, Norway spruce, and of Scots, white and mugo pines will certainly grow well in such a site. The difficulty would be with *Chamaecyparis*, particularly the *C. obtusa* cultivars, firs, *Cryptomeria*, and hemlocks. This delineation of conifers into two groups probably reflects differences in their

tolerance for warm nights rather than hot days. Thus, junipers, Norway spruce, and the pines presumably tolerate, and may enjoy, nights among hot rocks, while others need cooler nights. A north slope is also advantageous because it eliminates direct rays of the sun in winter, so that needle burn is minimized.

Next, although rock gardens normally drain well, check the planting hole before planting by filling it with water. Should it drain slowly, another site must be chosen. Consider also the soil. Books often state in rather cavalier fashion that conifers will grow in any good garden soil. It has also been shown that amending the soil with organic matter when planting does not affect the health of nursery stock a year or so down the road. Nevertheless, when planting a miniature conifer, you might wish to amend the soil. Then at least, if the plant does poorly, you have the satisfaction of knowing that you tried. Serious hobbyists and nurserymen, faced with the challenge of keeping a little gem flourishing, often maintain it in a pot containing a mix of fine pine bark, peat moss, and perhaps sand, rather than risking planting it out. Fine pine bark seems have a positive effect on conifers. Try incorporating one part fine pine bark (sold as soil conditioner) to two parts of soil. The planting hole should be as wide as possible but no deeper than the deepest roots. Soil which has a clay base should be dried, pulverized, and mixed with plenty of sand, as well as bark. Such a mix insures good soil aeration and provides organic matter, which will stimulate root growth and promote moisture retention. Peat moss could also be added with the pine bark but it should be remembered that overdoing organic amendments may result in soil subsidence as the material decomposes. Filling in the resulting dished out area with soil may be detrimental. Compost in the planting mix, unless in an advanced state of decomposition, should be avoided. Incompletely decomposed, it can lead to root rot and other causes of sudden death. And do not incorporate inorganic fertilizer. If you feel the need to fertilize at planting time, use a small amount of cottonseed meal or some granules of Osmocote. In so far as you wish the plant to remain a dwarf, fertilizer can be dispensed with. The procedure to be followed in planting a dwarf conifer are the same as those for any woody plant. The diameter of the hole should be twice as great as the diameter of the spread-out roots. The plant should be well watered at the time of planting to settle the soil around the roots.

Finally, there should be a way to provide extra water whenever the weather is dry, winter or summer. If the drainage is excellent, as is usual in a rock garden, the conifer may dry out despite organic matter in the soil and mulch. Water disappears even more rapidly if there are tree roots in the vicinity. In the first two years, all newly planted conifers, particularly the small ones, should be watered every four to five days in the absence of soaking rain. Conifers do not let you know when they need water by wilting. They just suddenly die. One day they appear normal, and the next the needles are turning brown and falling off—and that is the end.

Conifers fall roughly into two groups, the "mainstays" which can be found in many catalogs and even in garden centers, and the rare ones obtainable only in specialist catalogs or at plant auctions. The very rare new cultivars arise as the result of the on-going activity of enthusiasts who propagate from bud mutations (also known as witches' brooms) either by grafting or from seed. Approximately 50% of the seedlings from brooms will be markedly different from the species.

These progeny vary markedly in needle size, growth habit, and color. Most will not be distinctly superior to cultivars already available and will not be introduced, but a few will have outstanding, unique characteristics. Some may be difficult to propagate and therefore never become available. Seeds of cultivars of *Chamaecyparis*, yews and arborvitae can also produce plants differing from the parent. There are, for example, many cultivars of *Chamaecyparis obtusa* which have come from seeds of the old standby, *C. obtusa* 'Nana Gracilis'. However, as with broom seed, some of the seedlings will be like the species, rapid-growing, ungainly, and loose in habit, and the vast majority of the seedlings will not be superior to cultivars already available. Those which are unique, however, constitute a constant source of interesting new material for the avid collector. Since many of these are very difficult to obtain, the listing below concentrates on readily available plants and on cultivars listed in specialist catalogs. There are many other dwarfs; a longer list can be found in an article by the late James Cross in the *Bulletin of the American Rock Garden Society*, volume 52, No 4.

Abies. The Firs.

There are many species of fir. Most of the cultivars, even when classed as dwarf, become large, and their coarseness makes them appropriate only in the large rock garden. Of many cultivars, only a few are listed below.

A. balsamea 'Nana'. A widely planted dwarf balsam fir which slowly reaches a height of 2'. It is dense and compact, globose in shape, with superlative bright green new growth. It is, of course, hardy to zone 3 but, not liking summer heat, does not do well in zone 6, and some say it does poorly in zone 5. In these areas, it may benefit from partial shade. Even though it can be a disappointing performer, it is commonly found in garden stores.

A. koreana 'Prostrate Beauty'. The Korean fir is one of the most attractive of the *Abies*. This cultivar eventually spreads widely. Leaders which form should be cut out. In zone 5b where summers are hot, give partial shade or a north or east exposure. It is more adapted to zones 6 and 7.

A. nordmanniana 'Golden Spreader'. A spreading plant with horizontal branches in layers, which in time may look like a golden beehive. The needles in summer in full sun are a light yellow and, in some shade, a deeper yellow. It is most beautiful in winter, when they are a bright golden yellow. It grows slowly but does get large and at maturity would fit well only in a large rock garden. Eventually, it may put up a leader which should be cut out. Widely planted in England but not readily available in the USA. Good in zone 5.

Cedrus: The True Cedars

The most well known of the true cedars are the cedar of Lebanon, *C. libani* and the deodar or Himalayan cedar, *C. deodara*. Both have dwarf forms which grow best in zones 6 and 7.

C. deodara 'Glacial Blue'. Silvery blue foliage on a low, mounded, dense plant. Slowly grows to 2' high and may be 5' wide. A plant for zones 6b to 7b. It performs best in the Northwest.

C. libani 'Sargentii'. A creeping form of the cedar of Lebanon, which is unable by itself to grow upright. It will spread over a large area as a beautiful but expensive ground cover or cascade over rocks. It may also be trained upright. It will grow in zone 6a, in protected niches in zone 5, but performs best in zones 6b to 7b.

Chamaecyparis: False Cypress

This genus of trees known as false cypress provides us with a wide variety of attractive dwarfs with variable degrees of hardiness.

C. lawsoniana. There is a great tribe of cultivars of Lawson's cypress, a tree native to our West Coast. All grow well on the British Isles, where they often are spectacular in their beauty. Because they are not uniformly hardy and are somewhat susceptible to root rot, very few cultivars are grown in this country. Those which are available are too large for the rock garden.

C. obtusa. The hinoki cypress is an important timber tree in Japan. Cultivars of this species are numerous, and new ones are constantly appearing. Some attain moderate size, but many others stay small. Most of the dwarfs are seedlings of the old cultivar, *C. obtusa* 'Nana Gracilis'. The dwarf forms are very attractive but, unfortunately, less hardy than the larger cultivars. The smaller cultivars are best adapted to zones 6b and 7a and may survive in the right location in zone 6a. They are frustrating in that in zone 6a they become increasingly attractive over the years and then are badly damaged or killed by unseasonable cold weather before they are acclimated in the fall or by a severely cold winter. They may also sunburn in the summer, and a site out of the midday sun or in an east- or north-facing rock garden is recommended. The *C. obtusa* cultivars perform optimally with bark incorporated in the soil.

Some of the small *C. obtusa* cultivars are green, and others are two-toned yellow and green. Older foliage is a dark green, contrasting with the apple-green or yellow of new foliage in the spring. The yellow forms may sunburn more readily than the green forms. Unfortunately, growing them in partial shade to prevent this reduces somewhat the brilliance of their yellow color.

Examples of green cultivars which attain at the most the height of 2' in 20 years are *C. o.* 'Barkenney', 'Elf', 'Fantasy', 'Hage', 'Juniperoides', 'Leprechaun', 'Little Jackie', 'Nana', 'Pygmaea', 'Reis Dwarf', and 'Verkade's F'. Those with yellow foliage tend to grow more slowly and are smaller at maturity than the green forms. Examples of yellow forms are 'Golden Sprite', 'Nana Lutea', and 'Rainbow'. All of these cultivars may be obtained from mail order nurseries in the East and in the Northwest.

C. pisifera. The Sawara cypress is also native to Japan. Cultivars arise from bud mutations and from seeds of cultivars and of the species. Over the years, many cultivars have been developed. *Chamaecyparis pisifera* cultivars are hardy further north and are less susceptible to summer sunburn than the small *C. obtusa* cultivars listed above. They have the disadvantage, however, of not being quite as attractive: they lack their color and form. *Chamaecyparis pisifera* cultivars have wide variation in foliage characteristics. In some the foliage is like that of arborvitae, in some it is juvenile, and in others, it is a mixture of the two, or semi-juvenile. Juvenile foliage consists of short, simple, needle-like leaves usually perpendicular to the branchlet, characteristic of those found on seedlings. The juvenile foliage of some cultivars of *Chamaecyparis*, *Juniperus*, and *Thuja* persists, so they look nothing like the species. In some, branchlets will eventually appear with adult foliage. These should be cut off to keep the plant distinctive and small. Other foliage differences are discussed below.

All the *C. pisifera* cultivars grow well in good garden soil, although a little peat moss or bark might make for a healthier plant. All of them do well in zone 5a and 'Golden Mop' and perhaps 'Tsukumo' may survive in zone 4b.

C. p. 'Cream Ball'. Tight-growing new form with feathery, bright bluish-green foliage with creamy tips. Tends to be upright but slow-growing.

C. p. 'Golden Mop'. Thin, thread-like, golden yellow foliage similar to that of *C. p.* 'Filifera Aurea' which is often seen as very large specimens in parks. 'Golden Mop' makes a very yellow, airy, mound, which at most reaches 2' in height. It is most yellow in full sun and very satisfactory as a yellow accent. Hardy well into zone 5.

C. p. 'Golden Pincushion'. A 2' plant with dark green foliage tipped with a bright gold color. Dense and grows fairly rapidly.

C. p. 'Nana Variegata'. Dwarf, slow-growing, and dense. Forms a flat-topped dome which hugs the ground. Foliage is of the adult type and is flecked with creamy white variegation. At most it grows 1" per year. At 10 years, 12" high and 16" across. If you like variegation, a good, tough plant.

C. p. 'Gold Dust'. Similar to *C. p.* 'Nana Variegata', but variegation is yellow, and plant is smaller and neater.

C. p. 'Plumosa' and 'Squarrosa' cultivars. These are forms which have juvenile or semi-juvenile foliage and are difficult to distinguish. In general, 'Plumosa' foliage is semi-juvenile and more coarse and dense than 'Squarrosa' foliage. 'Squarrosa' foliage tends to be open and airy. Basic identification problems are compounded by a tendency of the plants to develop foliage variants which may be propagated and sold under the same name. One of the best 'Plumosa' cultivars for the rock garden is *C. p.* 'Plumosa Compressa'. It makes a tightly packed little bun which has a yellow green color. It may be 8" tall and 12" wide in 10 years. It is said to be susceptible to winter injury, which, if cut out, heals over in a season. *C. p.* 'Plumosa Juniperoides' has similar foliage but the plant grows more rapidly (but is still suitable for the rock garden). It becomes a rough, rather than smooth, bun, is less susceptible to winter injury and, all in all, very satisfactory. There are two closely related 'Squarrosa' cultivars suitable for the rock garden, *C. p.* 'S. Intermedia' and *C. p.* 'S. Minima'. Since the 'Squarrosa' cultivars tend to mutate, *C. p.* 'S. Minima' may be a variant of *C. p.* 'S. Intermedia' and there are intergrades. The mutation may be to the extent that adult foliage of considerable length develops. This should be cut away to maintain the relatively smooth globe shape. The color of both forms is an attractive blue-gray, and the foliage is very fine. Both can winter burn (*C. p.* 'S. Minima' is most susceptible) and should face east or north.

C. p. 'Tsukumo'. Forms a compact clump of fine-textured, emerald-green, tightly packed foliage. It becomes a flat-topped shrub which, after many years, may reach a height of 12". Highly recommended. Will do best in partial shade.

C. p. 'White Pygmy'. White, thread-like foliage. A slow-growing bun. Grows best in partial shade.

Cryptomeria. Japanese Cedar.

Cryptomeria japonica is the Japanese cedar or sugi, an important timber tree in Japan. Numerous cultivars have arisen from it. Many developed in Japan are unknown in this country, and the reverse is also the case. Some *Cryptomeria* cultivars are relatively hardy and can be grown in protected areas in zone 5b, but most grow best in zones 6 to 8. The heights attained given below would, for some, be exceeded under optimal conditions.

'*C. j.* Compressa'. Similar to *C. j.* 'Vilmoriniana' (see below). Assumes a globu-

lar form, grows slowly and remains small. Red brown in winter. .

C. j. 'Elegans Nana'. A slow-growing dwarf of dense habit with crowded juvenile leaves. A very satisfactory plant. There is a *C. j.* 'Elegans Compacta' with which 'Elegans Nana' may be confused. 'Compacta' becomes considerably larger and can outgrow a rock garden.

C. j. 'Globosa'. Paradoxically, 'Globosa' is smaller than the more widely available *C. j.* 'Globosa Nana'. The latter cultivar may reach 10' in height, whereas 'Globosa' is low-growing and bun-shaped and in 10 years may be 30" wide but only half as tall. The foliage resembles that of the much taller form, *C. j.* 'Lobbii', and it has therefore been called 'Lobbii Nana'. It also becomes rusty red in winter whereas the larger 'Globosa Nana' does not.

C. j. 'Knaptonensis'. This is a beautifully variegated dwarf *Cryptomeria* which must be properly sited to remain attractive. Unless in a warm climate, it should be completely protected from winter sun to avoid winter burn. In very hot areas, considerable protection from summer sun is also advisable. In fact, it does well on the north side of a structure exposed only to open sky with no direct sun (skyshine). In 10 years, 14" high.

C. j. 'Nana'. This cultivar has two types of foliage. In some parts, it is fine and congested, and in others more open and with larger needles. Branch tips are nodding. It is similar to the cultivar *C. j.* 'Pygmaea', which is now known as 'Archers Redbush'. 'Nana' differs, however, in that it remains a deep metallic green in the winter, whereas 'Archer's Redbush' turns reddish-bronze. 'Nana' grows very slowly but can become a roughly circular mound 3' in diameter in 25 years. It is a *Cryptomeria* cultivar which may do well in zone 5b.

C. j. 'Spiralis'. The leaves twist around the branchlets, giving a spiral appearance, and in Britain it has been given the name 'Granny's Ringlets'. It becomes an attractive, cone-shaped bush about 20" high in 10 years. *C. j.* 'Spiraliter Falcata' also has spiraling foliage but has a poor growth habit and becomes unattractive with age.

C. j. 'Tansu'. A very small, dense plant with tiny leaves. Becomes a broad, irregular pyramid. Reaches a height of 15" and a width of 12" in 10 years. Great for the small rock garden. Probably hardy in zone 5b.

C. j. 'Tenzan'. Plant and leaves are both small. Foliage is a light green, becoming bronze in winter. It grows 1/4" to 1/2" per year and is a good candidate for trough and miniature gardens. May also have bronze overtones in summer.

C. j. 'Tight'. Extremely dense and compact, eventually forming a broad column 3' tall. A sport of *C. j.* 'Vilmoriniana'.

C. j. 'Vilmoriniana'. An old, widely used, and widely available cultivar. Foliage is gray-green with bronze overtones in winter. Has a knobby appearance due to unbranched new growth which projects as shoots. Attains the height of 15" and a width of 20" in 10 years. May do well in a protected area in zone 5b but some years may winter burn badly.

Cupressus: True Cypress

The true cypress should not be confused with the genus *Taxodium* which contains the pond cypress and bald cypress of our southern swamps. *Cupressus* are usually large trees, the best known of which are the Mediterranean (*C. sempervirens*), the Monterey (*C. macrocarpa*) and the Arizona (formerly *C. arizonica*, but now *C. glabra*) cypress. Only a few very dwarf forms suitable for the rock garden

have come from this genus. They may survive in zone 6b but are most adapted to 7a and 7b.

C. glabra 'Compacta'. A very slow-growing, conical or oval bush with attractive gray-green foliage. The foliage is of the adult type but very congested. In ten years, it may reach 18" in height by 15" across. Not widely available.

C. macrocarpa 'Pygmaea'. A dwarf form of the Monterey cypress. Bun-shaped, with foliage which is mixed juvenile and adult and dark green in color. May reach 18" in height in a favorable location.

Juniperus. Junipers

This is a large, wide-ranging genus with many cultivars. Many forms of *J. chinensis*, *J. horizontalis*, *J. x media*, and *J. sabina* are low, spreading, and vigorous and make excellent ground covers but are too large and coarse for the small rock garden. Most of these are available in garden stores and will not be discussed. Junipers in general grow well in ordinary to poor soil. Most are very hardy and like full sun and will do well in the south- or west-facing rock garden. There are some excellent small cultivars.

J. chinensis 'Echiniformis'. The hedgehog juniper forms a flat mound of very fine foliage which is very prickly. It is ideal for the rock garden but not widely available. Very slow-growing, it takes five years to become 12" in diameter and maybe half as high. It likes full sun, does not burn in winter and is not susceptible to red spider as are a number of junipers. It is one of the few dwarf conifers which performs better in the USA than in England. It may be listed under *J. communis* but is now thought to be a *J. chinensis*. Highly recommended. Zone 4.

J. communis 'Berkshire'. A widely available dwarf with foliage consisting of small, silvery blue needles. A dense, very attractive, and dependable rock garden subject. Foliage is plum-colored in winter and does not burn. Grows slowly, eventually becoming a flat-topped bush 12" high. Zone 3.

J. communis 'Compressa'. This has been described as a miniature, tightly compressed Irish juniper. It makes a perfect, sleek, green column, ideal to give a bit of height to the rock garden. Eventually, under ideal circumstances, it may reach 30". The small branches are sharply ascending. Although it is said to be quite hardy, it is in this country often damaged by wind- and sunburn and is prone to red spider infestation. Beautiful specimens may be seen in England, but it grows in midwestern North America only in very protected niches. It is probably most reliable in zones 6b and 7a, protected may do well much farther north. Differing from other junipers, one of its requirements may be cool nights. Despite its weak constitution, it is relatively widely available.

J. communis 'Pencil Point'. This may be listed under *J. suecica*, the Swedish juniper. A columnar juniper, which grows more rapidly and becomes somewhat taller than *J. 'Compressa'*. It is not as tight and sleek as 'Compressa' and its main attribute is that it grows well where 'Compressa' will not. It usually stops at 3' but under ideal conditions may be taller. The foliage is gray-green. Occasional reversions to coarser foliage should be cut out. A worthwhile, rugged, and attractive juniper. Zone 3.

J. horizontalis 'Glomerata'. This creeping juniper stays put, growing at most 4" yearly. It sends up tufts of twisted foliage on 6" stems. Its chief charm is the bright green of its foliage. It turns purple in the winter. Zone 3.

J. horizontalis 'Mother Lode'. A patented new introduction. A beautiful yellow

color and, like *J. h.* 'Glomerata', of relatively slow growth. Eventually may make a 5' circle but will still hug the ground. Does not burn and is very hardy. Zone 3.

J. procumbens 'Nana' An old, worthwhile, rock garden stand-by. When young, it grows tight to the ground with apple-green new foliage, which later turns bluish green. In ten years, it may be 4' in diameter and 12" high.

J. squamata 'Blue Star'. A cultivar widely available in garden stores. It forms an attractive, low, blue mound, which, unfortunately, becomes rather open and sprawling with age or if planted in partial shade. Said by some to be the best of the low-growing junipers—but not an elite rock garden plant. Very hardy and resistant to all insults. Zone 4.

Picea: Spruce

There are many species of spruces, most of them forest trees, distributed widely. Many have dwarf forms, most of which eventually become too large for the rock garden.

Picea abies. The Norway spruce. Many cultivars have been developed, mostly from the seeds of witches' brooms. Many of the smaller, mounding types are difficult to distinguish one from the other. Identification depends on such characteristics as the color of the winter buds, the shape of the needles, number of stomatic bands, orientation of the branches, etc. Examples of older forms difficult to identify are *P. a.* 'Parsonsii', 'Gregoryana', 'Pumila' and 'Nana'. And with seedlings derived from witches' brooms resulting in many new cultivars, botanical details and nomenclatural niceties have the potential of becoming overwhelming. Any of the dwarf-mounding types are suitable for the rock garden, particularly the larger rock garden. Some of these, when ancient, as seen in arboreta, are of considerable size, but for many years they will be small. They have no enemies, do well under harsh conditions, like ordinary soil, but should not be planted in shade. There is one which remains small and is especially suited for the small rock garden.

P. abies 'Little Gem'. This arose as a broom on another cultivar, *P. a.* 'Nidiformis' (the Bird's Nest Spruce). It is a diminutive 'Nidiformis' with smaller needles and more tight and dense growth. It will achieve a height of 12" and a spread of 18" in 15 years. Its dense growth, together with the regularity of the branchlets in length and needles in size results in a smooth mound of unusual texture. Its only fault is a tendency in some parts of the country for die-back of whole branches due to unknown cause. Dieback seems to occur especially in regions with hot summers. But until this occurs, it is a most attractive dwarf. Zone 3.

Picea glauca. The white spruce. The most common cultivar is the well known *P. g.* 'Albertina Conica', the widely planted dwarf Alberta spruce, available in every garden store. Although attractive and slow-growing, it eventually becomes too large for the small rock garden, so several sports derived from it should be used instead. Two problems these cultivars have are the development of branches reverting to the adult form and a susceptibility to red spider. Reversions should be cut out and red spider hosed off or sprayed at its first appearance. Zone 3.

P. g. 'Alberta Globe'. Forms a somewhat pointed mound. Grows 1/2 inch per year.

P. g. 'Gnome'. Slow-growing and tight.

P. g. 'Echiniformis'. Forms a small, dense cushion of grayish blue-green foliage. Very good for the small rock garden but particularly subject to reversions. In 20 years, 20" high and 36" wide.

P. g. 'Little Globe'. Becomes a medium green globe. Tight.

P. g. 'Pixie'. Another miniature form. Grows at half the rate of *P. g.* 'Alberta Conica'.

P. g. 'Sander's Blue'. Needles in some parts of the plant have a definite blue color, giving a mottled or variegated appearance. Can become large.

Picea mariana. The black spruce of northern forests. Tolerates swamps.

P. m. 'Ericoides'. As the name implies, heath-like. A dwarf, dense cushion with tiny, narrow, blue-green needles.

P. m. 'Nana' Although the species is from the north, this dwarf does well in warmer regions. May become 18" high after many years but will be considerably wider than high. The needles are bluish-green. Well adapted for the rock garden but give it room for expansion.

Picea pungens. The Colorado blue spruce native to our west. Cultivars with especially blue new growth are widely planted. Several dwarf forms have originated from witches' brooms.

P. p. 'St. Mary's Broom' The best Colorado blue spruce for the rock garden. Needles are blue, and plant is compact and slow-growing, maintaining a globular shape without throwing a leader. Good if you need something to contrast with the yellows and greens.

Picea sitchensis The Sitka spruce of our Northwest. This species likes moist, cool shade.

P. s. 'Papoose' The cultivar *P. s.* 'Tenas' is probably the same. Needles are green on one side and silvery on the other and tend to grow in little tufts at the ends of the branchlets. Grows somewhat more than 1" per year.

Pinus: Pines

There are many species of pine scattered over the world. Many cultivars have arisen from them, but most become too large for the rock garden. Listed below are some of the smaller cultivars. They do well in full sun and in ordinary soil.

Pinus contorta. The lodgepole pine. Also known as the shore pine.

P. c. 'Spain's Dwarf' Short needles. Irregular open shape. Zone 5.

Pinus mugo. Seedlings of this species are widely variable and a large number of cultivars suitable for rock and miniature gardens have been selected. Only two of the many are listed. It is a pine easily grown in full sun without burning in winter or summer.

P. m. 'Alan'. Dense growing, short needles with a rich green color which is retained all winter. To 1' high and 3' wide in 16 years. Zone 3.

P. m. 'Valley Cushion'. Very short, green needles and a low-spreading flattened habit. Excellent for the small rock garden. Hardy even to zone 2.

Pinus parviflora. The Japanese white pine. A very attractive and distinctive species of pine. It seems to have acquired some of the unique beauty of Japan. Unfortunately, it is a little difficult to grow in hot regions, and there is only one common cultivar which remains relatively dwarf.

P. p. 'Adcock's Dwarf'. Forms an attractive mound of closely clustered

branchlets with short needles. Has excellent texture and character. Widely available and very good for the larger rock garden. Probably hardy in zone 5a.

Pinus strobus. The eastern white pine. Does not have the picturesque beauty of *P. parviflora* but a beautiful species, nevertheless.

P. s. 'Horsford's Dwarf'. Makes a mound of feathery needles with a slight bluish cast. Annual growth is 1". Remains attractive for many years. Often grafted on a standard. Excellent. Zone 3.

Pinus sylvestris. The Scots pine. Not demanding. Grows anywhere.

P. s. 'Repens'. Dense, dwarf, flat-creeping form with rich green needles. Good for over rocks in the larger rock garden. Zone 3.

Pseudotsuga: Douglas Fir.

P. menziesii is the Douglas fir of our western states. It is the source of the fir lumber used extensively in home building. Performs best in cooler regions such as zones 4b and 5a but survives in 5b. There are a number of cultivars, but most become too large for the rock garden.

P. m. 'Fletcheri'. An old cultivar but one of the most attractive. Eventually becomes a flat-topped, spreading bush. The needles have a blue-green cast. The plant is tight and compact but becomes picturesque as it matures. At maturity in 10 or more years, 2' high and 3' wide.

Thuja: Arborvitae

There are many species of arborvitae scattered over the world. Best known are the American (*T. occidentalis*), the western (*T. plicata*) and the Oriental (*T. orientalis*). The latter, however, may be found under the genus name *Platyclusus* in more modern texts.

Thuja occidentalis. The common and adaptable American arborvitae. There are many upright-growing and large, globose forms. Relatively few are small and slow-growing.

T. occidentalis 'Tiny Tim'. Small, globe-shaped arborvitae include 'Minima', 'Pygmaea' and 'Hetz Midget'. However, the most slow-growing, readily available cultivar is 'Tiny Tim'. It has a good green color in summer and a bronze-green in winter. The foliage is tight and gives the plant, as it matures, a textured appearance. At 10 years, may be 18" across and 12" high. Zone 4.

T. orientalis. This species has foliage resembling that of *T. occidentalis*, but in the cultivars it tends to be flat and oriented vertically in parallel layers giving the plants a compact, smooth look. The dwarf forms are shaped like eggs on end, so don't expect them to blend into a natural setting. Grown from seed, many variants are possible. Examples of those which are small, compact and egg-shaped are *T. orientalis* 'Bergman's Gem', 'Minima' and 'Wang's Green'.

Tsuga: Hemlock

Tsuga canadensis, the Canadian hemlock, is one of the most graceful of our native trees. Many cultivars have been derived from it, some inheriting the grace of the species and others, with irregular form and stiff branching, serving as conversation pieces. The graceful dwarf forms fit well in rock gardens designed to simulate a natural landscape. Those which are prostrate and pendulous develop a

natural beauty matched by few other plants, especially when drooping over large rocks. Hemlocks should be planted in a soil containing a moderate amount of organic matter, either peat moss or bark, and it should be on the acid side. Except for 'Cole's Prostrate', they do well in the open in full sun. However, in regions with hot summers, a west- or south-facing slope or wall would be too warm. They are especially valuable because they tolerate shade.

The following list should be considered only representative of the many cultivars. It does not include the whimsical, irregular forms, even though their heavily needled and twisted branches make them good candidates for the rock garden. Examples of these irregular forms are 'Bacon Cristate', 'Hussi', 'Jervis' and 'Nearing'. All will do well as far north as zone 4a and some authorities include zone 3 in their range. They do not do well south of zone 7.

T. c. 'Bennett'. A hemlock for the larger rock garden which could be described as a dwarf and spreading weeper. Will grow to 3' high and 4' wide. When young, it may have a central depression, giving it a bird's nest shape. The branches are slightly arched upward with pendulous tips. Foliage is abundant and thick and could almost be described as lush. With maturity the plant has a tiered appearance. It may be listed under the name it was first given, 'Minima', but be aware that there may be a true 'Minima' which is a slow-growing form of 'Bennett'. Either is excellent if you have the space.

T. c. 'Cole's Prostrate'. Very prostrate. Hugs the ground and takes on the contour of the rocks it grows over. In fact, the pendulous, waterfall effect of a mature, healthy 'Cole's Prostrate' growing over a rock can be the focal point of a garden. The center of the plant becomes open with age, exposing its branches. It must be planted in the shade or receive limited morning sun. Grows slowly and takes some time to develop its full beauty, but well worth the wait.

T. c. 'Fantana'. Similar to 'Bennett' in growth habit. Tends to have more prominent main branches, so it is not as regular in shape as 'Bennett' but has the same attractive, pendulous appearance. Foliage color said to be less attractive than that of 'Bennett', but the difference is probably appreciated only when plants are grown side by side.

T. c. 'Jeddeloh'. Foliage is a lighter green, and plant is somewhat more dwarf than 'Bennett' and 'Fantana' but has the same attractive pendulous appearance. Also has a central depression. Grows to 2' high and perhaps 3' in diameter. Widely available.

T. c. 'Minuta'. This cultivar is made for the small, intimate rock garden. It is a small, flat, bun which grows about 1" per year when established. It may achieve a height of 10" in as many years.

T. c. 'Stewart's Gem'. Like 'Minuta', this is a tight, bun-shaped plant but is more vigorous and becomes about 50% larger. The branch tips are cinnamon color.

Tsuga caroliniana. The Carolina hemlock is much less well known than *T. canadensis* but it is equally attractive, fully hardy and, according to Dirr, more tolerant of city conditions. The needles radiate on all sides around the twig rather than being oriented in a plane as in *T. canadensis*. One cultivar is highly suitable for the rock garden.

T. caroliniana 'La Bar Weeping'. This is not as ground hugging as *T. canadensis* 'Cole's Prostrate', but it is a creeper and becomes equally attractive. It can also be

trained to grow upright. Sources of this plant are limited but it is excellent for the right spot.

This long list of candidate dwarf conifers for the rock garden may be intimidating and confusing for those who wish to select a few reliable cultivars which require no special treatment. To simplify things for those in zones 6a and 5b, the following would be prime choices of cultivars which will do well in full sun without special treatment. They are listed in two groups, those which are diminutive and remain small, and those which grow more rapidly and must be given more space or eventually moved.

Diminutive, slow growers.

- Chamaecyparis pisifera* 'Plumosa Compressa'
- Juniperus chinensis* 'Echiniformis''
- Juniperus communis* 'Berkshire'
- Juniperus horizontalis* 'Glomerata' and 'Mother Lode'
- Picea abies* 'Little Gem'
- Picea glauca* cultivars derived from *P. g.* 'Albertina Conica'.
- Picea mariana* 'Ericoides'
- Pinus mugo* 'Valley Cushion'
- Pinus strobus* 'Horsford Dwarf' and other small *P. s.* cultivars.
- Thuja occidentalis* 'Tiny Tim'
- Tsuga canadensis* 'Minuta' and 'Stewart's Gem'

Conifers which become larger.

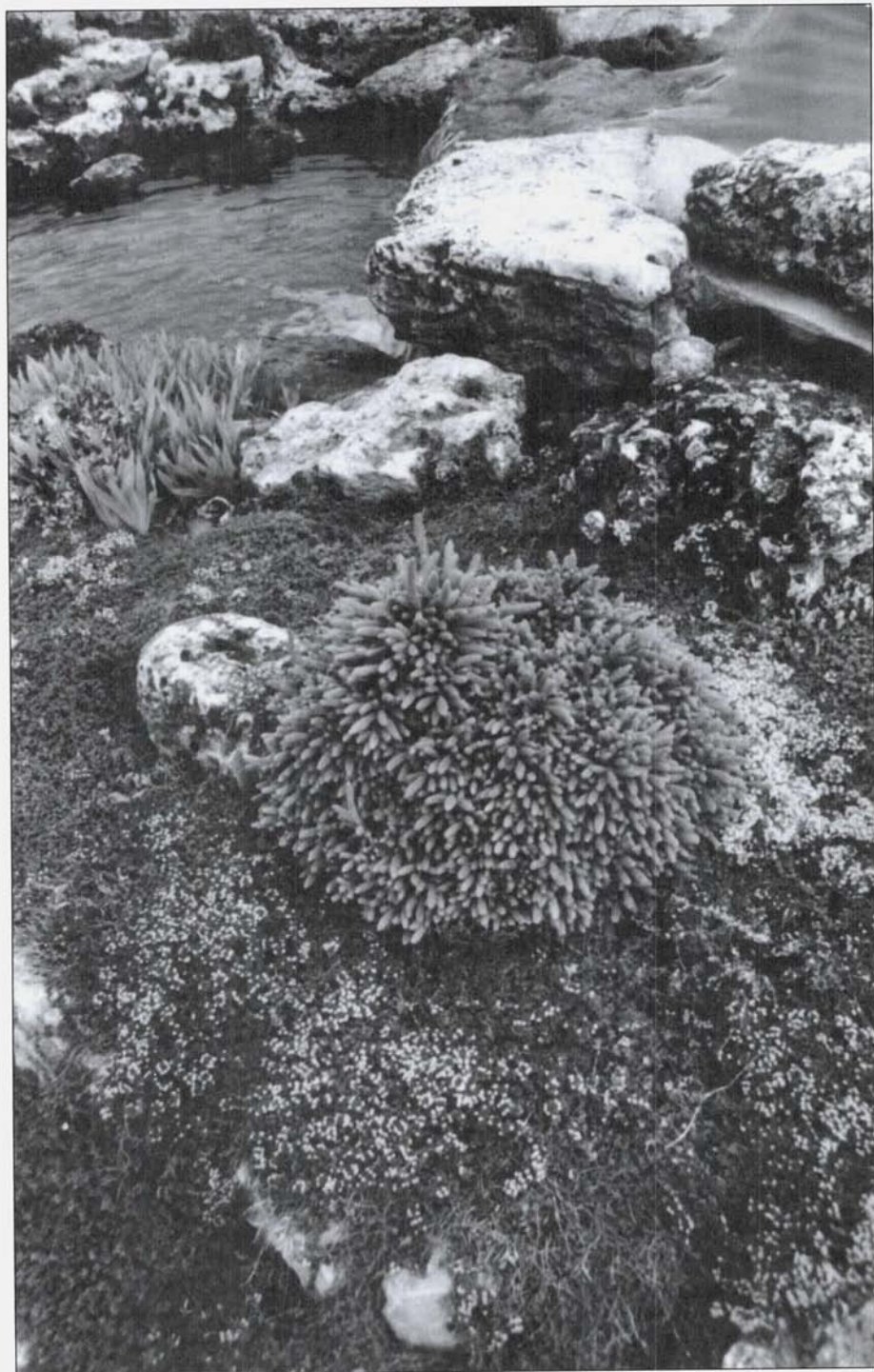
- Abies nordmanniana* 'Golden Spreader'
- Remainder of the *Chamaecyparis pisifera* cultivars
- Juniperus communis* 'Pencil Point'
- Juniperus procumbens* 'Nana'
- Picea mariana* 'Nana'
- Picea pungens* 'St. Mary's Broom'
- Picea sitchensis* 'Papoose'
- Pinus contorta* 'Spaan's Dwarf'
- Pinus parviflora* 'Adcock's Dwarf'
- Pinus sylvestris* 'Repens'
- Thuja orientalis* cultivars
- Remainder of *Tsuga canadensis* cultivars except 'Cole's Prostrate'(which requires shade).
- Tsuga caroliniana* 'LaBar Weeping'

For those residing in warmer areas, zones 6b and 7, the following choice dwarfs can be added to the above lists:

- Cedrus deodara* 'Glacial Blue'
- Cedrus libani* 'Sargentii'
- Cultivars of *Chamaecyparis obtusa*
- Cultivars of *Cryptomeria japonica*
- Juniperus communis* 'Compressa''

Those wishing to learn more about dwarf conifers can subscribe to the Bulletin of the American Conifer Society by addressing the American Conifer Society, PO Box 360, Keswick, VA 22947-0360

Clark West's interest in dwarf conifers began in 1974 at a time of increasing interest in rock gardens and disillusion with roses. His interest has evolved to focus on growing conifers from seed in the search for new cultivars.



DWARF CONIFERS:

MUSINGS FROM A ROCK GARDEN

by Alexej Borkovec

After the first series of killing frosts, most rock gardens viewed from a distance acquire "the winter look," a rather sad appearance that can range from acceptable to dismal. The difference between the two extremes rests largely on the presence or absence of evergreen plants, especially dwarf shrubs and trees. There is a fair number of broad-leaf evergreens that can liven up the winter sadness, but in many rock gardens, including mine, conifers are the undisputed leaders.

Why conifers? Because they possess the three principal graces most gardeners seek: color, shape, and longevity. Most conifers, despite their lack of significant flowers, change the hues of their foliage several times during the year, and even if the basic color is invariably green, the differences between individual plants in winter, as well as during the growing season, are substantial. The winter colors are never flamboyant, but they are in perfect harmony with the mood of a sleeping rock garden. What they lack in intensity they make up for in variety, from rich green through silver, blue, purple, to almost black. The architectural beauty of conifers is proverbial and loses nothing in specimens of pygmy proportions. On the contrary, a dwarf tree personifies a rock garden's celebration of the beauty of small plants.

Longevity deserves a paragraph of its own because, in terms of a human lifespan, most conifers live forever. It is somewhat disquieting to look at one of your small trees that could easily survive not only you but also your children and grandchildren. However, despite their fancy names like 'Minima', 'Pygmaea', 'Nana', 'Compacta', 'Compressa', and others, most evergreens you plant will overgrow their allotted space in much less than 20 years and will have to be removed in one way or another. With this caveat in mind, some authors suggest that a conifer should be planted in the rock garden for a limited time span only, say 5-10 years, and then transplanted elsewhere. This may be a reasonable suggestion, but I have been always reluctant to follow it, and all plants mentioned in the rest of this article have been in my rock garden for well over ten years. In fact, some of them are now approaching their 40th birthday.

Although aesthetic considerations are the most important in deciding what to plant in your rock garden, the question of how difficult it is to grow a given

plant is not to be sneezed at. In this department, the conifers win easily on many counts. Most, and certainly all mentioned here, are indifferent to soil acidity or alkalinity as long as it isn't extreme. Good drainage and sun are essential, although some will tolerate a partly shaded spot. In some areas, winter burning owing to excessive exposure to sun and wind may occur, but I have seldom experienced this problem in my rock garden located in the northern suburbs of Washington, DC. In most instances when problems occur, with a conifer's survival, the cause was faulty planting or the first-year maintenance. Most dwarf conifers, when received, have been growing in containers for several years, and their entangled roots must be first straightened out and spread apart during planting. The first year in the garden is a critical period when drying out as well as overwatering must be avoided, which suggests a certain amount of coddling, if you wish to call it that. In our climate, fall planting will solve most problems of this kind. After the first year, conifers require almost no special attention except for pruning. In my garden, the most destructive enemies of conifers are deer, but if you somehow manage to keep them at bay, there are only few other pests, mainly aphids and mites, to watch for. Fortunately, the invertebrates can be fairly easily controlled by common insecticides (read the label!), but watch for the tiny mites, because they and their damage are not easily seen soon enough. All told, conifers are the easiest plants to maintain in the rock garden.

Having said this, I should add that even the easiest of plants requires some attention and maintenance from time to time. In established conifers, the principal, and sometimes only maintenance is pruning. If you want to keep one of these little trees in a specific location for a period longer than some 7-10 years, you will probably have to start shaping it up, or more accurately shaping it down, about 3-5 years after planting it. Please note that all the numbers I have been and will be throwing around are only very rough approximations. The growth rates of dwarf conifers are extremely variable and depend not only on species, variety, and the particular clone you happen to have, but they are also greatly influenced by the growing conditions such as the climate, light, soil, water, and nutrients.

Basically, there are two kinds of pruning: to minimize growth (shaving) and to maintain a certain shape (shaping). Usually, both operations are required periodically, shaving more often than shaping. Shaving, done with shears or even better, whenever you pass by the plant, with fingers, removes the ends of growing branches. Occasionally, a branch of a dwarf tree reverts to a normal growth; this has to be removed as soon as it is observed. Shaping is a much more drastic operation in which a sizeable branch is removed at the main trunk or at the ground level. Shaping allows you to create a miniature tree with a single trunk and a distinct crown of almost any desirable shape, to produce decumbent or otherwise distorted forms that conform to the plant's location. Surprisingly, most conifers tolerate these insults quite well.

It is, of course, possible to carry shaping to extremes by creating distorted and quite unhappy looking cripples rather than dwarfs, but who decides which is which? Because the sole arbiter of this is, or should be, the gardener, it is no surprise that opinions differ quite sharply. The purists' position is that except to remove diseased and dead branches no pruning should be done because it disfigures the natural shape of the plant. I am not certain whether these people would hesitate to cut off a part of the conifer that reverted from dwarfness to its

natural size, but, in general, I doubt that there are many purists among rock gardeners. After all, almost every rock garden is an artificial creation in which pruning and shaping is as common as is watering or weeding. It is largely a matter of personal taste how far should one go.

Fortunately, for those who simply dislike heavy pruning, there is an alternative to cutting off the plant's top or side growth. One can reduce the size of its roots. This time-honored method, best known from the classical bonsai procedures, consists of a simple transplanting the tree from one place to another either directly or with a temporary placement in a pot. In either case, the plant is cut around its base with a sharp spade to produce a root ball about one third as large as the plant itself. All roots should be cut as cleanly as possible, and the tree with the ball is transplanted into its new location or into a pot, somewhat larger than the root ball. Although some authors prefer to remove the old soil and even to wash the roots, I found leaving the ball intact entirely satisfactory. Transplanting should be done in the spring, and the soil around the tree should be moist enough to prevent it from falling off. As drastic as this procedure appears, most dwarf conifers will survive it, and their growth will be substantially reduced for the next several years. Humphrey Welch, perhaps the best authority on dwarf conifers, recommends using transplanting every five years (!) as a standard procedure for all conifers that are to remain small. However good and correct this advice may be, a busy rock gardener may find it too demanding and choose the other pruning procedures instead. However, there are instances when the most popular pruning, i.e., shaving, has distinct drawbacks. The most obvious is the case of variegation, yellow or white, that appears as new growth at the tips of branches and constitutes the main attraction of the plant. Even with much care, when shaving is done early in the season, a substantial part of this prized adornment is lost. Another potential disadvantage of shaving is that certain conifers, junipers more often than other genera, either do not tolerate it or look rather rugged weeks or months after the ordeal. Shaping can reduce some of these disadvantages, but it too has its limitations. Some conifers are very difficult or even impossible to shape without distorting their general appearance. A good example is the well known and deservedly beloved Alberta spruce, *Picea glauca* 'Albertiana Conica', whose perfect, pyramidal appearance suffers badly from any more substantial pruning. To sum up, not all dwarf conifers can be kept at a given size by pruning their top growth, but the number of those that can is still quite large.

Before attempting any of the more drastic pruning procedures, i.e., radical shaping or transplanting, it may be a good idea to consider propagating the conifer, just in case the patient doesn't survive. This may be very easy or very difficult, depending on the species and variety of the plant and on the facilities available. Commercial and aristocratic gardeners in possession of greenhouses, automated misting devices, and other paraphernalia may find this discourse primitive, but my intent is to show that every rock gardener can, just as I do, propagate a large variety of conifers with the simplest possible equipment. All that is required is a box, at least 20 cm deep and furnished with drainage holes, filled to about its half with clean, sharp, moist sand, and a fitted with a translucent or transparent cover. A small (3-6 cm-long) cutting of the conifer is detached with a sharp razor, all leaves are removed from its lower third, and the leafless stem is firmly inserted into the sand. The lid is closed, and the box is

placed in a shady spot, where it will remain undisturbed for a period of 4-8 months. Occasional inspections will reveal a need for watering or for a removal of cuttings affected by mold or other mishaps. When new growth is observed and a gentle pulling will not dislodge the cutting, roots have formed, and the rooted cutting can be carefully transplanted into a pot. Whether the new cutting should be first dipped in a rooting hormone, fungicide, or otherwise treated is a complex and controversial question that will not be tackled here, but the nature of the cutting and the time of the rooting procedure are of utmost importance. In my experience, the best time to take cuttings is late summer or early fall, and the stem of the cutting should be semi-woody, about one year old. Detaching the cutting with a small heel appears beneficial. The period required for new growth and root formation varies, but most late-summer and fall cuttings will be ready for transplanting before the end of the next spring. In this simple fashion, good results can be expected in attempts to propagate most varieties of *Chamaecyparis*, *Cryptomeria*, *Picea*, *Taxus*, *Thuja*, and *Tsuga*. Some varieties of *Cedrus* and *Juniperus* and most varieties of *Pinus* are difficult or just about impossible.

Almost all dwarf conifers are cultivars derived from mutations of the original large trees and shrubs. Because they are propagated vegetatively as clones of the parent mutant, they ought to be clearly distinguishable one from another. Unfortunately, for various reasons this is not always the case, and the result is a bewildering variety of names that even the best experts cannot sort out. In the following, I have relied on a sole authority of Humphrey J. Welch (*Manual of Dwarf Conifers*, Theophrastus, New York, 1979, 493 pp.), and even then some of my names may be incorrect for the plants I have in my garden. What is included here are dwarf conifers that I have grown during the last 35 years and that I have managed to keep, with the help of my pruning shears and fingers, at a size appropriate for a medium-size rock garden. It is not, however, a selection of the "best," "easiest," or "smallest." With the availability of some 2000 varieties, such selection would require expertise that I only wish I had. Apart from mentioning some general characteristics, I have omitted most botanical descriptions that can be found in reference books, such as the already mentioned Welch's *Manual*. The listing is alphabetical, with the genus first, followed by the cultivars I know and have grown for 8-35 years in my rock garden or, in exceptional cases, in pots. Many other cultivars that I grew but was unsuccessful in keeping small are not mentioned. Notes on propagation refer to the cultivars mentioned here. The size shows height first, and then the largest width dimension.

CEDRUS

A rather small group of evergreen conifers that resemble deciduous larches (*Larix*). Propagation is easy from semi-soft cuttings taken in early fall and kept over winter.

C. libani Comte de Dijon'. The original plant was a graft that was shaped and maintained like a tree with a flat crown. It has bright green, sharp needles that do not change color in winter. Light shaving is required yearly or more often to shorten protruding shoots. Size after 23 years: 47 x 48 cm.

CHAMAECYPARIS

The largest group of dwarf conifers and the easiest to grow and keep in

bounds. Branchlets are flattened, fan-shaped, or thread-like, with scaly juvenile foliage. Shaving of the fan-shaped sprays should be done often and very lightly because the sprays are slow to recover. Cutting into the wood invariably leads to a die-back. So does pruning performed by deer. However, shaping by removing entire branches at the trunk site is usually well tolerated. Propagation is easy from cuttings taken in the fall.

C. obtusa 'Coralliformis Nana'. A mound-forming, decumbent bush with curious, thread-like foliage, dark green throughout the year. Yearly light shaving is well tolerated. Prefers a sheltered location. Size after 13 years: 22 x 34 cm.

C. obtusa 'Golden Sprite'. One of the very slow-growing tennis-ball chamaecyparises that form a flattened bun with bright yellow-green foliage. None or only very light shaving is required. Size after 8 years: 6 x 10 cm.

C. obtusa 'Gracilis'. Although this is supposed to be a very fast-growing, upright bush or tree, my clone, possibly misnamed, is not that vigorous and can be shaped by cutting of unwanted branches at the trunk site. The leaf sprays are rather small, and shiny green with a bronze cast in winter. It is now a crooked tree with a 6-cm wide main trunk. Size after over 20 years: 40 x 41 cm.

C. obtusa 'Nana Aurea'. A rounded bush, medium green with bright, yellow-green new growth that only slowly changes to green through the year. Bronze cast in winter. Requires careful, slight shaving every year and more drastic shaping every second year. Size after 22 years: 23 x 27 cm.

C. obtusa 'Nana Gracilis'. Can be grown as a tree with a more or less flat crown. Every five years unwanted branches may be cut off at the trunk, and the plant can be shaped as required, but shaving and shortening of branches is not tolerated. The foliage is dark green with a slight bronze cast in winter. This is one of my oldest dwarf conifers. Size after 32 years: 106 x 76 cm with a 7 cm wide trunk.

C. obtusa 'Nana Lutea'. A very slow-growing, columnar tree with sparkling yellow-green new growth that shaving would remove. The yellow color fades very slowly during the year. Only shaping by removing entire unwanted branches needs to be done every second year. This drastic surgery is well tolerated. Because of its striking appearance, I allowed this plant more space than was absolutely necessary. Size after 22 years: 83 x 66 cm.

C. obtusa 'Pygmaea Aurescens'. Similar to the previous one but with a tendency to grow sideways rather than upright. Welch describes it as being a rather vigorous grower, but my plant grows very slowly and is easy to keep small by occasional shaping, probably because it is planted directly in a stone wall where it receives limited amounts of water and nourishment. This starvation diet, however, does not affect its beauty. Size after about 24 years: 21 x 28 cm.

C. obtusa 'Repens'. A prostrate, permanently green bush with fan-shaped sprays. A yearly, careful shaving will keep it low. Contrary to Welch, my plant, situated in full sun, is not a vigorous grower. Size after 14 years: 19 x 20 cm.

C. obtusa 'Tetragona Aurea'. One of the most brilliant and beautiful of the species. It forms a round bush with vivid gold, long, decumbent, frond-like branches. Being a strong grower, it requires frequent and very careful pruning by shortening the longest shoots and occasionally removing the upright growth. Fortunately, the pruning is well tolerated, and the plant remains dense and colorful, assuming a metallic bronze cast in winter. However, even partial shading strongly diminishes its gold color. Size after 17 years: 35 x 31 cm.

C. obtusa 'Tetragona Green'. Welch considers this a green form of 'Tetragona Aurea' and doubts its existence. Nevertheless, my plant is generally indistinguishable from the golden form except for its color that is a solid, somewhat glaucous green throughout the year. Because the yellow cultivar remains green when grown in shade, Welch believes that the green form was simply the former grown in partial or full shade. However, my plant remains green even in full sun. Pruning and care is the same as for the gold cultivar. For some reason, this plant was once badly damaged by deer. Size after 17 years: 22 x 20 cm.

C. pisifera 'Boulevard'. A striking, intensely blue-silver bush that can be shaped to form a small tree with a round crown. It is a strong grower and, after the initial shaping, requires a twice-yearly shaving. Because the new growth is its most beautiful aspect, the shaving, even if done very carefully, does somewhat diminish its full glory, but still the plant is a reliable attention-getter. I grow it in full sun in poor, clay soil, with a 5-cm dressing of limestone chips. This treatment is quite contrary to Welch's suggestion of partial shade, no lime, and perhaps even alpine house cultivation. Size after 15 years: 44 x 47 cm with a 2.5 cm wide trunk.

C. pisifera 'Plumosa Aurea Nana'. A brightly colored bush with delicate branches and feathery foliage that retains its gold color throughout the year. Because the growth is not dense, pruning of any kind presents difficult problems. Very mild shaving in late fall is probably best, because the new growth in the spring at least partially fills the empty spaces. Damage caused by spring and summer pruning recovers very slowly. It is a lovely plant but very difficult to keep small and still good looking. Size after 12 years: 42 x 41 cm.

C. pisifera 'Plumosa Compressa'. A gem for the rock garden that can be kept at almost any size and shape for decades in full sun or slight shade. The foliage is very small and grows in tight rows, giving the plant a mossy appearance. The color is lush green during the growing season with variable bronzing in winter. However, several differently colored varieties are also known. Both shaping and pruning are well tolerated. Only deep shade or bad drainage can kill this invaluable dwarf conifer. My oldest plant of over 30 years was shaped as gnarled tree, now 49 cm tall and 40 cm wide with a trunk over 5 cm in diameter. Other specimens were shaped as bushes of different shapes and proportions.

C. pisifera 'Snow'. A rounded, gray-green bush that really looks as if it were covered with snowflakes, especially in the spring and summer. It is a strong grower, and its pruning presents the familiar dilemma of smallness versus good appearance. The only solution I found was to shave it rather substantially every second summer. The first year much of the snow effect is destroyed, but it appears, in full glory, the second year. Size after 13 years: 46 x 52 cm.

C. pisifera 'Squarrosa Minima'. Also known as 'Squarrosa Pygmaea' is a spherical bush, silvery with just a hint of green but becoming dark green when wet. If the lower branches are removed, only the top part retains its foliage, and the plant resembles a giant mushroom. Frequent shaving and manual nipping of the slender shoots that appear throughout the growing season is essential to maintain dense appearance and to keep the size down. Even so, older specimens tend to become quite large. Size after 30 years: 66 x 61 cm (sphere), 65 x 40 (mushroom-like).

C. thyoides 'Andelyensis'. A columnar, very slow-growing tree that may become too tall in time and must be carefully pruned. It has a single leader that,

after some 10 years, will need periodic but very gentle shortening. The sprays are small and dark green, giving the plant an airy look. It tolerates some shade. Size after 12 years: 28 x 11 cm.

CRYPTOMERIA

A monotypic genus that offers a large number of dwarf cultivars some of which, especially the white-variegated ones, are not hardy in my garden (USDA zone 7a). Most of these plants were developed and named in Japan, and their nomenclature is complex and confusing. However, the two popular varieties described here are fairly well defined, and their names are generally accepted. Both are fully hardy in my garden. Propagation by fall cuttings is easy, but a full year is required for the cuttings to develop an adequate root system.

C. japonica 'Elegans Nana'. An extremely dense bush or tree with stiff, spiny, very dark green needles that can be shaped by hard pruning to any desirable shape. It is a vigorous grower that needs frequent removal or shortening of branches. New growth starts from young or old wood, and if the plant is shaped as a tree the new growth from the trunk must be periodically removed. In the fall, clusters of male flowers develop at the ends of leading shoots. However, in my opinion, these brownish, congested, almost woody flowers are not very attractive, and I consider their removal during pruning more beneficial than harmful. By hard pruning and shaping the plant as a tree, the appearance of great age can be created in just few years. In full sun, this cultivar will turn rich, deep bronze in winter, more distinct than any other conifer I know. It does well also in partial shade, but the color change is not as intense. Size of a 29-year-old tree-shaped specimen: 57 x 70 cm with a 9 cm wide trunk.

C. japonica 'Vilmoriniana'. Although this very popular and common dwarf is easy to maintain small for the first 5-8 years, its pruning becomes more difficult afterwards and unless done very frequently and with great care, it may disfigure the plant. The reason for it may be the almost perfect spherical or ovoid growth this plant exhibits without any pruning. The bright green, short needles form round brushes that project out of the plant's surface in all directions and slowly increase its overall size. Only a careful shaving performed twice or three times a year will slow down the growth and maintain good appearance. Fortunately, this conifer is very easy to propagate or transplant, and either of these two steps may be preferable to pruning an old specimen. The winter coloring is bronze but less intense than that of the previous cultivar. Size of a 10-year-old plant: 39 x 32 cm.

JUNIPERUS

This genus of over 40 species provides several hundred cultivars of low stature in a broadest variety of color and texture. For a rock garden, some are simply indispensable, but all too many seem to resent pruning and are so slow to recover that their suitability for limited spaces is questionable. Many junipers, especially those derived from *J. procumbens* and *J. horizontalis* are dwarf only in the sense that they are low-growing, but they are vigorous growers that may lengthen their branches 30 cm or more in one year. If there is a need to cover a bare wall or some other unsightly feature, then these plants can do the job better and faster than any other conifer, however, if they are placed in some more valuable site in a small rock garden, severe pruning will have to be done quite

often, and only varieties that will tolerate this can serve the purpose. I have several of these plants in my rock garden, but because I am unsure of their proper cultivar names I have not listed them here.

J. chinensis 'Echiniformis'. The ideal, truly dwarf conifer for a small rock garden. The very sharp, spiny foliage is deep green, and the growth is dense and so slow that no pruning whatever is required for many years. Because propagation by cuttings is very difficult, most commercial plants, including mine, are grafts. The only problem I encountered with this plant were spider mites, whose attack is usually discovered only after the infestation is quite heavy and the foliage color changes from shiny to dull green. Repeated application of an appropriate insecticides (read the label!) may be required. Size after 23 years: 24 x 45 cm.

J. communis 'Compressa'. This is another true dwarf but of columnar habit. Its needles are shorter and thinner than those of the preceding cultivar, and its color is silver-green. Welch considers it highly susceptible to spider mites, wind and frost damage. I cannot confirm the mite problem; I never observed an infestation on any of my five specimens. However, frost and wind damage is an almost yearly occurrence, especially on those plants that are fully exposed to sun and wind. The damaged branches, usually on the northern side, turn brown and must be removed in their entirety. A shortened branch will not break new growth. If the operation is done early in the spring, the neighboring healthy branches will close up the left-over empty space quite rapidly, and the beautiful columnar shape will not be affected. Otherwise, no pruning is necessary for many years. Size of a 23-year-old plant: 44 x 14 cm.

J. communis 'Suecica Nana'. This cultivar is very similar to 'Compressa' except for its much larger size and a somewhat less silvery color. Contrary to Welch, my plant seems to suffer even more from winter burn than does its smaller relative, and the healing of pruned areas takes a good part of the growing season. A very careful placing in a protected site may alleviate the problem. Size after 20 years: 92 x 23 cm.

J. communis 'Depressa Aurea'. An egg-shaped, dense, rather fast-growing bush with prickly, silver-green needles. The spring new growth is bright yellow-green, but the color changes to green rather quickly. It needs shaving and nipping twice a year, in early summer, after the yellow color fades, and in fall. Size after 10 years: 24 x 19 cm.

MICROBIOTA

This genus is represented in rock gardens by only one species.

M. decussata. This unusual, flat-topped bush is apparently not a cultivar and thrives even in shade. It is slow-growing and needs only yearly pruning, which is well tolerated. Its intricate, ferny branches can be shortened and shaped to a low bun, and the plant remains small for many years. The tiny leaves are dark green and turn brown in winter. It is a curiosity rather than a beauty. Size after 11 years: 17 x 34 cm.

PICEA

The spruces are large trees with many dwarf forms that are hardy and can be grown in a rock garden. Nevertheless, if space is a problem, the selection diminishes substantially, because some of the well-known and easily obtainable cultivars grow in all directions and are difficult to shape as true dwarfs. Frequent

transplanting, i.e., root pruning, may be a better solution than shaving and shaping, but all plants mentioned here were kept within limits by shaving and shaping. They tolerate partial shade, but in full sun the growth is somewhat slower.

P. abies 'Little Gem'. This extremely dense and slow-growing cultivar is rather an exception to the earlier mentioned generalizations. When shaped as a tree by removing all branches from the lower half of the central trunk, a perfect dwarf will be obtained in about 10 years. From then on, only occasional shaving and cutting off stray branches will be required. Its appearance will resemble a very ancient tree with a broad crown, very unspruce-like but quite lovely. The needles are small and dark green, almost black in winter. Size after 22 years: 36 x 64 cm with a 7-cm wide trunk.

P. abies 'Pumila'. Because of its primarily lateral growth, this plant cannot be shaped as a tree. Shaping by removing entire branches is possible, and even an old specimen can be kept quite small, but I was never able to achieve a truly pleasing shape. Still, the upright-growing young shoots are light gray-green and very pretty year round, and the plant is well worth growing. Size after 22 years: 28 x 33 cm.

P. abies 'Pygmaea'. A dark green, upright-growing bush that needs severe shaping to remain small. Size after 28 years: 46 x 49 cm.

P. pungens 'Montgomery'. A strikingly beautiful silver spruce (Colorado blue spruce) with silvery blue, prickly needles. The new, spring growth is pure silver with a slight hint of green. It can be shaped as a tree with a flat crown by removing all lower branches during the first 5-7 years of growth. After that only yearly summer shaving is needed. However, this plant is a vigorous grower, and the only way I managed to keep it small was to have it confined to a heavy, plastic pot that is submerged in the ground. Once a year, the pot is lifted and all protruding roots are cut off. Size after 10 years: 36 x 39 cm.

PINUS

The pine genus offers a large number of dwarf cultivars and even two dwarf species; some are so slow-growing that no pruning of any kind is required for the first ten or more years. The majority, however, grow more or less vigorously in all directions, and even with frequent shaving and shaping the plants are difficult to keep from overgrowing their allotted space. Shaving is best done in the spring, after the new growth forms club-like shoots that can be easily shortened without any damage to the plant. For shaping, entire branches have to be removed because new growth doesn't start on partially cut wood.

P. aristata. The bristle-cone pine is an extremely slow-growing tree if planted in sun and in meager, well-drained soil. Reportedly, some even slower-growing cultivars exist, but the species itself, when planted in a rock garden, will require no pruning for the first ten years. It will form a creeping bushlet that can be later shaped as required. Size after 13 years: 10 x 22 cm.

P. mugo. The European dwarf mountain pine is a common feature of high elevations in the Pyrenees, Alps, Carpathians, and the Balkan mountains where it occurs in an endless variety of sizes and shapes. The smaller forms are usually considered selections of *P. mugo* 'Pumilio' and at least a dozen cultivars have been named. I was unable to trace the origin of my two representatives of this group, but both are rather strong growers and require not only yearly shaving

but also an occasional severe shaping to keep them under control. Size after 20-22 years: 52 x 54 cm and 42 x 48 cm.

P. strobus 'Horsford'. An extremely slow-growing pine with soft, thin needles that forms a small bun and requires no pruning for at least 15 years. Unfortunately, it seems to be susceptible to mites that find ideal hiding places in the furry cushion. When the soft green color of the plant changes to dull gray, it is already too late, as I unhappily found out. It was the only dwarf conifer I lost during the past 25 years. Size after 14 years: 11 x 15 cm.

P. sylvestris 'Beuvronensis'. A fairly fast-growing, low but broad bush that needs frequent shaving. By selecting a leader and removing all lateral branches from the lower part of the trunk, it can be shaped as a very low tree with a broad, flat crown. Size after 24 years: 47 x 76 cm with a 7-cm-wide trunk.

TAXUS

Unlike most other conifers, the yew can stand and actually thrive in considerable shade. The dwarf forms are usually grown as bushes rather than trees, because a true leader is rarely formed even in upright-growing forms. Because hard pruning is well tolerated, the plants can be shaped and maintained small even if its rate of growth is rather fast. If your garden happens to be infested by deer, who consider this plant a delicacy, you may not need to do any pruning, but results of shaping by deer are seldom aesthetically pleasing. The very dark, somber green of yews is in some cultivars pleasingly relieved by a bright yellow spring growth; consequently, shaving of these varieties should be postponed until summer.

T. baccata 'Davie'. This cultivar, which is not listed by Welch, was developed by Dorothy Metheny (Seattle, Washington) and named after her husband. It is a narrow, upright, slow-growing bush with yellow spring growth. Size after 18 years: 39 x 21 cm.

T. baccata 'Repens Aurea'. The growth of this cultivar is mainly lateral and, because of its rapid rate, severe pruning is required to keep the plant small. It forms a flat bush. Size after 25 years: 40 x 70 cm.

T. cuspidata 'Minima'. Reportedly one of the smallest hardy conifers, it forms an upright bushlet, but it can be shaped to a more rounded form. The leaves are lanceolate-ovate and remain soft green throughout the year. It needs very little pruning every 2-3 years. Size after 18 years: 20 x 25 cm.

THUJA

These trees and bushes are so closely related to chamaecyparises that their dwarf forms, especially when they are periodically pruned, are indistinguishable.

T. occidentalis 'Hetz Midget'. This spherical bush needs yearly shaving, but cutting into the wood must be avoided. The sprays are blue-green and turn brownish in winter. Size after 25 years: 30 x 25 cm.

T. occidentalis 'Rheingold'. A golden, ovate bush with predominantly juvenile, needle-like, foliage that turns pink in winter. A beautiful but very difficult plant to keep small. It is a rather strong grower, and the removal or drastic shortening of its spring growth also removes its main attraction, the golden color. One possible but hardly ideal solution is to perform the drastic shaving only once in two years and forgo the display every other year. Probably a better solution would

be to confine the plant to a pot and cut off any protruding roots every year. Size after 14 years: 41 x 40 cm.

T. orientalis 'Sanderi'. This is a true miniature in all respects. Tiny, brilliantly green juvenile foliage on thin, filigree branches and a rather slow growth to boot. It has confused numerous botanists who classified it as a *Juniperus*, *Chamaecyparis*, or *Shishendenia*. Although Welch describes it as being rather tender, I didn't notice any damage through several hard winters. It is, however, located in a sheltered spot. It forms a round bush, and its unique color makes it stand out from a distance. In winter it becomes almost blue. Slight annual shaving of protruding shoots gives it a nicely globular form. Size after 10 years: 15 x 15 cm.

TSUGA

The dwarf cultivars of the hemlock range from extremely small to very large; I mention here two of these extremes which, as different as they are, can be accommodated in a small rock garden.

T. canadensis Coles Prostrate'. This ground-hugging plant, seldom more than 50 cm high, can in time cover several square meters with a dense growth of fine, medium-green, flat needles. The branches curve down naturally and their polished outline stands out pleasingly from the foliage. Obviously, such a large plant requires very special placing and although its ultimate width can be controlled by shortening the protruding branches, an area of 1-2 square meters must be allocated to it. Although it tolerates some shade, its full beauty will develop only in full sun. Size after 27 years: 48 x 170 cm.

T. canadensis 'Horsford Dwarf'. I consider this dwarf hemlock one of the slowest-growing of all conifers. It is a true miniature of the Canadian hemlock, perhaps a little more dense, but otherwise with the same color and foliage. For the first 10 years, no pruning whatever is needed; afterward occasional light shaping may be performed to achieve a desirable form. It is a perfect dwarf conifer for small troughs. Size after 21 years: 13 x 21 cm.

T. canadensis 'Nana'. Welch considers this cultivar to be too large for a dwarf, but I have been able to maintain my specimen within reasonable confines with relative ease for more than 20 years. The plant is of an upright growth with a leader and can be easily trained as a tree by removing all lower branches. The crown can be kept flat or slightly domed, and its circumference must be closely controlled. Once the general shape is attained, only light, but very frequent, shaving and nipping is needed. This hemlock has a pleasingly olive-green color. Size after 23 years: 50 x 52 cm, with 3-cm wide trunk.

Photo by Charlene Harris

Alexej (Sasha) Borkovec Silver Spring, Maryland, U.S.A. USDA Zone 7a, min. temp. -20 C



Phacelia sericea

ERIOGONUM UMBELLATUM: FORMS AND VARIETIES

by Geoffrey Charlesworth

In the winter 1990 *Bulletin of the American Rock Garden Society*, Vol.18(1) p. 21 there is an article by Margaret Williams: "Eriogonums to Grow and Treasure." Margaret Williams is the recognized authority on the genus, at least as it occurs in Nevada and California. She founded the Northern Native Plant Society and has done extensive field work in the area of the Sierra Nevada and the White Mountains. In the June 1993 *Quarterly Bulletin of Alpine Garden Society*, Vol. 61, p. 200 Jack Elliott wrote a very fine article on eriogonums based on his research and experience as a gardener and his extensive travels in the West. In the winter 1993 *Bulletin of the American Rock Garden Society* Vol.57(1) are two articles on eriogonums. The first is by Betty Lowry, one of the best growers in the Northwest, who describes her favorite species and discusses growing them in her climate. The second is by Gwen Kelaidis, who also discusses the culture of eriogonums and shows, in a way helpful to rock gardeners, how this large genus has been subdivided botanically.

These four articles are required reading for any gardener interested in the genus. But if you are just getting interested you will also want to order seed from the great seed lists of Northwest Native Seed (NNS), Rocky Mountain Rare Plants (RMRP) and Alplains (A). Also Rogue House (RH) usually has seed of a few eriogonum species. When ordering seed from these lists you are struck by the number of collections of *Eriogonum umbellatum*. I have put together a list of seed of this species that has been offered over the last five or six years and what each collector has to say about the plants from which the seed came.

It is strange that the genus *Eriogonum* belongs to the family Polygonaceae, which also includes *Rheum* (rhubarb), *Rumex* (sorrel), *Polygonum* (knotweed) and *Oxyria* (mountain sorrel). Many of these are distinctly weedy and the rumex we battle with in New England meadowland wastes a lot of gardening time. It is sometimes difficult for gardeners to accept the fact that belonging to a family rarely tells you anything definite about the shape or size of the plant, the color of its flowers, or the degree of woodiness or succulence. You can eat sorrel in salads and soups, rhubarb in pies, and, if you are lost on Mt Washington, you might find *Oxyria digyna* to stave off thirst. *Eriogonum*, also, includes edible

plants: buckwheat is the grain used for horses and pancakes, and the common name for any eriogonum is 'buckwheat'. Though it is the sexual parts of flowers that unite genera, there are certainly other visual similarities among them, for instance the rusty colors and parchment texture, especially after the seed is ripe. Eriogonums also have the muted colors of faded carpet, too long exposed to sunlight. When you read 'purple', 'orange', 'red' in a description you have to recognize that this means 'comparatively purple', 'brownish red and orange', because none of the colors are the least bit gaudy. Occasionally one of the yellows might warrant the adjective strong, but even the yellows are creams, buffs and sulphurs for the most part. In the rock garden everyone can admire the soft colors against a sympathetic background of sands and rocks. Their beauty is partly tied up with the changes in color as the flowers age, many of them assuming redder shades after being open a few days. *Eriogonum umbellatum* is one of the most widespread species in the genus, so widespread it may be ignored by gardeners. But it is also very variable, and there are forms and varieties for every size of rock garden, including troughs. The plants I have grown have been very durable too, but only recently have I started growing the dwarf forms, so my experience is limited. The leaves are in general grayish-green and velvety, but never as wonderful as some of the more difficult species such as *E. caespitosum*. But you can grow many eriogonums without exhausting their charm, so the easier species are certainly worth growing. The species not to grow are the not-so-pretty annuals, but these seldom appear in seedlists. The only list where I have found an occasional poor garden species is the NNNPS list, where the collectors are wildflower people more interested in anything that grows locally than in purely decorative plants.

Here then is a list of forms and varieties of *Eriogonum umbellatum*. In addition to those listed there are thirteen others listed in the *Jepson Manual of California Plants*; four in the *Flora of the Pacific Northwest* and two in the *Utah Flora*. There may be other varieties in Arizona and New Mexico and probably in Colorado and the Great Plains, too.

var. *aureum*, Carbon Co WY 7200', 2195m. Green, mounded leaves often tinged scarlet, especially under cool conditions. Lax stems bear pom-poms colored red-dish to cream. A95

var. *hausknechtii*, Kiger Gorge Rim, Steens Mtn. Harney Co., OR 8900'. Dense flat mats, up to 2' across, of small grayish blue-green leaves with wisps of long white hairs and the undersides thick with white felt. Many of the leaves age to maroon. The 2"-wide cream to pale yellow inflorescences are on 1-3" stems. A very tidy habit and one of the best forms of *E.umbellatum*. Exposed rocky ridges, in a dry alpine bunch grass. A locally common form, found only in a few locations in Washington and Oregon. NNS97

var. *humistratum*, Ridge N and above Robbers' Meadow, Scott Mtns, Trinity Co. CA 7250'. Still another dense mat of silvery-gray rosettes. This is one of the tightest forms of *E. umbellatum*. The large umbels vary from greenish-yellow to bright yellow when first open then transform into innumerable degrees of red, bronze, orange, maroon etc. W-facing serpentine talus soil. NNS97

var. *humistratum*, Siskiyou Co. CA, 8600', 2622m, Condensed mats of silvery grey

with large umbels of yellow, aging to various bronze, maroon and orangish hues. A97

var. *hypoleium*, Ridge W of Pearson Ck, SE of Mt Lillian, Kittitas Co. WA, 5900'. Small rosettes of 1/2" dk green oval leaves form small mats with bright sulphur yellow 2" perianths on 2-4" stems. The leaves turn purple and dark red in the winter. Steep e-facing slopes and dry gravelly openings in subalpine forests. NNS94

var. *minus*, Mt Harwood, San Gabriel Mtns, San Bernadino Co. CA9500'. Dense silky white mats. The dwarfest and tightest form of any *E.umbellatum* variety. More compact than the tightest *E. ovalifolium* var. *nivale* cushion. Even the inflorescence color surpasses any other eriogonum. The deep amethyst-red to blackish-red, stemless balls are translucent and glow like embers in the sunlight. Alpine ridge tops of metamorphic talus. Gravelly compact soils. NNS96.

var. *nevadense*, Ridge NE of Capies Lake, Sierra Nevada Range, Alpine Co CA, 8950'. Low mounding shrubs with greenish leaves clustered at the nodes. On short stems are the branching umbels of bright yellow, maturing to brassy gold, heads. Gravelly dry slopes. This form is widespread throughout the E slopes of the Sierra Nevada Mtns. NNS96

var. *polyanthum*, Copper Butte, Siskiyou Mts, Siskiyou Co.CA 5000-5600'. Resembling the *nevadense* form with its loose mat of rosettes. In this case the leaves are densely tomentose underneath and the umbels are greenish yellow. Rocky outcrops among montane chaparral .NNS95

var. *porteri*, SSW ridge of Brian Head, Markagunt Plateau, Iron Co. UT 11,200'. Small mats of woody prostrate stems of elliptical green leaves. The large capitate inflorescences are variable in color: yellow with red stripes, orangish-red, purplis maroon etc. No two are alike. Slightly larger mats than var. *humistraum* with a greater color range. Rocky volcanic slopes.NNS97

var.*porteri*, Beaver Co., UT, 10400', 3170m. Absolutely the cutest buns of tiny spatulate, green leaves, tinged red. Add poms of red and yellow and this becomes an opstanding addition to the rockery. Growing on igneous slopes. A97

var. *porteri*, ex Uinta Mts, UT. Minuscule alpine race: a treasure. RMRP95

var. "*proliferum*", (mistake for *polyanthum*) ex CA. Forms a round shrub about 15" in diameter. Bright yellow flowers rise 3" above the foliage. In some seasons, the flowers can create a solid dome. Excellent hardy plant for xeriscape. RMRP96

var. *subalpinum*, Naneum Ridge, Wenatchee Mts, Chelan Co.WA 6700'. This variety is quite distinctive with small, oval, dark green leaves with white felty undersides. This population is very compact: 4-6" across and <1" high with broad pale yellow heads on 2" stems. Very rocky, gravelly subalpine regions.

var. *subalpinum*, Miners Ridge, Entait Mts, Chelan Co WA, 5500'. This variety is quite distinctive with 1/2-1" leaves dk green on top and white underneath forming short dense mats over 2' across. The 2-3" wide cream to pale yellow inflores-

cences are on 2-6" stems. Dry grassy meadows in a sandy rocky soil. Does very well in a well-drained sunny position. NNS94

var. *umbellatum*,,, Ridge SW of Mission Ck, SE of Mt Lillian, Kittitas Co WA 5550'. This variety is almost identical to var. *hypoleium* with undersides of leaves woolly white. Gravelly dry soils in subalpine forest openings NNS93

var. *umbellatum* Centennial, Albany Co WY 7600'.RMRP94

var. *umbellatum* ex Kannah Creek. Prostrate mats of leaves—dark green above, white-hairy below—with good maroon fall color. Xeric RMRP97

dwarf form Shasta Co, CA 6000', a tiny form from top of range. Yellow fls fading to red and orange. Tiny lvs. Turn red with the first frost.RH97

shrubby form, A particularly tall and showy form of *umbellatum* we obtained years ago from California. Very hardy here (in Denver), and the shrubby growth seems to make it a superior garden plant. RMRP95

ex 'Alturas Red', Rosy-red buds open cream, quickly turn crimson red. Lasts for weeks in early summer. The foliage is uncharacteristically gray for the species as well. From an outstanding cultivar introduced by Siskiyou Rare Plant Nursery.RMRP97

The original 'Alturas Red' is described in the Siskiyou catalog: Our color selection is a reliable rock garden performer. Coin-like, gray leaves, silver-backed and tinged red and orange in winter. Stocky stems topped with traffic-stopping, russet-red flowers for a long summer season.

Another clone listed by the same nursery is 'Siskiyou Gold'. Here's the gold in them-thar-hills. This is a beautiful garden plant, dense olive-drab foliage, and big clustered balls that start yellow and then turn gold in summer. One variety listed by Plants of the Southwest is described as being "wonderful for meadows and borders. Strong, dark honey." The catalog also says it "keeps its bright yellow color when dried" and "used medicinally by Native Americans." Even though I am not vitally interested in meadows, honey, dried flowers, or herbal medicine, this description makes me want to grow it.

I have several forms in my garden. One of them came from seed given to me by Panayoti Kelaidis, who described it as "super." So I call this beautiful, big, sprawling bush 'Super'. The flowers turn a strong orangey-brown in late summer, and the leaves have interesting color in late fall and winter. It is hard to say one grows anything in New England for winter effect, but there is a period in October and November when the garden is peacefully without fallen leaves and distracting flowers, when a walk through the garden reveals mats, buns and bushes with strange colors in a unique and idiosyncratic state of beauty, before the hardships of winter—the curled and blackened leaves, the splashed mud and animal footprints—have made it less than perfect. *Eriogonum umbellatum* (and also *E. flavum* and *E. ovalifolium*, too) now assert themselves and show their gentle, weather-resistant beauty as their purples and bronzes glow among the white plastic labels.

ADDRESSES OF THE SEED AND PLANT NURSERIES MENTIONED ARE:

Alplains, 32315 Pine Crest Court, P.O. Box 489, Kiowa, CO 80117-0489
Northwest Native Seed, Ron Ratko, 4441 S. Meridian St. #363, Puyallup, WA 98373
Rocky Mountain Rare Plants, 1706 Deerpath Road, Franktown, CO 80116-9462
Rogue House Seed, Phyllis Gustavson, 250 Maple St., Central Point, OR 97502
Siskiyou Rare Plant Nursery, 2825 Cummings Road, Medford OR 97501

Geoffrey Charlesworth gardens in Sandisfield, Massachusetts in USDA Zone 5. He is interested in all dwarf plants and grows and extraordinary number from seed.

PLANT PORTRAIT

LAMIUMS: THREE CHALLENGING NEW GEMS FOR THE EXPERT

For most of us, lamiums connote mottled foliage, partial shade, and an aggressive groundcover—several selections of useful but not really first-class rock garden plants. There are, however, also a handful of *bona fide* alpine species with which you may dazzle experts and casual visitors alike.

The first time I saw *Lamium armenum* was in the garden of Howard Porter in Connecticut, where it had pride of place in the elaborate tufa mound under a canopy that he referred to (almost lasciviously) as his Seraglio. I was indeed smitten, captivated with its fascinating sugar-pink, hooded flowers and elegant form.

There is something of the courtesan character in these alpine lamiums. Those who have grown them will vouch for their fickleness, their maddening infidelity—you may have a splendid plant one day, and tomorrow a mound of mush. One year they spread so quickly as to threaten your garden, and you contemplate ripping them out. The next year you realize that they are gone without a trace, never to return, and you are left bereft of a treasure you had been fool enough to take for granted.

I have grown three distinct forms of *Lamium armenum* (photo, p. 184) over the last 15 years, the loveliest of which is also known as *L. sintenisii*, with dark pink hoods and a very tight habit. Even the laxer, paler-flowered forms of this species (those that seem to be the most persistent) are worth growing, however. The glory of these flowers is interestingly accompanied by a coarse, vulgar smell to the foliage, almost like cigarette lighter fluid (if you can recall that smell). Rub your hand across the foliage and bring it to your nose to smell—should you bury your nose directly in the mound, we shall not be held responsible for wrenching or fainting.

Most individuals of *Lamium armenum* perish shortly after flowering. But then, beyond hope, often a seedling will appear in the following year somewhere close to the original plant. Loose gravel mulch seems attractive and useful in encouraging self-sowing. Avoid too assiduous cultivation around the dear departed.

When I first grew *Lamium eriocephalum* (photo, p. 183) I was astonished first by the maroon-chocolate cotyledons and first leaves and then by the developing symmetrical mound of its woolly foliage—like an elaborate, puffy wedding pastry, as light and full as whipped cream, delicately powdered as with confectioner's sugar. When the outlandish, deep pink flowers emerged, I was speechless. As monocarpic in the garden as its cousin, this species has self-sown every year for seven years in one sunny scree—and refused to remain anywhere else we put it. Like *L. armenum*, it acts as a biennial and is worth any effort to tame. We hover over the plant in flower and pray that the mention of its name in print will not cause it to withhold its favors.

I should also mention also that germination in pots seems difficult and is delayed a season; i.e., it takes two years to germinate in pots placed outside. We can't germinate it in pots ourselves but gratefully transplant seedlings dug out of the scree when they have their first two sets of leaves.

There is one easily accommodated *Lamium*: *L. garganicum* (photo, p. 184) will thrive on most rock gardens with a minimum of fuss. Both variety *striatum* and *inflatum* can grow quite large in time. There is a tiny form which has been introduced recently by indefatigable Czech collectors which challenges in charm the first two species mentioned here, and it's soundly perennial into the bargain.

—Panayoti Kelaidis

ERRATA

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

Spring1997 Issue Vol. 55(2), p. 109, line 27. Delete "joined towards the base by a delicate membrane." Add: "From just above the base of the perianth segments rises the staminal tube. Six ribs, which hold the filaments, serve as a framework for the delicate membrane. This is the corona."

Spring1997 Issue Vol. 55(2). p. 90, top. The caption should say *Rhododendron lutescens*, not *Ranunculus*.



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Juno kopetdagensis, *kuschakewiczii*, *linifolia*, *narbutii*, *subdecolorata*, *willmottiana*, *zenaidae*,
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