ROCK GARDEN





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COVER: *Ipomopsis aggregata* by Jill Starkey, Del Norte, Colorado

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ROCK GARDENING IN THE SOUTHEASTERN UNITED STATES

by Nancy Goodwin

What do you do when attracted to tiny plants with small leaves, tight growth, and relatively large flowers? Try to grow them, of course. It isn't as easy as it sounds if you live in the southeastern United States. We have wet winters and long, hot summers. In summer the air is heavy with humidity, the soil dries from lack of rain, and the nights remain warm and still. I have no underground springs with cool, constant water, and I have no refrigerated benches. Therefore, choice alpines, accustomed to cool, clear air and unceasing winds, cannot survive where I garden. My solution is to go to visit them where they are happy and to concentrate on growing plants that can live where I live.

The soil, where I garden in the piedmont region of North Carolina, is a clay loam, rich with minerals, never sticky, yet moisture retentive. I have two areas where I grow small plants in and around rocks—one in shade, the other in part sun.

An enormous, old, white oak, *Quercus alba*, provides the shade for my rock garden in the front of my house. This is an old rock garden, made at least a century ago. I remember my first view of mounds of ivy, poison ivy, honeysuckle, and Vinca minor. No stones were visible. When I removed the vines, I found a virtual scree consisting of a little soil and many white quartzite stones streaked with black. There were small forms of Solomon's seal, probably Polygonatum pubescens, and Smilacina racemosa growing between the stones, old cultivars of Iris germanica, and a few plants of I. cristata. I was shocked by the brilliance of the white stones and left a little ivy to soften their glare. That was my first mistake; I am still fighting to remove it. I moved the large forms of Iris germanica to a garden nearby and began to develop a rock garden.

I planted every species of cyclamen I could grow, the descendants of which became the nucleus of Montrose Nursery. They love the high shade and good drainage. Because the soil was sparse and the stones plentiful, I added no amendments. I quickly realized that because of the summer shade provided by the oak, this would have to be a garden primarily for fall, winter, and spring interest.

I planted every crocus species I could purchase, always buying the

minimum number, because my appetite was large and my budget small. I quickly became frustrated by the limited choices available, so I joined several rock gardening societies and requested seeds from their seed exchanges. I grew some of the smaller tulip species and found a few permanent ones: Tulipa linifolia 'Batalinii Group', T. kaufmanniana, T. clusiana, T. saxatilis, and T. kurdica (photo, p. 259). These plants are threatened more by deer than by our climate, and to deter these pests I use a Tabasco sauce spray (a nice Southern touch, I think**). White Narcissus cantabricus opens the fall narcissus season, followed by the pale yellow, winter-flowering N. romieuxii. Throughout winter many forms and species of Galanthus bloom, beginning in October with Galanthus reginae-olgae and ending in spring with G. ikariae. Adonis amurensis 'Fukujukai' open their bright yellow flowers before the end of January. I added every Scilla I could find and now have Scilla bifolia seeding throughout this garden accompanied by forms of S. siberica with white or blue flowers. I added S. autumnalis and S. scilloides but think the latter too robust for this location; it now grows with larger perennials in the main gardens. Leucojum autumnale also blooms in fall with dangling cups of white flowers tinged with pink. I have several forms with extra petals, making them look nearly double. They are self-sowing on the west side of the large oak. Three small alliums grow successfully in the rock garden. At the northern tip, in the sunniest section, Allium coryi (photo, p. 258) produces its bright yellow flowers in late spring and goes dormant during summer and fall, while the pinkflowered A. saxatilis blooms throughout summer on the southern edge. Finally in fall, A. senescens var. glaucum produces lilac flowers above bluegreen, twisted leaves. An allium relative, *Caloscordum neriniflorum*, blooms all summer with umbels of rose-pink flowers.

I grow more than bulbs in my shady rock garden. Anemonella thalictroides grows throughout this area. producing flowers in pink or white above elegant, slightly glaucous leaves. A precocious blossom often appears in early winter. Many forms of Tiarella cordifolia (photo, p. 259) and T. wherryi grow here. None are invasive; all are clump-forming, but the variation in leaf form and pattern is enormous. Some have leaves that are nearly round, shiny, and green with only a few hairs, while others have leaves that are angular, hairy, deeply lobed, and marked with dark burgundy. Some plants have white flowers, others pink, and some are fragrant, while others have no scent.

At the north end of the shady rock garden I grow several forms of XHeucherella tiarelloides and X H. alba. Nearby Arenaria montana, a nonaggressive groundcover, bears relatively large, slightly cupped, white flowers in spring. Viola corsica tolerates the heat, loves the high shade and sun in winter, and thus is persistent in this garden. Many Primula x polyanthus hybrids bloom from winter through spring. Primula vulgaris and P. veris begin the season, and P. elatior ends it with clear yellow flowers. A relative of Campanula, Phyteuma scheuchzeri produces deep blue, oval flower clusters in late spring. Geranium dalmaticum grows on the south side and blooms in early summer with pink flowers. Nearby Gentiana scabra and G. paradoxa provide blue from early summer through fall, accompanied in late spring and summer by the brilliant blue flowers of Lithodora diffusa 'Grace Ward'. Dentaria laciniata and Sanguinaria canadensis make fleeting appearances in early

spring, along with Trillium pusillum (photo, p. 258) and the pale blue Jeffersonia dubia with its glaucous leaves flushed with purple. Trillium catesbaei and T. cernuum follow shortly thereafter. I have brief visits from Corydalis ledebouriana and C. solida growing near Eranthis hyemalis Cilicica Group, cherished for their transient beauty. Iris cristata follows I. verna in midspring, and gracefully pendant I. gracilipes ends the iris season with small, elegant, white or purple-blue flowers. I limit my columbines to the smaller forms but by now have few pure species. Aquilegia viridiflora grows near the path, close enough for me to kneel before it. A near relative, Semiaquilegia ecalcarata, bears its pendant pink, or mauve-pink, spurless flowers at about the same time. Happily, it seeds about now.

A few small hostas bloom in summer, deer permitting. Hosta venusta and H. v. 'Lemon Lime', with chartreuse leaves, open the season. The smallest one I grow is Hosta 'Saishu Jima', barely visible at the path's edge. With them I grow a few asarums. The largest, Asarum arifolium, has heartshaped leaves for much of the year, but the round-leafed A. shuttleworthii 'Callaway', is showier, with bright white veins and a slowly spreading habit. Asarum virginicum is choice, with leaves as variable and beautiful as those of Cyclamen purpurascens. In summer the yellow stargrass, Hypoxis hirsuta, blooms near Chrysogonum virginianum (photo, p. 260), the latter cut back severely after its first flush of flowers to keep it compact and mildew-free. Three small thalictrums grow at the edge of the walk. Thalictrum ichangense generally has to make two appearances in spring, the second after it has been blackened by a late frost. Thalictrum kiusianum more wisely waits until late spring to produce its dark green leaves and fluffs of purple flowers, as does *T. minus* with near-white flowers.

I grow a few woody plants in this garden. Paxistima canbyi has dark green, small leaves and, like a good friend, is always present but never invasive. A few of the smaller forms of Pieris japonica and P. japonica var. yakushimensis (photo, p. 257) have remained tight enough to be in scale with the stones. A few twisted and contorted forms of Nandina domestica grow here with the extremely slowgrowing Buxus sempervirens 'Kingsville'. Chamaecyparis obtusa 'Nana' and Tsuga canadensis 'Bennett' have not outgrown their allotted space, but I have removed most of the "dwarf" conifers I originally planted. They were on their way to becoming "giant" conifers.

My second solution for rock gardening in the South is on the west side of the main greenhouse. There we improved the drainage and aeration of our clay loam in hopes of growing small, sun-loving plants. First we sterilized the soil and killed the lawn, weeds, and weed seeds by covering the area with clear plastic in midsummer. The plastic remained in place for about six weeks, during which we had many days with temperatures of 90°F or higher. After removing the plastic, we spread a large truck-load of pea gravel on the site and tilled the stones in as deeply as possible-about 15-18". We wanted a mixture of 50% stone, 50% soil. We shaped the soil into small hills for planting and valleys for walking and finally mulched with an additional 4" of gravel. This garden has sun from the east but is partly shaded on the southwest side by a Quercus alba. We practically bareroot each plant as we set it in, because we want to maintain a soil with little humus in order to grow tight, compact plants. We water the plants at planting time, and thereafter until they look established, and we never water the scree after that.

In this area we grow many of the smaller dianthus species, including Dianthus erinaceus, D. alpinus, D. monspessulanus, D. haematocalyx ssp. pindicola, and D. cruentus, as well as a few cultivars including 'Blue Hills' and 'La Bourboule'. I have a few hardy agaves here, the hardiest of which is Agave parryi. Two alyssums grow here: Alyssum markgrafii, with masses of tiny, bright yellow flowers and the larger-flowered A. wulfenianum (photo, p. 260), with gray foliage and a more prostrate habit. A few campanulas tolerate our summers, when given this well-drained soil. Forms of Campanula garganica are the longest-lived. We have an area planted with Cymbalaria aequitriloba, which gently spreads; thus far it is neither so invasive nor so vig-



orous that it won't allow bulbs to grow through it. A number of small genistas thrive in the heat and gravel.

A large Genista aetnensis grows at the edge of the scree area, but G. dalmatica, G. delphinensis, G. pilosa, G. lydia, and G. villarsii remain low and tight. The small, brightly colored sanguineum 'Nanum' Geranium remains compact in this garden. In late spring, Globularia punctata produces flat heads of fluffy, blue-purple flowers above rosettes of dark green leaves. We grow Helleborus cyclophyllus and H. multifidus ssp. hercegovinus at the western, shadier edge of this garden. A few small irises bloom in midspring. Iris pumila is the most successful, but we also grow I. subbiflora and I. suaveolens 'Rubromarginata'. Limonium minutum is true to its name, small both in flower and mass. Most opuntias are too large for this tiny garden, but we

> have Opuntia compressa, O. imbricatus, and O. 'Smithwick' for contrasts of foliage and texture. A small peony, Paeonia kavachensis, grows but thus far hasn't bloomed near the oak. Origanum microphyllum, O. scabrum, O. "UCSC hybrid," O. amanum, and O. 'Kent Beauty' (photo, p. 257) love the sun and good drainage here. Sometimes I think they love it too much, so we watch to prevent them from smothering their neighbors.

I travel to the Rocky Mountains to enjoy most of the smaller penstemons, but *Penstemon hirsutus* var. *pygmaeus* and its form *albus* are perennial. Phloxes don't insist on such soil, but they like it

well enough to seed about in the gravel. We leave the smaller, more compact forms of Phlox subulata, P. douglasii, and hybrids that occur and move the other more vigorous seedlings with good color or form to other parts of the garden. We can't resist keeping each one until it blooms. Pulsatilla vulgaris and P. halleri survive longer in this gritty soil than anywhere else at Montrose; however, we still must collect and sow seeds each year in order to keep them going. Gray-leaved Potentilla villosa blooms in spring, with bright vellow flowers. Several compact forms of Scutellaria thrive in the garden. My favorites are Scutellaria indica var. parvifolia, with small rounded leaves tinged purple, and S. suffrutescens, with bright carmine-pink flowers all summer. Low veronicas (including Veronica prostrata, V. pecti-

nata, V. amana, and V. surculosa) give us pink, white, blue, or blue-purple flowers in late spring and summer. This is the only place I have successfully grown our native Viola pedata. I have seen it in the wild growing on clay roadsides, but it thrives for me only in the stony soil of this garden. A few thymes persist here partly because they have space and good air circulation around them. I like especially the slightly woolly Thymus serpyllum 'Minus' and the shrubby T. richardii ssp. nitidus 'Peter Davis'.

Most succulents will grow in this garden. We limit our delospermas to Delosperma floribundii, D. herbeum, and D. lavesiae, but grow others elsewhere at Montrose. I like all of the sempervivums and have them at the edges of the paths. I limit my sedums here to a few of the smaller, more compact ones. My favorites are the native *Sedum nevii*, with its gray-blue rosettes of leaves, and the tiny *S. hispanicum* 'Minus'.

We have more compact woody plants here than in the rest of the garden, primarily because we can see them better here than elsewhere, but also because their neighbors are small and won't smother them. We grow the deciduous *Ulmus parvifolia* 'Hokkaido', but most are conifers. Three pines, *Pinus sylvestris* 'Repens', *P. parviflora* 'Adcock's Dwarf' and *P. thunbergii* 'Sayonara', grow in full sun beyond the shade of the oak. Several junipers, *Juniperus chinensis* 'Echiniformis', *J. communis* 'Berkshire', and several cul-



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tivars of J. horizontalis ('Curley Bell', 'Gray Forest' and 'Pancake') give structure and contrast to our smaller perennials. We have а few Chamaecyparis species: Chamaecyparis pisifera 'Plumosa Compressa' and C. obtusa 'Lycopodioides Glauca' grow slowly enough to remain in this area. Heaths and heathers grow better here than anywhere else at Montrose. We grow Erica carnea cultivars 'King George', 'Silberschmelze' and 'Springwood White'. The hybrid Erica x darleyensis 'Arthur Johnson' blooms throughout the winter. The heathers are more difficult, but we still have a few Calluna vulgaris, including 'Gold Haze', 'Aurea' and 'Autumn Glow'. A few daphnes persist. Daphne alpina, D. x mantensiana, and D. retusa tolerate our summers, although only D. x mantensiana blooms consistently.

Cyclamen graecum likes the good drainage, but it grows best in the shade of Yucca rostrata and Quercus alba. Other bulbs include Leucojum autumnale and Allium thunbergii that bloom in fall, and Narcissus fernandesii in winter.

We weren't satisfied with this envi-

ronment for all of our "alpines," so we filled three large iron containers with about 80% stones and 20% soil to try to grow a few more tiny plants. Gentiana verna and G. scabra var. saxatilis bloom without fail. Iris minutoaurea grows near tiny Carex ornithopoda 'Variegata', Iberis sayana, and Sedum sieboldii 'Mediovariegatum'. The sedum occasionally reverts to its normal bluegreen color, but we quickly remove the non-variegated bits to other parts of the garden. We can grow some of the smallest columbines in these pots, keeping Aquilegia scopulorum for several years. Draba inserta seeds about in one of the pots but not vigorously enough to be declared a pest. Linum capitatum grows in the pots and blooms with brilliant, clear vellow flowers all summer.

This is not a complete list of the plants in my sunny and shady rock gardens, but an indication of the variety of plants that will tolerate this climate and soil. A list of plants I tried to grow but couldn't would be much longer. As long as I garden, I will continue to search the catalogs and seed lists for small, slow-growing plants. I

**Her recipe for deterring deer is as follows: Take one tablespoon Tabasco[™] sauce, add one egg, and nearly one cup water, and blend. Strain into a gallon container. Add one tablespoon of a liquid dishwashing detergent (she uses Dawn[™]). Fill gallon container with water. Use as a spray or mist. Respray after each rain.

Nancy Goodwin gardens at Montrose, her home in Hillsborough, North Carolina. She edited Elizabeth Lawrence's manuscript, *A Rock Garden in the South* (1990) and was proprietor of Montrose Nursery (now closed). She is one of the founders of the Piedmont Chapter of NARGS and has served on the national NARGS board.



Origanum 'Kent Beauty' (p. 254)

photos, Nancy Goodwin

Pieris japonica var. yakushimensis (p. 253)





Trillium pusillum (p. 253)

Allium coryi and Myosotis sylvatica (p. 252)





Tulipa kurdica (p. 252)

Tiarella cordifolia (p. 252)

photos, Nancy Goodwin





Chrysogonum virginanum (p. 253)

Alyssum wulfenianum (p. 254)

photos, Nancy Goodwin



CHOICE PLANTS OF THE SOUTHEASTERN UNITED STATES

by Rob Gardner

Many garden-worthy plants are native to the southeastern United States. A tapestry of varied habitats provides homes to some wonderful plant species, many candidates for the rock garden. Unfortunately, many of the most desirable species are not commonly available commercially. Propagation difficulties, rarity, and marketing problems are some contributing factors that make choice candidates difficult to find in the trade. Here are a few plants from the Southeast that would be worthy additions to any small woodland or rock garden—if and when you can obtain them.

Dwarf Trillium-Trillium pusillum (photo, p. 258, 295)

Trilliums have long been the holy grail of wildflower gardeners. There is in recent years a resurgence of popularity, due in part to the publication of wonderful books about them (in particular, *Trilliums*, by Frederick W. and Roberta B. Case, Timber Press, Portland, Oregon, 1997, and *Trilliums in Woodland and Garden, American Treasures*, by Don Jacobs and Rob Jacobs, Eco-Gardens, Decatur, GA, 1997). One of the most charming of all the trilliums is *Trillium pusillum*, the dwarf trillium. This fascinating species is distributed in isolated populations throughout the southeastern and southcentral United States in a variety of habitats that are often characterized by moist, acidic woodland soils.

One of the distinctive variants of this species is *T. pusillum* var. *virginianum*, distinguished from the typical species by its sessile or nearly sessile flowers. According to Fred Case, it is found in southeastern Virginia, the Delmarva Peninsula, and extreme northeastern North Carolina in acid soils, usually in low, swampy woodlands on hummocks or along streams in red maple swamps. I have grown this plant at the North Carolina Botanical Garden at the University of North Carolina at Chapel Hill, North Carolina, for the last 20 years. All who see it instantly fall under its charms.

Trillium pusillum is an excellent subject for the open shade or woodland garden. Growing no taller than 5–6", it characteristically blooms in mid to late March in the Chapel Hill, North Carolina area. Petals emerge a pale pink and mature to a rich, rosy pink as they age. By the middle of June the foliage has faded, and the entire plant goes dormant for the remainder of the year. This is the best time to divide or transplant trilliums. They seem to be sensitive to being moved or otherwise disturbed during their growing season and usually respond by going dormant prematurely.

Trillium pusillum var. *virginianum* is a fairly vigorous plant that can form colonies of 30 or 40 stems in just a few years. It does best in relatively rich, well-drained soils and prefers to be situated in a location with open or high shade.

Heartleaf Wild Ginger—Hexastylis minor

Hexastylis minor is a clumping, evergreen perennial native to North Carolina, South Carolina, and Virginia. The most attractive features of this low-growing species are the substantial, heart-shaped leaves that exhibit a variety of silver patterns and marbling against a shiny, dark green background. Individuals have been found with completely silvered leaves, while others bear intricate and regular patterns of silver on leaves with very wavy edges. In the wild, it is interesting to see the amazing variety of leaf markings exhibited even within a single population. There are many garden-worthy individuals, some already in tissueculture propagation, so we can hope that it won't be long before we have the opportunity to purchase some interesting and distinctive named cultivars.

Plantain-leaf Sedge-Carex plantaginea

A favorite sedge that would make a great companion to either of the two above species is the plantain-leaf sedge, *Carex plantaginea*. Its bold, evergreen, greenish-chartreuse leaves grow 8–10" tall. The nearly 1"-wide foliage has pronounced raised parallel veins running the length of the leaves, which themselves rapidly taper to a point. These veins give a noticeable seersucker or corrugated look. The overall effect is that of a bouquet of pleated ribbons rising from a central point.

Plantain-leaf sedge is found in rich woods in the Appalachian Mountains. I have seen it growing on the banks of the Nantahala River and on slopes of rich deciduous woods above Shining Creek in western North Carolina, where temperatures are relatively cool, rainfall is high, and the soils are typically very fertile. However, this species seems to be perfectly happy growing in shady conditions at the North Carolina Botanical Garden, where conditions are considerably warmer and not nearly so wet. Seldom seen in cultivation, *Carex plantaginea* is a wonderful addition to any small garden by virtue of its unique foliage, which is equally attractive every day of the year.

Cumberland Rosemary-Conradina verticillata

This rare, low, evergreen shrub is restricted to three populations in Tennessee and Kentucky. In the wild, it occurs on sandy or gravelly stream banks, sand and gravel bars associated with floodplains, or on river islands. In spite of its very specific habitat in nature, it is an excellent and very versatile plant well suited to a variety of growing conditions in the garden, even tolerating dry and hot sites once it is well established. One of the few growing situations in which it does not thrive is dry shade.

This very uncommon species is an excellent study for the rock garden. Beautiful, bright pinkish-purple mint flowers appear in May and continue for about three weeks. They are most abundant at the tips of the arching woody stems, but a few appear along the stems as well. There is an elegant, pure whiteflowered form named 'Snowflake'. The linear, evergreen leaves give off an aromatic, minty fragrance when crushed.

Conradina verticillata is easily propagated by cuttings of hardened-off, current season's growth. Dipped in a powdered rooting hormone and stuck in a rooting mix of half Perlite and half vermiculite, cuttings usually root in three or four weeks.

A more familiar but equally choice species is *Conradina canescens*. It is similar to *C. verticillata* but has much finer, often blue-gray foliage. It is native to coastal dunes in the Florida panhandle. I particularly enjoy growing these two species together, not only for their year-long interest, but because of the interesting play on texture that they present when grown side by side.

Indian Pink-Spigelia marilandica (photo, p. 295)

When this stunning southeastern native blooms at the North Carolina Botanical Garden in June, it causes quite a bit of excitement among our visitors: "Wow, what's that?!" *Spigelia marilandica* has red, tubular flowers, arranged in a one-sided cyme, held open to reveal a delicate yellow interior. The five distinct petals open like the skin of a banana being peeled back and expose the very conspicuous yellow stamen that projects straight out from the corolla. Even in bud, the flowers are an architectural marvel. Along the entire, 2" length is a series of flares and constrictions that combine with angular fluting reminiscent of the columns in a temple of some long-forgotten ancient culture. Flowers are borne on the ends of the 2'-tall stems. The simple, opposite, sessile leaves are attached to an upright stem that is usually unbranched.

Spigelia marilandica is hardy to at least zone 6. Although much of the literature recommends an open, shady site for this stunning Southeasterner, I have grown it in both heavy shade and full sun. It does require a rich soil that does not dry out. Indian pink looks best when grown in some shade and is attractively displayed with ferns, in particular Adiantum pedatum and A. capillus-veneris.

Atlantic St. John's Cross-Hypericum reductum

This seldom seen but choice *Hypericum* is a natural for the rock garden. Probably not hardy north of zone 7, it is native to sandy, open sites in several states of the Southeast. The needle-like, evergreen leaves are attached to cinnamon-colored stems that lie close to the ground. Seldom taller than 6-8", this delightful gem among hypericums flowers most of July. A two- or three-year-old plant may display hundreds of small, canary-yellow flowers with reflexed petals blooming at the tips of the upturned, terminal branches. Flowers and stems together make a cheerful display over the extremely fine-textured mat. Although it is adapted to growing in very well-drained, sandy soils with relatively low fertility, *H. reductum* is equally easy to grow in a wide variety of soil types.

Its evergreen habit, tolerance to full sun, and durability in dry conditions, combined with its attractive foliage, make it a point of attention in winter as well as a subject of conversation in the growing season. Like most other species of *Hypericum*, Atlantic St. John's cross is easily propagated from cuttings taken in June or July, treated with a powdered rooting hormone, and placed under mist.

Pixie-moss-Pyxidanthera barbulata var. brevifolia (P. brevifolia, photo, p. 295)

Few plants of the Southeast have "rock garden" written all over them, but pixie moss is one. Never exceeding an inch in height, even in flower, this prostrate, creeping, evergreen subshrub is a minuscule marvel that haunts dry, sandy woods and pine barrens. I have seen it growing in sterile, white, sandy soils in open woods under turkey oak and long-leaf pine. It differs from the typical form of *Pyxidanthera* in that it is much smaller in all its parts and has very fine hairs on the entire leaf. This particular form occurs only in North Carolina.

Thomas Everett of the New York Botanical Garden Illustrated Encyclopedia of Horticulture has this to say about Pyxidanthera barbulata: "America has many native plants that challenge even the most expert gardeners' skills, among them the two species of Pyxidanthera. Yet dedicated, skillful rock gardeners will persist in their efforts to tame these pretty wildlings and, if success be theirs, it will abundantly repay their efforts...Gems for choice locations in rock gardens, and for pans in alpine cold frames or greenhouses, pyxidantheras have proven so difficult to tame that few gardeners have long succeeded with them."

I have tried more than once to grow this diminutive jewel without any enduring success, but it is a worthy challenge even for the most experienced rock gardener—and what boasting rights success would grant!

Rob Gardner is Curator of Native Plants at the North Carolina Botanical Garden in Chapel Hill, North Carolina. Photo of *Pyxidanthera barbulata*, below, by William Flook.



LITTLE PLANTS ON THE PRAIRIE

by C. Colston Burrell

For gardeners to find diminutive rock garden plants in the tallgrass prairie of the American Midwest seems a bit like Cinderella's stepsisters hoping to fit their chubby toes into the glass slipper. This fairy tale, however, can come true. As it turns out, there are a wealth of enchanting and suitable plants in the region. Though not true buns and cushions, these smaller prairie denizens are lovely in rockeries, prairie plantings, containers, and even in city boulevard gardens where conditions are too stressful for more delicate plants.

Mention of the tallgrass prairie brings visions of 6' bluestem tickling the bellies of enormous bison thundering over the plains. This is the region of giants, from the 8' compass plant to the towering bluestem from which the tallgrass name was bestowed on the ecosystem. This seems the last place one would look for diminutive treasures for the rock garden. Surely they would be shaded, or worse, trampled out of existence. But tucked atop dry ridges, on rock outcroppings, and in goat prairies, where soil is thin, a host of irresistible pint-size plants await discovery. For prairie gardeners, they are *de rigeur*, and for newcomers to the prairie flora, they are a choice group of plants that offer the gardener adaptability, intriguing foliage texture, an astounding range of colors, and a season-long progression of bloom.

The tallgrass prairie once stretched unbroken from Illinois west to southern Manitoba at the northwestern limit to eastcentral Texas at the southwestern limit. In the extreme east of the Prairie Province, there are pockets of tallgrass in Ohio, Kentucky, and Arkansas. On its western edge, from Saskatchewan to Texas, the tallgrass prairie melds with the drier, mixedgrass prairie, which in turn merges with the shortgrass of the western Great Plains in the rainshadow of the Rocky Mountains. Some of the species included in this article are found only in the tallgrass region, whereas others are found throughout the Prairie Province.

The continent's midsection is dominated by prairie where summer heat and periodic drought, combined with wildfires, made it difficult for trees to survive. High heat and low rainfall result in more water lost through evapotranspiration than is gained through precipitation. This condition favors deep-rooted, drought-adapted grasses and forbs. Annual rainfall varies from about 40" in the east to 19" at the western edge of the tallgrass region. The shortgrass prairie may get as little as 11–13" of annual precipitation, scarcely more than a desert. The soils are deep and rich in the eastern prairies, thin in the western ones. Most of the soils throughout the region are circumneutral, and some are saline.

In the 1980s writers like Claude Barr at Prairie Gem Ranch in South Dakota and the Smiths, who founded Prairie Nursery in Wisconsin, popularized prairie wildflowers with their mouthwatering and often poetic descriptions. Today, through promotion of underutilized plants and improved propagation techniques, a dazzling array of prairie wildflowers is available for garden use. With this tide of new plants have come new ways of gardening with wildflowers. The focus has shifted away from specialty wildflower gardens and prairie reconstructions dubbed as gardens, in which perhaps only local natives are acceptable, to informal and formal borders. Native wildflowers have become integral parts of traditional garden designs. They are combined with plants from all over the world to create gardens of unique beauty and lower maintenance.

Success with the captivating prairie wildflowers depends on knowledge of the plants' native environment. You must match the plant to the site. Proper light, moisture, and soil type are essential considerations. Of course, most plants will prefer full sun. Some wildflowers are widely tolerant, while others grow within a limited range of conditions. Many of the dry prairie species will suffer a glutinous death if planted in fertile, evenly moist soil. Rapid, succulent growth makes the stems and roots susceptible to insect damage as well as fungal and bacterial rots. Here are some of my favorite species from the tallgrass prairie region of Minnesota.

Allium stellatum (starry wild onion) is an excellent summer-blooming bulb for full to partial sun. Starry, sixtepalled, rose-pink flowers are borne in rounded clusters like symmetrical fireworks atop slender 1' stems. Members of the Liliaceae, they grow from true tunicate bulbs. The deep green leaves are up to 1' long and form open clumps. Plants often grow singly. The foliage remains attractive all summer, and the dried infrutescences are decorative in autumn. Use A. stellatum for its unique, globe-headed form in formal borders, meadows, prairies, and rock gardens. Combine it with Campanula rotundifolia, Heterotheca, and Geum triflorum. Plants are well suited to pot culture. They thrive in average to rich, well-drained soils in full sun or light shade. Allium stellatum is native to dry to mesic prairies, savannas, rocky slopes, and open woods from Ontario and Saskatchewan, south to Illinois and Montana in zones 3-8.

The closest thing to a cushion plant on the prairie is Antennaria neglecta (pussytoes). These charming, groundcover plants in the Asteraceae form tight, weatherproof carpets of silvery white, 2"-long, spoon-shaped, evergreen leaves arising from fibrous-rooted crowns. Mature plants grow into extensive rug-like colonies. The delicate bloom stalks rise 3-10" and sport enchanting, whimsical clusters of flowerheads that resemble the furry toes of cats-hence their common name. In reality, the flowers are small, discoid, and congested into tight, conical, rayless structures. Give pussytoes dry to moist, well-drained soil in full to partial sun. Pussytoes is the perfect plant to entice children into gardening. Its flowers are so beguiling that no one can resist them. Plant them in cracks and crevices in walkways, patios, and walls. They form attractive mats in rock gardens with *Pulsatilla* species, dwarf iris, *Phlox subulata*, and *Geum triflorum*. They are also suitable for troughs. Look for them in woods, savannas, and prairies from Newfoundland and British Columbia, south to Virginia and California. Zones 3 to 8. Trial in Zone 2.

From farther west comes the even more diminutive *Antennaria rosea*, with smaller leaves, to 1"–long, and pale pink to rose flowers. Plant it in average, dry to moist, well-drained soil in full to partial sun. *Antennaria rosea* is native to mountain meadows, open woods, and roadsides from Alaska and Alberta, south to California and New Mexico. Zones 3 to 8.

Visitors to my garden never fail to comment on the drifts of Asclepias verticillata (whorled milkweed). This petite enchanter has 1-2' stems densely clothed in long, needle-like leaves, giving the appearance of a cat's tail after an electric shock. The sweetly scented, creamy flowers are held in tight, spherical clusters near the top of the stem in mid to late summer and continue for several weeks as side branches bloom. The leaves turn yellow to orange in autumn, and the delicate, pencil-thin capsules are extremely decorative after they split open. Clumps increase rapidly by creeping runners but are never invasive. Unwanted stems are easily pulled or dug to keep the plants in control, should they be relegated to a small spot in the garden. Grow them in average to rich, well-drained soil in full sun or light shade. Asclepias verticillata is found on dry to moist prairies, savannas, meadows, woodland edges, and roadsides from Massachusetts and Saskatchewan, south to Florida and Arizona. Zones 3-9.

More curious than beautiful are the tight, green umbels of Asclepias viridiflora var. lanceolata (green milkweed). The individual flowers have strongly reflexed petals and narrow, protruding horns that give the appearance of a spent bullet cartridge. Up to three flower clusters crown the 12-36" stems. The thick, leathery, 2-4" leaves vary from oval or oblong to lance-shaped and sparsely clothe the lax stems. Plants are often mistaken for the similar A. hirtella, which has spreading rather than totally reflexed petals. Grow in average or sandy, dry soil in full sun. Plants are native to dry prairies, meadows, and roadsides in the upper Midwest. Zones 3-8.

Aster oblongifolius (aromatic aster) is an overlooked species for the fall garden. Mounds of 11/4", purple flower heads cover the 16" stems. This outstanding plant, a real show stopper, blooms for at least three weeks in September and October. The fuzzy, oblong foliage and scaly buds create an interesting display through the summer season. Plants spread by creeping, fibrous-rooted rhizomes to form dense, broad clumps. To keep A. oblongifolius compact, shear the plants by half in June. The informal nature of the plant makes it perfect for meadows, prairies, and exuberant perennial beds. The profusion of late season color is a welcome addition to the waning garden. Combine it with grasses, goldenrods, sunflowers and anemones. Give plants average, well-drained soil in full sun or light shade. Foliage is somewhat susceptible to powdery mildew. 'Dream of Beauty', selected by Claude Barr, is shorter in stature and has rose-pink flowers. This species is native to dry, sandy to rocky slopes in prairies, meadows, open woods, and savannas from Pennsylvania to Saskatchewan, south to Alabama and New Mexico. 'Raydon's Favorite' is a southern cultivar, probably from Tennessee, with blue-purple flowers. Zones 3–8.

Touch alone is enough to warrant the inclusion of Aster sericeus (silky aster) in a rockery or dry prairie garden. This unique species has wiry, brittle stems sparsely clothed in $1-1^{1/2}$ ", oblong leaves coated with silky, silvery hairs. The lower leaves drop as the stems elongate. The upper branches have smaller, tightly packed leaves that set off the 1"-wide, deep violet flower heads in late autumn. Plant in average to sandy, well-drained soil in full sun. Aster sericeus is native to gravel prairies, slopes, open woods, and savannas from Ontario to Minnesota, south to Alabama and Texas. Zones 3-9.

Calylophus serrulatus (plains yellow evening primrose) is closely allied to Oenothera, the evening primroses, but differs in that the stems are clustered and somewhat woody and in stigma and anther morphology. The ³/4", lemon or primrose-yellow flowers with 2"-wide, blunt petals last but a day, though the clumps bloom much of the summer. The shrubby plants have

wiry, lax stems clothed in 2-4", lanceshaped leaves with toothed margins. Mature clumps are mounded and open in form. The mounds of fine-textured foliage and yellow flowers add a bright note to the front of a bed or the edge of an informal path or trail. Use them in rock gardens with winecups (Callirhoe spp.), penstemons, campanulas, and other diminutive plants. They are also suitable for large troughs. Plant in average, well-drained, limy soil or sandy to gravely loam in full sun or light shade. Plants tolerate drought but not soggy soil. If plants look tatty by midsummer, cut them back to 6-8" to promote fresh growth. Self-sown seedlings will appear. This species is native to dry, often gravel or sand prairies, open woods, plains and roadside embankments throughout the Great Plains, from westernmost Wisconsin to Alberta, south to Texas and northern Mexico. Zones 3-9.

Calylophus hartwegii (Hartweg's sundrops) has 1" flowers on prostrate to low-mounding plants with 1–2", oval leaves. The leaf margins may be



Scutellaria resinosa

smooth or toothed. The stems have tough, woody bases. Plant in average to sandy, well-drained soil in full sun. *Calylophus hartwegii* is native *to* dry prairies, hillsides, and open woods, often in limy soils, from Kansas and Colorado, south to Arizona, Texas, and Mexico. Zones 4–9.

I first encountered harebells (Campanula rotundifolia) on the rocky face of Mount Desert Island in Maine. Imagine my surprise to find it growing with abandon on the dry prairies of the Midwest. Harebells are attractive members of the Campanulaceae or Bellflower Family, noted for their 1", 5lobed, bell-shaped flowers in shades of true blue. They open throughout the summer. Plants near lake shores and seacoasts are dainty, only 2-3" high, wheras in less extreme environments, they may grow as tall as 18". The small, 1", oval to heart-shaped basal leaves have wavy, toothed margins. The stem leaves are lance shaped and often bractlike. Harebells are so delicate, it's easy to loose them in traditional garden settings. Use them in unmortared rock walls, rock gardens, troughs, and between pavers on a planted terrace. Suitable companions include thymes, pussytoes, ornamental onions, and penstemons. In dry prairie and savanna gardens, plant them with dotted blazing star (Liatris punctata), purple prairie clover (Dalea purpurea), upland white aster (Aster ptarmicoides), blanket flower (Gaillardia aristata), butterfly weed (Asclepias tuberosa), and prairie smoke (Geum triflorum). Plant in average to poor, well-drained, loamy or sandy soil in full sun or light shade. Division is often necessary to control the spread of underground stems and is best done in spring. Found on outcroppings, dunes, dry prairies, and savannas, Campanula rotundifolia is circumboreal, native south in North America to New Jersey, Iowa, and the western mountains to Mexico. Zones 2-8.

Chrysopsis villosa, hairy golden aster, is a markedly variable species, the intergrading varieties and forms of which differing in height and leaf and head size depending on region of origin. Wild forms native to the upper Midwest are usually 12-18" tall. Some forms may grow to 40". This summer bloomer sports starry, 1" yellow daisies on mostly low spreading plants. The stems are sparsely clothed with narrow, slightly twisted, furry leaves. The flowers often open a few at a time, so the display tends to be subtle. Combine plants with prickly pear cactuses (Opuntia spp.), butterfly weed, and dotted blazing star in a sunny position with well-drained soil. Chrysopsis villosa is native to gravel prairies and sandy savannas from Wisconsin and British Columbia south to Texas and California, Zones 4-9.

Purple prairie clover (*Dalea purpurea*) is an attractive summer-blooming plant that forms fountains of wiry stems topped with purple pompons. The showy, 1-2" heads consist of dozens of tightly packed, bright violet, peashaped flowers. These heads are borne on the upper half of the stems from June to early August. The showy heads attract a steady stream of bumble bees and butterflies. The 2-3' stems bear pinnately divided leaves with 3-5 narrow leaflets. The dried seed heads turn charcoal gray and often persist into winter. Prairie clovers, like all plants in the Fabaceae, or Pea Family, are important ecologically as they fix atmospheric nitrogen and add it to the soil. For best growth, plant in moist, humus-rich or loamy soil in full sun or light shade. Purple prairie clovers add an airy exclamation of sparkling purple to the early summer garden. Combine them with black-eyed Susans (Rudbeckia spp.), mountain mint (Pycnanthemum spp.), prairie phlox (Phlox pilosa), butterfly weed (Asclepias tuberosa), blazing stars (Liatris spp.), yarrow (Achillea spp.), and low grasses such as side-oats grama (Bouteloua curtipendula) and little bluestem (Schizachyrium scoparium). They grow well in containers alone or in combination with grasses and other tap-rooted perennials. This species is native from Indiana and Alberta south to Alabama and New Mexico on dry to mesic prairies, savannas, and in open woods. Zones 3–8.

White prairie clover (*Dalea candida*) is similar but is a more coarse-textured plant. The 4' stems bear larger, broader leaves with 5–7 leaflets and white flowers. The flower heads are 2–3" long. Plants are often found in deeper-soiled sites and bloom a week later. Zones 4–8.

Shooting stars (Dodecatheon meadia) are delicate plants of open woods and prairies. The naked 1-2' flower scapes sport a regal crown of gracefully arching flowers that resemble cyclamen with dart-like points. Flowers vary in color from white to pink to rose. Members of the Primulaceae, they have thin, broad leaves held weakly upright to reclining. Fleshy white roots radiate in a circle from the crown. Shooting stars give wings to the spring garden. Interplant small groupings or drifts among decorative groundcovers that will hide the spaces left during dormancy.

In the shade garden, choose wild gingers (Asarum spp.), bloodroot (Sanguinaria canadensis), Jacob's ladder (Polemonium reptans), and ferns. In prairie gardens, plant shooting stars with early wildflowers such as golden Alexander (Zizia spp.), prairie phlox (Phlox pilosa), wild geranium (Geranium maculatum), and violets. Give shooting stars moist, humus-rich soil in sun or shade. Once plants are dormant, the soil can be allowed to dry, and the site can become quite shady. They prefer a neutral or slightly acidic soil. Divide multi-crowned clumps in summer or fall and replant the individual crowns with the roots spread evenly in a circle. 'Album' is a white selection that is often given as a designation to any of the white variants. 'Queen Victoria' is a 10–12" plant with deep rose-purple flowers. *Dodecatheon meadia* is native to rich deciduous or dry rocky woods, savannas, and prairies from Maryland and Minnesota south to Georgia and Texas. Zones 4–8.

Dodecatheon pulchellum, beautiful shooting star, includes plants that were formerly classified as *D. amethystinum*. They are more delicate than *D. meadia*, with 10"-long, oval to spatula-shaped leaves and rose-pink to deep magenta flowers. Plants are quite variable, from 3–20" tall, depending on geographic location and position. Plant in moist, humus-rich, limy soil in full sun or partial shade. This species is native on cliffs and banks, and in seeps and open woods from Pennsylvania and Montana, south to Arkansas and Colorado. Zones 4–7.

Echinacea angustifolia, narrow-leaved coneflower, is the shortest species of its genus, with compact, 1-2'-tall stems with spare, lance-shaped basal leaves with stiff hairs. This member of the Aster Family has mostly leafless bloom stalks topped by 2" heads with 1"-long, drooping, rose-pink rays. Plant in welldrained, average, loamy or sandy soil in full sun. This species is avidly sought for its medicinal properties and is being over-collected by "wildcrafters." Use this showy, compact species in containers or in the garden with little bluestem (Andropogon scoparius), gray goldenrod (Solidago sp.), and purple prairie clover (Petalostemon purpurea). The dried seed heads are rich, charcoal black and are a dramatic winter accent. Chickadees and other birds feed on the seeds, picking them out from between the spiny bracts of the

heads. Plant in average to rich, well-drained soil in full sun. Plants tolerate alkaline and saline soils. *Echinacea angustifolia* is native to dry prairies and savannas from Saskatchewan and Minnesota south to Texas. Zones 3 (possibly 2)–8.

Scarlet gaura (Gaura coccinea) is much smaller than the more familiar white gaura (G. lindheimeri). The flowers of this member of the evening primrose family (Onagraceae) resemble clouds of tiny butterflies. The 2' stems are densely clothed in 1", narrow, graygreen leaves, giving the plant the air of a bottlebrush. They form a dense, tidy clump when mature. The 1/45/8" rose-pink to red flowers are crowded at the tips of the stems in early summer. Plants offer fine texture and subtle beauty to rockeries in combination with prairie coralbells (Heuchera richardsonii), prairie smoke (Geum triflorum), dotted blazing star (Liatris punctata), and harebells (Campanula rotundifolia). Plant in average to rich, well-drained soil in full sun. Gaura coccinea is

native to dry prairie ridges, savannas, plains, and roadsides from Indiana and Alberta, south to Missouri, Texas, and California. Zones 3–9.

Prairie smoke (*Geum triflorum*) is one of the earliest plants to bloom on dry prairies. The timid shoots push from the thatch soon after snowmelt in the company of pasque flower (*Pulsatilla patens*). With the first deeply incised, compound leaves barely expanded, the furry bloom stalks push upward 6–12", revealing three ³/^{8–1}/2", nodding, rose-pink flowers with long, purple bracts. The straw-colored petals within the inflated flower are



barely visible. This diminutive member of the Rose Family (Rosaceae) does not produce a fleshy hip. Instead, the styles (part of the female reproductive structure) elongate to form dense heads of feathery, pale rose-pink plumes or "smoke," for which the plant is so aptly named. The plumes carpet the ground in large drifts, creating the impression of a smoldering fire. On lean soil, try a grouping with typical prairie denizens: white beardtongue (Penstemon albidus), pink prairie phlox (Phlox pilosa), spotted blazing star (Liatris punctata), and a low, upland aster such as Aster ptarmi*coides.* Give prairie smoke average, well-drained soil in full sun or partial shade. This species is native to prairies, savannas, and tundra across northern North America, south to New York, through the Great Lakes States and across the Plains to the southern Rockies and the Sierras. Zones 1–7.

The flowers of prairie coralbell' (Heuchera richardsonii) are not the showiest of the genus, but the tight clusters of 1/4", chartreuse to creamy vellow flowers are held on naked stalks above a dense rosette of rounded, glossy leaves. The display is actually created by a showy bract that surrounds the flower. The low, mounded foliage rosettes grow from stout, fibrous-rooted rhizomes. The flowers are an added bonus to the attractive foliage. Bloom stalks are held 24-36" above the leaves. Use this member of the saxifrage family (Saxifragaceae) as a groundcover, along a walk, in rock walls, or at the front of perennial beds. It is equally valuable in formal and informal settings. Combine it with hardy cranesbills, columbines, sages, cushion asters, pinks, and grasses. Give plants a spot with dry to moist, average, well-drained soil in full sun or partial shade. Plants form woody crowns that lift the rosettes above the soil. Divide and replant clumps every three to four years to keep them vigorous. Borers may be a problem. Heuchera richardsonii is native to dry to mesic prairies, savannas, and in open woods from Minnesota and Indiana west to the Rocky Mountains. Zone 3-8.

The plains coralbell (*Heuchera cylindrica*) is native farther west. Plants are similar in appearance, but the leaves are mottled with silver, and the showy flower bracts are ³/4" long. The flowers are carried in unbranched clusters atop the naked stalks. 'Greenfinch' is a selection from Blooms of Bressingham, England, with pale lime-green bracts and pronounced silver veining in the leaves. *Heuchera cylindrica* grows in nature on dry prairies, slopes, and open woods from Alberta and British Columbia south to Nevada and California. Zone 3–8.

The delightful long-leaf bluets (Hedyotis longifolia) is a diminutive plant perfect for weaving through a grouping of larger plants. This relative of the familiar eastern Quaker ladies is a member of the Madder Family (Rubiaceae). Plants stand 4-6" high. Dense heads of tiny, 4-petaled, starry flowers are carried in clusters at the tops of the stems. The paired leaves are lance-shaped and bright green. Plant in a well-drained site in full sun or partial shade. This species is native to open woods, savannas, and prairies from Maine and Saskatchewan south to South Carolina and Arkansas. Zones 3-8.

The dense, violet spikes of dotted blazing star (Liatris punctata) brighten up the dog days of summer despite heat and drought. This compact, densely clumping plant grows to 14" tall and produces small heads packed tightly into short 6" spikes. The stiff foliage is deep black-green and very attractive. Plants bloom in late summer along with narrow-leaved coneflower, Mexican hats (Ratibida columnifera), gray goldenrod, white upland aster, and hairy golden aster. Plant in average to rich, well-drained soil in full sun. Liatris punctata is native on dry gravel prairies, plains, and open slopes from Manitoba and Alberta south to Texas and New Mexico. Zones 2-8.

The curious flowers of dotted horsemint (*Monarda punctata*) hide beneath decurved pink bracts in summer. It is the showy bract, rather than the flower, that creates a stir in the garden. Wiry, 1–3' stems with 1–2", furry, pointed leaves are crowned by tiered clusters of small, spotted, green flowers above whorls of the decorative pointed bracts. The leaves are mildly fragrant, hinting at its affiliation with the Mint Family (Lamiaceae). Plant this curious beauty in masses with little bluestem, butterfly weed, liatris, prairie phlox, and asters. Plant in average sandy or loamy, moist but welldrained soil in full sun or light shade. Plants may be short lived in rich soil but will reseed freely. *Monarda punctata* is native to open woods, savannas, dunes, and shores from Vermont and Minnesota south to Florida and Texas. Zones 3–9.

The ghostly spikes of white-flowered penstemon (Penstemon albidus) create haunting drifts that glow in the evening light on dry prairies. The compact flower stalks sport perky spikes of 1"-long, white flowers with flat faces. The 2"-long, deep green leaves decrease in size upward on the 6-14" stems. The leaves of the basal rosettes are broadly lance-shaped. Combine this lovely member the of Scrophulariaceae with prairie buttercup, blue-eyed grass, prairie phlox, narrow-leaf coneflower, and long-leaf bluets. This is a tough, adaptable, and extremely heat tolerant penstemon. Plant in average to rich, sandy or loamy, well-drained soil in full sun. Penstemon albidus is native to prairies, woodland edges, and embankments from Manitoba and Alberta south to Texas, Zones 3-8.

Slender penstemon (*Penstemon* gracilis) is a petite plant with ³/4", rosepink to purple flowers carried in open spikes on 2' stems. The flowers open for two to three weeks in early summer. The narrow, 2–5"-long, toothed leaves are minutely soft-hairy. The dried capsules are decorative in summer and autumn. This plant shows up to best advantage when planted in mass with prairie smoke, purple prairie clover, prairie phlox, prairie buttercup, and dropseed. Plant in average to rich, well-drained soil in full sun or light shade. Do not overwater, or this heat and drought tolerant plant may rot. This species is native to open woods, savannas, and prairies from Wisconsin and Alberta south to Iowa and New Mexico. Zones 3–8.

The low, erect stems of prairie phlox (Phlox pilosa) are graced with 1/2-3/4"wide, pink or white flowers carried in flat-topped terminal clusters in early summer. Some individuals have darkeyed flowers. The Nebraska Statewide Arboretum is making selections of this species for outstanding form and color. The upright stems reach 2' tall and are loosely clothed with 3" lance-shaped leaves. Plants produce many vegetative stems that do not bear flowers. There are several regional varieties of this species, differing in the width of the leaves, the size and color of the flowers, and hair type and length. Use them as a groundcover under open shrubs and atop walls, or combine them with golden Alexander, penstemons, liatris, and asters. Plant in rich, moist soil in full sun or light shade. Phlox pilosa is native in open woods, savannas, prairies, and roadsides from Connecticut and Manitoba south to Florida and Texas. Zones 3-9.

The earliest and perhaps the best loved prairie wildflower is the pasque flower, or prairie crocus (Pulsatilla patens). This tough member of the Buttercup Family (Ranunculaceae) opens its flowers when the snow of early spring still swirls on the slopes of the goat prairies. The silky buds push from the ground as soon as winter's blanket of snow melts. The gobletshaped flowers are like white stars that close in the evening to reveal the purple blush on the outer tepals. Mature plants may have dozens of flowers. As the flowers fade, wispy spheres of feathery achenes form and remain attractive into the summer, until they disperse. Combine pasque flowers with prairie smoke, prairie buttercup, harebells, penstemons, and blazing stars. Plant in average to rich, sandy or gravelly soil with excellent drainage. Plants will rot if they stay too moist. *Pulsatilla patens* is native to dry prairie slopes, sand barrens, dunes, and savannas throughout the Midwest.

The delicate yellow petits fours of prairie buttercup (Ranunculus rhomboideus) are a welcome treat as winter snow melts away in April. This diminutive but charming plant produces mounds of tiny flowers for up to a month in early spring, when bright yellow is a welcome color. The lobed basal leaves and divided stem leaves set off the bright flowers. Plants grow from a corm-like rootstock with fleshy roots. Combine prairie buttercup with birds-foot violet, pasque flower, prairie phlox, and blue-eyed grass. Plant in a sunny position in well-drained, sandy or loamy soil. Ranunculus rhomboideus is native to dry prairies, dunes, savannas, and open woods from Ontario and Saskatchewan south to Iowa and Nebraska. Zones 3-8.

Blue-eyed grass (Sisyrinchium campestre) is not a grass at all but a narrow-leaved member of the Iris Family.(Iridaceae). The tufts of flat, grass-like foliage rise from short, creeping rhizomes that branch profusely. Flower stalks resemble the leaves but are crowned with clusters of starry, blue flowers with three petals and three petal-like sepals. Plants grow to 10-12" tall and are compact and dense. Blue-eyed grass is so delicate it is easily overlooked if placed improperly. Plant it in groups of three to five plants in meadows or as an accent in perennial gardens. Combine them with green and gold (Chrysogonum virginianum), fire pink (Silene virginica), phlox, prairie smoke (Geum triflorum), and violets. Plant in moist average to rich soil in full sun or partial shade.

Sisyrinchium campestre is native native to open woods, savannas, prairies, and meadows from Illinois and Minnesota south to Arkansas and Nebraska. Zones 3–8.

Sisyrinchium montanum grows 2' tall and has violet flowers. Plant in average to rich, well-drained soil in full sun or light shade. This species is native to open woods, meadows, and clearings from Quebec and British Columbia south to North Carolina and Nebraska. Zones 4–8.

Gray goldenrod (Solidago nemoralis), also called dyer's woad, is a charmer with tight clumps of soft-hairy, graygreen basal leaves and arching stems with one-sided, plume-like inflorescences of rich lemon-yellow flowers. Plants vary from 6-24" tall, depending on the fertility and moisture of the soil, and bloom from August to October Mature clumps form fountains of bright color in the late summer and autumn. Suitable companions include purple prairie clover, aromatic aster, dotted blazingstar, and prairie dropseed (Sporobolus heterolepis). Plant in lean, sandy or loamy soil in full sun or light shade. Solidago nemoralis is native to dry meadows and prairies, savannas, dunes, waste places, and on roadside embankments from Nova Scotia and Alberta south to Florida and Texas. Zones 2–9.

Upland white aster (*Solidago ptarmicoides*) is a taxonomically confused but lovely plant with a flat-topped, branched inflorescence sporting showy, 1"-wide heads with pure white ray flowers andbright yellow disk flowers in late summer. The plant was formerly classified as an aster, but recent taxonomic work places it with the goldenrods. The plants form dense clumps of attractive, 8"-long, deep green leaves with narrow, flat blades from fibrous-rooted crowns. They are perfect for rock gardens, containers, or the front of perennial beds. Combine them with dotted blazing star, gray goldenrod, and silky aster. Plant in average to rich, well-drained soil in full sun or light shade. This species is native to open woods, prairies, and rocky slopes, usually on limy soils, from Quebec to Saskatchewan south to Georgia, Arkansas, and Wyoming. Zones 3–8.

The flat-topped, yellow flower umbels of heart-leaf Alexanders (Zizia aptera) provide a bright accent in the spring garden, when yellow is a welcome color. The lush, heart-shaped leaves are attractive all summer and turn shades of wine in autumn. This parsley relative (Apiaceae) is a larval food plant for many butterflies, including swallowtails. The open, mounded form of heart-leaf Alexander makes it a good weaver for the front or middle of the border. In prairies and meadows, place it next to the path, where it can be appreciated at close range. Combine it with columbines, blue phlox, and geraniums along woodland walks. Plant in average to humus-rich, moist soil in full sun to moderate shade. Plants are drought tolerant once established. Plants form full clumps in a few years time but seldom require division. Zizia aptera is native to open woods, savannas, and moist prairies from New York and British Columbia south to Georgia and Nevada. Zones 3-9.

Zizia aurea is a bushy plant with many leafy stems. The thrice-divided leaves are more delicate than in the previous species, and the flower clusters are larger. Plant this in rich, moist soil in sun or partial shade. This species is native to open woods, floodplains, and meadows from Quebec and Saskatchewan south to Florida and Texas. Zones 3–9.

Farther afield than Minnesota, the prairies yield up additional treasures for rock and small-scale gardeners. The eastern tallgrass prairie, at its boundary with the eastern deciduous forest, offers a few choice garden dwarfs. The drier, mixed-grass prairies of the eastern Great Plains are particularly blessed with horticultural delights.

Winecups, or purple poppy mallow (Callirhoe involucrata), is a sprawling to creeping plant in the Malvaceae with lax stems 1–11/2' long. The 3–31/2"-long leaves are deeply dissected into five to seven toothed lobes. The gorgeous 21/2"-wide, deep wine-red flowers are carried singly above the foliage. Plants begin blooming in mid to late spring and flower for several months on new growth. Purple poppy mallow is an excellent weaver, best used to knit plantings together. In rich soils, plants form more dense clumps, best used at the edge of a bed or along a path. In prairie gardens, plant them with milkweeds (Asclepias), asters, blanketflower (Gaillardia), spiderwort (Tradescantia) and ornamental grasses. Choose them for a long-flowering carpet in rock walls and rock gardens. Plant in average, well-drained, loamy or sandy soil in full sun or light shade. Callirhoe involucrata is native from North Dakota and Montana south to Missouri and New Mexico; it is naturalized farther east in dry, often sandy plains, prairies, and open woods. Zone 4-9.

Callirhoe digitata, standing winecups, is an upright to sprawling plant with 12–48" stems, sparsely clothed in deeply dissected foliage. The decorative leaves have five to seven narrow, linear lobes that resemble slender fingers. The 1–2"-wide flowers are carried singly or in few-flowered clusters on thin stems. The color varies from white to light rose and wine red. Plant in well-drained loamy or sandy soil in full sun or light shade. Plants will grow up through large perennials or shrubs for support. This species is native to dry prairies and open woods from Missouri and Kansas south to Texas; naturalized farther east. Zones 4–9.

Callirhoe triangulata, poppy mallow, is similar in habit to purple poppy mallow, but the undivided leaves are broadly triangular to heart-shaped. The flowers are carried in open clusters in the leaf axils at the ends of the 12–24" stems. The flowers are deep purple-red. Plant in average, welldrained soil in full sun or light shade. *Callirhoe triangulata* is native to dry prairies, savannas, and in open woods from Indiana, Wisconsin, and Nebraska south to Georgia and Alabama. Zones 4–8.

Wild petunia (Ruellia humilis) is named for its resemblance to the popular bedding annuals that share their common name. They have tubular, flat-faced flowers with five petals in shades of pale purple and lilac. Plants grow from fibrous-rooted crowns. A member of the Acanthaceae, wild petunia grows 12-24" tall with hairy stems and 3"-long, stalkless leaves. The lavender or lilac-blue flowers are borne in pairs in the leaf axils for several weeks in summer. The delicate wild petunia is likely to be overlooked if planted with exuberant plants. Place it at the front of the border, along a trail, at the bottom of steps, or in a rock garden. Combine it with prairie smoke, coreopsis, ornamental onions, Silene virginica, Chrysogonum virginianum, and smaller grasses. Plant in average to rich, moist, but well-drained soil in full sun or partial shade. This species forms dense, attractive clumps in time but is never invasive. Plants may be crowded out or smothered by more exuberant neighbors, so leave them room in the garden. Take tip cuttings in early summer. Sow seeds outdoors in autumn or indoors in spring. Seedlings develop quickly. Ruellia humilis is native to open woods, prairies, meadows, and clearings; Pennsylvania and Nebraska

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south to Alabama and Texas. Zone 4-9.

Ruellia caroliniensis, Carolina wild petunia, is larger, sometimes reaching 2', with 5" stalked leaves covered in dense, soft hairs. The 2" flowers are lilac to lavender blue. Plant in moist, rich soil in full sun or partial shade. This species is native to open woods and clearings from New Jersey and Indiana south to Florida and Texas. Zones 4–9.

The short, shrubby resinous skullcap (Scutellaria resinosa) boasts a profusion of 3/4"-long, deep blue flowers for months in summer. The thick, gray-green, oval leaves are decorative when the plant is out of bloom. Numerous tightly packed stems rise 6-10" from a woody, tap-rooted crown. Choose this species for rock gardens and the front of beds and borders, as well as informal plantings. Combine it with creeping phlox, purple prairie clover, evening primroses, blackfoot daisy, grasses, and cacti. Plants demand average to lean, welldrained soil in full sun. Plants thrive on neglect and tolerate all manner of climatic abuse, including cold, heat, and wind. Set out young transplants, and do not disturb established clumps. Scutellaria resinosa is native to dry, rocky prairies and high plains from Kansas and Colorado south to Texas and Arizona in Zones 4-8.

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Crocus pestalozzae 'Albus' (p. 282)



Eranthis 'Guinea Gold' (p. 283)



Narcissus minor 'Cedric Morris' (p. 283)



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Lomatium dissectum (p. 284)

Ozothamnus ledifolius (p. 286)





Celmisia spectabilis (p. 286)

photos, Jack Elliott

Iris 'Katharine Hodgkin' (p. 283)





280 Cyclamen hederifolium in Elliott garden (p. 281)

A KENTISH GARDEN IN WINTER

by Jack Elliott

erhaps I should first confess that I do not possess anything like a real rock garden. I have raised beds, peat beds, and border edges with their drainage improved by digging in extra-coarse grit. I also have a raised bed with glass sheets overhead from November to March, but it is open round the sides and has no cold protection. Our rare snows blow underneath the glass. My garden is in Kent, England, where in average winters temperatures drop to around 19°F for a day or two but rarely freeze for long. The winter cold is roughly equivalent to USDA zone 8B; temperatures in summer are considerably cooler.

I consider winter to stretch from December to February, bearing in mind that often a few flowers of autumn still bravely appear in December, and that some years plants normally flowering in March start performing in February. During our hardest winters nothing starts flowering until the end of February.

Bulbs provide excitement in the winter garden. Cyclamen hederifolium, so important in the autumn garden with its fine pink or white flowers, usually continues to produce a few flowers until Christmas. But it is the excellent foliage, with every degree of silvery mottling and a remarkable variety of leaf shapes, that makes it so valuable. A seed strain 'Bowles Apollo' is sometimes offered and can be relied upon to produce plants with exceptionally good markings. Some time around Christmas the first flowers of Cyclamen coum should begin to appear and will continue well into spring. Typically it has rounded leaves that may be plain or faintly marbled and flowers in a range of colors from pure white to deepest magenta, usually with a contrasting dark spot at the base of each petal. Both these species are easy to grow in well-drained soil with plenty of leafmold in partial shade, C. coum being perhaps a little less tolerant of dry shade in summer. One of the better features of our garden is a bed devoted to cyclamen, about 3' wide and 30' long, with hundreds of corms of C. hederifolium and C. coum and a few lateflowering C. repandum (photo, p. 280). Originally it was shaded by an old apple tree, but this blew down in the hurricane of '87. Since then the C. coum have been dwindling, but the C. hederifolium have been as good as ever.

The autumn-flowering crocus are usually over by December, but I often find blooms on the late-flowering *Crocus goulimyi*, a most beautiful species with an exceptionally long tube for the size of the cup-shaped flowers, which are typically pale lilac. There are two exquisite white forms of it. The first, named 'Mani White', was of nursery origin and is more vigorous and freely increasing than the white form found in the Peloponnese a few years ago, *C. goulimyi* var. *leucantha*.

Sternbergia lutea (photo, p. 296) with its deep golden-yellow goblets and narrow, glossy green leaves often continues to produce a sprinkling of flowers until December. Even after a hot, dry summer, it never gives quite the display that one can enjoy around the Mediterranean in autumn, but there are always enough flowers to make it worth growing. In our climate it nearly always flowers with the leaves, whereas in nature the leaves usually do not appear until the flowers are over.

Early in the New Year more crocus flowers appear, and the various species will flower until late spring. In our protected bed the diminutive C. danfordiae is usually the first, a delicate-looking plant with small, slender, pale yellow flowers streaked with gray on the outside of the segments. It has never increased sufficiently to try it in the open garden. In the same bed C. pestalozzae (photo, p. 277) flowers a little later. It resembles C. goulimyi in having an exceptionally long tube for the small flowers, which are soft lavender in color with deep yellow in the throat. The white form grows equally well and also has a yellow throat.

In the garden *Crocus imperati* appears first, with striking flowers that open to reddish purple within but are cream with dark purple feathering on the outside. Soon to follow, with equally dramatic markings, is *C. corsicus*,

similar in color when the flowers open in the sunshine, but with buds appearing darkest purple on a pale background. One of our greatest successes with crocus has been *C. malyi*, which was very uncommon a few years ago but is now recognized as one of the easiest and most freely-increasing species. It has large, pure white flowers with a conspicuous orange style and deep yellow anthers. Having inadvertently planted a few bulbs in grass in mistake for *C. tommasinianus*, I now find that it will even grow well and increase there!

Crocus fleischeri is a popular species, which sadly I find slow to increase. Although its flowers are small, they are a pure white with dramatically contrasting deep reddish orange, feathery anthers. Perhaps the most spectacular coloring on the outside of the segments is seen in C. biflorus ssp. alexandri, another white-flowered species, but deep blackish purple on the reverse. Another unusual color scheme is seen in C. sieberi 'Hubert Edelsten', white within but heavily blotched outside with an unusual shade of reddish purple. All these crocuses with attractive buds are especially useful at a time of year when the lack of sunshine so often keeps the flowers closed. In C. sieberi ssp. atticus the contrast is between the deep lilac upper part of the flowers and the well-demarcated deep orange of the basal third. This has grown particularly well in the covered bed.

My favorite harbingers of spring are the earliest of the reticulata irises. Quite early in January one can see their fat buds poking through the ground, and a few warm days suffice to bring out the spectacular, deep blue flowers of *Iris histrioides* 'Major', a plant which was very common 20 years ago but now is rather scarce and sadly is dwindling in my garden. It is not obviously virused, but one wonders. It is a won-
derful plant, with its large, darkest blue flowers each with a golden crest and a few white streaks on either side of the fall. The flowers are astonishingly weather-resistant. They have often been submerged under snow for several days and reappeared unsullied when it melts. I hope I still have a few bulbs of I. histrioides 'Lady Beatrix Stanley', with flowers slightly paler blue with a lot of white streaking in the center of the fall and a less conspicuous, vellow crest. It flowers a bit later, at the same time as 'Katharine Hodgkin' (photo, p. 279), the hybrid between I. histrioides 'Major' and the later-flowering yellow I. winogradowii. It has none of the problems of its tricky parents and increases tremendously in the garden. The flowers are very large, a curious mixture of blue and greenish vellow. The color may not appeal to everyone, but it is a joy to see a substantial and ever-increasing clump of it in the winter garden. 'Frank Elder' is of the same parentage but a pleasanter, pale blue color with much less yellow intermingled. It does not seem to increase quite so freely. Iris reticulata and its varieties only flower later, in February in a very mild season.

Snowdrops would probably be most gardeners' top choice for winter-flowering, and we grow a considerable number here but tend towards quantity rather than quality. There are very few of the rarities beloved of the keen galanthophiles-these can only be truly appreciated on one's knees. There were a few Galanthus nivalis and its double form in the garden when we arrived 27 years ago, and these have increased greatly and been split up and moved around. The snowdrop that has done best is a very large species procured as G. elwesii, which I am assured by the experts is G. caucasicus (photo, p. 296). It flowers for months from February onwards. The only real treasure is a small clump of *G. nivalis* 'Sandersii' (photo, p. 298), better known still as 'Lutescens', which was my pride and joy but now seems to be dwindling. It is very distinct with a yellow ovary and yellow markings in place of the usual green.

Winter aconites must obviously be included, and they do well here, seeding around very freely, especially into the edge of a gravel drive. It is curious how difficult they are to establish in some gardens, and we are fortunate to have them as a major feature in January or early February. The finest by far is the hybrid 'Guinea Gold' (photo, p. 277), which unfurls its bronze-tinged leaves much later than the species and produces its large, golden flowers when the others are almost over.

The first narcissus to appear is Narcissus minor 'Cedric Morris' (photo, p. 277), a remarkable plant that I was first given as a November-flowering form of N. asturiensis. It was originally found in Spain, and there is some doubt about its name, but it is generally considered to be a form of N. minor. Flowering varies but usually begins towards the end of November and continues until January. The flowers closely resemble the small trumpets of N. asturiensis, but the stems are 8-10" high. It seems to increase modestly where it is happy. I have lost it in one or two parts of the garden, but it does well in partial shade with plenty of humus.

The most beautiful of the winterflowering narcissi are the white bulbocodiums, *N. cantabricus* and its various subspecies, with dazzling, pure white flowers, or creamy white in ssp. *foliosus*. They are great with the protection of a cold greenhouse or a frame, but they are a little delicate for life outside in cold, wet winters. *Narcissus romieuxii* on the other hand is excellent outside in spite of flowering generally in January. Its pale yellow flowers with widely flaring coronas seem to withstand the rain remarkably well, and like *Iris histrioides* it can be under snow one day and looking as bright as ever the next.

Before the end of winter the first flowers are usually appearing on some of the excellent tuberous anemones like *Anemone blanda* in its various color forms in blue, pink, and white. 'White Splendour' is a particularly large-flowered and reliable white selection. One problem with these is that they interbreed, and the original cultivars can be swamped by inferior seedlings in wishy-washy colors.

Winter-flowering shrubs are a feature here, especially between the house and the garage, where their scent can be most appreciated at a miserable time of year. The mahonias and even the fairly compact Sarcococca hookeriana var. digyna are really much too large for consideration in this article, but they do give a lot of pleasure en route for the "alpines." As rock gardeners seem to have taken daphnes to their hearts irrespective of size, perhaps I may sing the praises of Daphne bholua, for me the finest scented shrub of them all. It starts flowering before Christmas and continues throughout the rest of the winter, filling the air with its fragrance. I have only lost it once, in the winter 1982 when the temperatures was below 5°F for a couple of weeks. Now I have several plants 4-5' high from cuttings of the original. Would that all daphnes rooted as easily!

I suppose the hellebores are a bit too large also, but I grow *Helleborus niger* in a shady place between the scented shrubs, and that looks almost alpine. It was originally the cultivar 'Potter's Wheel', which has among the largest flowers of all, but now seedlings have appeared, and the plants are probably less striking than they were. I grow it very badly and have only a sprinkling of fine flowers, but they are appreciated even though they never live up to their name, Christmas Rose. They may well perform better in my new garden, which has a slightly alkaline and heavier soil.

Small, fully hardy perennials for winter are few, but Hacquetia epipactis is one of the best, as long as you do not expect anything spectacular. It comes into growth in January, and the flowers appear at the same time as the leaves are beginning to unfurl. A cluster of very small, yellow, true flowers is surrounded by a cup of yellowish green, petal-like bracts, giving the effect of a green flower with a yellow center. It has an amazingly long season of beauty, because bracts last much longer than flowers, so that one enjoys the same inflorescence for several weeks. It has a deceptively dense and solid rootstock, so that propagation is easiest by the self-sown seedlings that appear quite regularly. In fact, I have always been able to find seedlings and have never resorted to collecting the seed. If you do, sow it immediately, as its viability is short.

Lomatium dissectum (photo, p. 278) may be an unexpected plant for early flower, but it comes up every year in late January, producing loose umbels of small, yellow flowers at the same time as the first finely dissected, gray-green leaves appear. The flowers are well developed when the plant is 3" high and still in fine condition when the stems are up to 10" six weeks later. My original plant must be ten years old and gets better each year. Remarkable for a Rocky Mountain alpine!

The most striking of all the early flowering plants here is *Euphorbia rigida* (*E. biglandulosa*), admittedly rather large, but it enjoys the excellent drainage of the rock garden, making a sprawling mat of 1-2' stems, with fleshy, glaucous, pointed leaves, and large, flat heads of bright yellow flowers in February, which gradually become tinged with red during April until late May or June. I find it misses flowering some years, but the foliage is so dramatic that it is still well worth growing. Its tenderness seems to be exaggerated in the books, where I have seen it recommended for the alpine house. It even survived our worst winter in the garden, but I suspect the excellent drainage helps.

Foliage Plants

The appreciation of foliage in the garden is one of the most important developments of the last 20 years, hence the great enthusiasm for silver foliage, purple-leaved plants, and plants like hostas that are largely grown for their foliage effects. In this respect, as in the appreciation of color combinations, the rock gardener tends to lag behind those who garden on a larger scale. Perhaps the fact that rock plants are difficult enough just to keep alive makes other considerations less important! Nevertheless, one has only to consider the rock garden in winter to appreciate the importance of attractive or colorful leaves when flowers are few and far between.

There are comparatively few plants that look good throughout year, among them some of the larger and easier cushion plants for the open garden. *Bupleurum spinosum* (photo, p. 277) is one, now a dome of small, grayish green leaves 10" high and 3' wide, that never looks scruffy in winter and changes its appearance only when it is smothered in small, greenish yellow flowers around midsummer and later when its soft green spines develop. Another is *Dianthus anatolicus*. Every garden visitor likes to stroke it as they pass by, perhaps because it is in a raised bed conveniently at stroking height. At its best, it was a hard, dense cushion 2' across, but then it lost a considerable lump and started again from another side, where it had rooted down afresh, to become longer, narrower, and more lumpy. It was still patted by all. It only produces a few miserable, pink flowers, but nobody cares. Dianthus erinaceus can make a similar, dense cushion in the open. usually with sparse but larger flowers, but the leaves are definitely too sharp for touching. The even sharper hedgehog of Erinacea anthullis always looks interesting in winter, even if its real glory is when it covers itself in pale blue, gorse-like flowers in early summer. It takes several years to get going but is worth the wait, and you always have the foliage to enjoy. Another favorite cushion is Hebe topiaria, which has gradually formed a mound of small, glaucous leaves 2' across but only 10" high. It has survived for at least ten winters in perfect condition but is only really appreciated when it is smothered in small spikes of white flowers in summer. In winter it stands out as a perfect, large bun surrounded by bare earth, before becoming enveloped in a sea of scillas and chionodoxas in early spring. Some of the bronze-leaved, whipcord hebes like H. armstrongii can also be very attractive in winter, but I find they often become straggly and are more likely to suffer from very cold spells.

Silver or gray foliage can also look its best when there is no competition from flowers. *Helichrysum selago* makes an attractive dome of slender stems that are enveloped in tiny, adpressed leaves with white woolly backs, giving an overall silvery effect. It can soon become a foot or more across and is easy to grow. *Helichrysum coralloides* is even better with thicker and woollier,

more upright stems, but it is more difficult, needing winter protection from excessive rain. I grew it outside for several years, but it eventually succumbed to an unusually wet winter. A pleasant surprise has been Helichrysum sessiloides surviving with the minimum of winter protection to make a low cushion of small, dark green leaves with contrasting white hairs along the margins. Even better is one of the more exotic raoulias, Raoulia x loganii, a beautiful, compact dome of small, white, intensely hairy rosettes, on which I have never noticed flowers. It looks every inch an alpine-house plant but has grown for several years at the (wet) edge of our protected raised bed.

The genus Ozothamnus is closely related to Helichrysum. Generally, they are excellent foliage plants, but most become too large for the rock garden. One of the best is O. ledifolius (photo, p. 278), which will take several years to attain 2'. It is a dense, rather upright shrub with tiny, dark olive-green leaves with golden backs, giving a permanent green-and-gold look. It seems impervious to winter weather until killed outright, which only happened in our coldest winter. It is always handsome and puts on a special show in summer, when clusters of vivid red buds appear at the shoot tips to open into somewhat anticlimactic, small, fluffy, cream flowers.

These are some of the easiest Australasian plants for the garden, but there are many more exotic species that may succeed in suitable conditions. The celmisias (Asteraceae) in particular are all splendid foliage plants, but like most New Zealanders they dislike our hot, dry conditions in summer, and over the years I have grown and loved and lost many species. One of the most striking is the large *Celmisia spectabilis* (photo, p. 279), and this has also proved one of the least demanding when grown in a peat bed. It has magnificent rosettes of hairy, white-backed leaves that withstand the weather well, and large, white daisies on 12" stems in early summer. *Celmisia longifolia* has much smaller rosettes of long, narrow, intensely silver leaves, a beautiful foliage plant that thrives in a raised bed with some protection overhead in winter.

Most New Zealand plants have splendid evergreen foliage, and there is a much wider choice than I have indicated, particularly for gardens with cool, moist summers. I seem to have concentrated on New Zealand plants for good foliage, but one need look no further than the silver saxifrages to see fine foliage effects from nearer home. They all look good in winter, especially the great silver-encrusted rosettes of Saxifraga longifolia or S. 'Tumbling Waters', preferably planted on their sides in a wall. They may take years to flower, but in the meantime the rosettes are one of the most dramatic features of any rock garden. There are too many saxifrage species with very attractive rosettes to mention, but I have a special love for S. grisebachii. It is usually grown under glass to protect its fine, symmetrical, silver rosettes from excessive wet, but I have found it very satisfactory planted into a tufa rock, where it gets better every year with no protection. The flowers are the best of this group and may even begin to unfurl their pink buds in February, giving an early hint that spring is round the corner.

Jack Elliott gardens in Ashford, Kent, United Kingdom. He is a past president of the Alpine Garden Society and the Hardy Plant Society, and recipient of the Royal Horticultural Society's Victoria Medal. He is the author of several books including Bulbs for the Rock Garden, The Smaller Perennials, and a forthcoming book The Woodland Garden.

Learning from England in the Southeastern USA by Bobby J. Ward

It may come as a surprise to realize that gardeners in much of the British Isles garden in the equivalent of USDA Zone 8, and we may further be amazed that portions of the western counties of England, including parts of Scotland and Ireland, are in Zone 9. Despite the fact that Jack Elliott gardens at a latitude roughly equivalent to southern Labrador and northern Newfoundland, the climate is ameliorated by the warm ocean currents that flow northeastward to the British Isles from the West Indies. Temperatures very seldom drop below 20°F, rarely below 32°F for more than 24–48 hours.

Statistically, the wettest months in Kent are October and November, followed by July and August. The driest months are March, May, and June. In Piedmont North Carolina, we experience our wettest months in July and August, often with brief downpours from violent thunder storms or tropical hurricanes. Our driest months tend to be April and October. Kent receives about 30" of rain per year; we have about 40", with extremes of 30–64".

Neither Kent nor North Carolina have many snow days, though North Carolina has more. In the last decade winters have been milder, resulting in early bursts of spring flowers in gardens in both regions. One significant difference between the two climates is summer nighttime temperatures. In Kent low night temperatures are only rarely above 60-65°F in July and August, with relative humidity of 72–76%. In the Southeastern US, these are the killer months for plants in clay soils, which are enduring 80–100% humidity and nighttime temperatures of 75–88°F; these conditions occasionally linger into early September. J. C. Raulston used to say that if a plant could survive August here, there would be no problem with the other eleven months.

Recently the American Horticulture Society published a heat-hardiness map, somewhat akin to the familiar cold hardiness USDA zones. The idea was to indicate the heat tolerance of plants. The map shows geographic areas by the number of days the temperature is above 86°F, presumably the heat at which plants become stressed and cell structure is affected. Nighttime temperatures and relative humidities are not considered, however. And many plants will tolerate 100°F days at the low humidity of southern California but will die here at a humid 85°F. The problem is that plants respire at a higher rate at high temperatures, burning large amounts of sugars produced during the day, rather than using the sugars for growth as they do in areas with cooler nights.

From the British we can discover many plants that may also successfully grow in the Southeast, including numerous bulbs, such as *Cyclamen*, *Crocus*, *Sternbergia*, *Narcissus*, and *Iris*. I personally have less success with snowdrops and winter aconites; *Galanthus caucasicus* does well for me, and aconites will survive a few seasons. Certainly *Sarcococca*, *Daphne*, *and Helleborus* grow well in both regions. We have trouble with the Southern Hemisphere plants, such as *Hebe* and *Helichrysum*. We can also discover new combinations of plants and novel ways of thinking about our gardens.

We could wish for the cooler summer nights and lower humidity that Kent enjoys—or we could relish our uniqueness and treasure the plants we can grow and those singular to our area. And learn from the many successes of the British!



Pots on the terrace in winter

A CITY TERRACE GARDEN IN WINTER

by Larry Thomas

I he question I am most often asked about my terrace, even by sophisticated gardeners, is "What do you do with all the plants in the winter?" My answer is simple: I do nothing but leave them to brave the elements. And always, after I've said that, I realize that I've over-simplified what has been an ongoing learning project for me, and that the actuality is a bit more complicated.

I garden in New York City (USDA Zone 6b) on an eleventh floor terrace that measures 13'x 40', faces east on the long side, and has a southern exposure on the short side. It receives full sun from sun-up until around three in the afternoon, depending on the season. I have gardened here for 32 years. A friend dubbed my terrace "the alpine zone of Manhattan," claiming I can grow these plants because of "all that wind and radiation." The wind I can attest to; I'm not sure I really want to know what she means by the latter.

The problems I face throughout the year, but which are multiplied in winter, stem from wind, sun, and moisture. These factors affect not only the plants, but the containers in which they grow. Over the years I have devised various means of coping with these effects, and perhaps some of my methods may be of help to you.

For the most part, the terrace is protected from severe wind, which usually comes from the northwest. From time to time, however, the wind shifts drastically with unpredictable results. On at least one occasion, I found myself blocked inside by a toppled tree and had to beg entrance through the adjacent apartment and terrace to climb over the fence and right a fallen Himalayan pine in its whiskey barrel. Incidents such as this have taught me to weight down or anchor any container that is likely to blow over, or take even more drastic action. I had an pencil-shaped Arizona cypress (Cupressus arizonica), grown from seed, that stretched up almost two full stories. Masonry nails driven into the brick wall and foam-padded wire worked to hold it in place for awhile. Ultimately, as the tree reached 13', I could no longer climb high enough to anchor it to the wall. Violent winds caused it to whip wildly, and the nails were ripped from the wall. Drastic measures were clearly called for, so I got out the pruning saw and reluctantly cut the proud, columnar beauty down. Now I have a more manageable, 1', globular evergreen to admire. (Ironically, I also have a similar conifer bought as *Juniperus communis* 'Compressa' that has shot up to 9'. I've dubbed it "Juniperus communis 'Not-So-Compressa'.")

Wind, however, is the least of my winter problems. The other two factors are more serious and require a more concerted effort. My garden is entirely container-grown, the containers ranging from large, pressure-treated, wood planter boxes to a group of troughs some ceramic, some hypertufa, and a wide range of ceramic pots. I teach ceramics classes at a small Manhattan college, and most of these were handthrown and high-fired by me.

Commercial flower pots, even good terra-cotta ones, simply will not stand up to the repeated freeze-and-thaw cycles of winter, particularly if the pots are positioned where the sun strikes them. All of us, I suspect, have faced the dreaded sight each spring of flower pots that have cracked or scaled so badly we have no recourse but to replace them. In the past, inevitably, I would find myself with an unwanted abundance of broken crock—and I don't even use it.

Over the years, I've tried several methods of getting commercial pots through the winter without cracking, none of them fool-proof. At one point, I wrapped expensive Italian terra-cotta pots in heavy thicknesses of newspaper. At other times, I used burlap or black plastic garbage bags. Both methods sometimes worked, but erratically. The more successful way was to move the pots to full shade so that they remained colder and were thus less susceptible to the freeze-and-thaw cycles. Still, on a relatively small terrace, one is hard put to find sufficient shade, particularly in winter. Ultimately, I simply gave up using commercial low-fired pots and began making my own, but with a difference. To make them durable and less likely to crack, I high-fire them, i.e., subject them to two firings, the first a lowtemperature, bisque firing and the second a high-temperature firing that fully vitrifies the clay and makes it much harder than commercial pots. These specially made pots withstand winter extremes very well, and I've rarely lost one to scaling.

My in-ground-gardening friends talk constantly about snow cover, with which they are either blessed or without which they consider themselves cursed. If they have snow cover, they report that their alpines come through the most dire winter, blissfully protected beneath a fluffy white blanket from freezing temperatures and dehydrating winds. I am among the cursed: New York City, even at ground level, is seldom blanketed for as much as ten days at a time by snow, and my plants are never so lucky. They must tough it out on their own, subjected to almost anything Ma Nature may throw their way.

Most of my alpine and rock plants in pots winter over in the open, uncovered, with no protection. Not all do, however. While many of the plants will tolerate almost any amount of cold weather, some will not abide winter damp and must be kept almost bonedry throughout the cold season. Some choice campanulas and primulas benefit from protection from precipitation. Hence, late in the season, but certainly before the first frost, I begin grouping the plants that require special winter treatment. Space on a terrace, naturally, is at a premium, so I usually have to hustle to find enough protected spots. From the beginning I have pressed a wrought-iron terrace table into use, tiering plants underneath the table and on the top, then covering the lot with a

sheet of Plexiglas or window-pane. The result is not a pretty sight, I'll admit, but listen, if it works, do it, and damn the looks!

Later, I put in two potting benches in an L-shape in my work area. Each has an under-shelf that now gives me sufficient room for the plants that must be kept dry. With these potting benches, I devised a jerry-built alpine house for the winter months by attaching foot-long sections of 2" x 4" boards to elevate the top, which I then cover with sheets of waffle-weave lighting louver and Plexiglas. I then drape the entire bench with a plastic shower liner attached at the top only so that there is plenty of air circulation—but no moisture. This works beautifully.

In recent years, I've altered this system by converting one of the benches to a sand-plunge bed. For this, I attached lengths of 2" x 4" on edge to form a rim on the bench top, lined it once again with plastic shower liner (this is of a gauge that is both pliant and thick enough to last for several years, inexpensive, and easy to obtain), and filled it with a fine grade of mason's sand. I'd prefer a much grittier sort of sand, but in New York City we make do with what's available, and this is all my hardware store carries. The sand-plunge bed works well year round, for it has cut down on the amount of watering time I must spend, and some of the more difficult alpines respond beautifully to this osmosis method of watering. The plunge works equally well in winter, allowing me to water lightly from time to time without endangering the crowns of the touchier plants.

I have a variety of troughs, including both traditional hypertufa ones as well as ceramic ones that I've high-fired for durability. While some make it through the winter with nothing for protection other than a few evergreen boughs to reduce the light level, other troughs appreciate drier conditions. For this, I devised a simple system of flat, Plexiglas roofs cut an inch or so wider than the trough and suspended about 6" above the surface level on four chopsticks or lengths of bamboo. To anchor them from the wind, I burn holes in each corner of the plastic with a heated ice pick, insert cord, and tie them beneath the trough just as Granny used to tie her bonnet strings under her chin. It works like a charm and is easy to dismantle when spring comes.

Lately, I've become the proud possessor of two large pieces of tufa, which I've drilled, planted with an assortment of kabschia saxifrages and androsaces, and mounted in two of my large planter boxes. This is their first year, and the saxifrages have taken beautifully, growing into the tufa in tight, hard buns. I will try them this year in the open with nothing more than an evergreen bough or two to keep them from sunburning in the winter months. I'm also growing Campanula raineri in tufa, and it wintered over for me this year with no protection-a first, as I've only been able to keep it going in the past if I kept it bone-dry through winter until it broke into active growth in the spring.

Basically, my gardening experience has been one of trial and error—many errors, I'd be the first to admit, but the successes have been sufficient to keep me going, and isn't that what our love of gardening is all about?

I grow many of my plants from seed, and their winter treatment is one I've devised over the years that works for me. Possibly you can adapt parts of it to your needs. I use styrofoam cups for my seed containers, because they're cheap, readily available, and last (barely) the requisite three years that I allow for germination before chucking them out. (Impatient me! Henrik Zetterlund

of the Gothenburg Botanic Garden told me recently that the Juno or Oncocyclus iris can take up to ten years to germinate!) At seed sowing time, I poke drainage holes through groups of the cups with a sharp skewer, and write basic information about the seed-name, dates, special needson the side with a ballpoint pen. Even though the ink will fade and eventually disappear, the impression can usually still be read. I fill the cups to within an inch of the top with my mix (half soil/half grit or Turface), sow the seed, top with grit, place the cups in open, lattice-work flats, and then soak them overnight by setting them in a waterfilled, solid flat.

Then comes the hard part-the waiting! Flats are checked periodically to move the cups with germinating seedlings into another area where they can be smothered with tender loving care. The rest, the slow-germinators (usually about half), are tiered for the long wait. Since I have little room, I stack them, which means some flats are subjected to dark (which causes some to germinate). Periodically, I rotate the flats so that each one gets some light and dark treatment, and at least once each spring, I cull them, checking dates and discarding the old-timers who've shown no action. Rare seed and certain species such as androsaces are usually given the benefit of the doubt. I've had heavy germination in the third year of some choice androsaces, by the way. Discarded seed cups are dumped unceremoniously into my allpurpose soil bin, where all soil is recycled, and, invariably, months or even years later I'll find myself about to weed out something that looks too good to be a weed. Then comes the long hard search to try to identify the mystery child...often with gratifying results. Dare I hope for such luck with

that Juno iris seed thrown out two years ago?

I try to have all of my pricking out done by mid-summer each year so that the seedlings have a chance to develop enough root system to carry them through the winter-if I've still got them. I use small, 21/4"-square by 3 1/4"-deep plastic pots. Since space always is at a premium at that time of year, I'm usually forced to leave them uncovered in the open. Surprisingly, the losses are very few from this harsh treatment. The deciduous seedlings come back readily the following spring; the evergreen ones tough it out and seem especially vigorous when they green up the spring. I attribute this to their being nearly pot-bound in a very gritty soil mix; hence, they're rarely wet at the crown and never for very long.

The last days of winter and the approach of spring occasion many trips out to the terrace, poking, prodding to see how everything came through, and invariably doing some damage to the still dormant plants. But the excitement of finding the drabas and the kabschia saxifrages budded up, their tiny pinheads taking on a flush of color, makes the long winter wait worthwhile. For it is the promise that any day now the draba buns will be dancing with tiny, ballpark-mustard blossoms, and the saxifrages, clad in soft, ice-cream colors, will nod back genteelly ... and yet another season will have begun.

Lawrence B. Thomas gardens on an eleventh floor terrace in New York City. He is a stalwart of the Manhattan Chapter of NARGS and its newsletter editor. Photos by the author.



Winter in the Larry Thomas garden in Manhattan, New York (pp. 289-292)



photos, Larry Thomas



Habranthus gracilifolius

Habranthus texanus (pp. 308-9)



Habranthus concolor (p. 309)



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Habranthus brachyandrus (p. 308) Photos, Scott Ogden





Pyxidanthera barbulata var. brevifolia (p. 264)

photos, Rob Gardner

Trillium pusillum var. virginianum (p. 261)









Galanthus caucasicus (pp. 283, 302)

Sternbergia lutea (p. 282)

Jack Elliott

Jack Elliott



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Galanthus plicatus (pp. 301-2)

Galanthus 'Hill Poë' (p. 305)





Galanthus nivalis 'Sandersii' (pp. 283, 303)



Galanthus 'S. Arnott' at Colestown (p. 305) photos, John Grimshaw



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Galanthus elwesii (pp. 301-2)





Galanthus nivalis 'Lady Elphinstone' (p. 303)

Galanthus nivalis 'Scharlockii' (p. 303)





300 Snowdrops in an English cemetery (pp. 301–306)

John Grimshaw

STARTING WITH SNOWDROPS

by John Grimshaw

Jardening fashions come and go, and plants that have been the preserve of a few enthusiasts suddenly become intensely popular. Snowdrops are one such, and now everyone in Great Britain with a pretense to a serious garden, from Highgrove downwards, must have a collection of selected Galanthus cultivars. It is a wise choice to pursue this genus, however, for few flowers contribute so much to the garden at what can be a drab time of year. Followers of fashion are, moreover, following in famous footsteps, for the galanthophilic flame has been carried by such great gardeners as Henry Elwes, E.A. Bowles, Sir Frederick Stern, E.B. Anderson and Chris Brickell, who have all appreciated the qualities of this modest flower in white and green, or white and yellow, or pure white, or all-green.

Galanthophiles have been selecting variants for well over a hundred years and during that time have named a great many. Some forms have died out, but at present approximately 700 cultivars are in circulation. Many would say that this is a ridiculous number, as they all look alike, but I would like to try to persuade people to look a little more closely at snowdrops and perhaps make the effort to grow just a handful of distinct and reliable clones. I can promise them that winters will never be the same again!

Not surprisingly, many people find it difficult to distinguish among snowdrops and wonder how on earth others do. I think the galanthophiles even wonder at times. It is really quite easy to identify the commonly grown species Galanthus nivalis, G. plicatus (photo, p. 297), G. elwesii (photo, p. 298), and their varieties, using the arrangement of their leaves as a quick guide. In G. nivalis, the common snowdrop found in British woods and hedgerows, the leaves are said to be applanate, being placed flat against each other, the flower scape emerging between them. The leaf-surface is flat in G. plicatus and its subspecies byzantinus, but the margins are explicative, that is, recurved beneath the main leaf blade; in G. elwesii the leaves are supervolute, the outer of the pair being curved around the inner. They are usually rather broader than in the other species and often strongly glaucous. Hybrids between all these species occur, which can be confusing as their leaf characteristics are usually blurred, requiring further observation and thought. For example, a hybrid between *G. nivalis* and *G. plicatus* may have only one of the leaf margins recurved.

Leaf characters are important in identifying Galanthus species, but most cultivars are distinguished by the markings and shape of the flower. Snowdrop flowers are very uniform in shape, consisting of three large outer perianth segments surrounding three smaller inner perianth segments that usually form a tube in the center of the flower. The cone of anthers and the style lie within this tube; the ovary is the round body to which the perianth segments are attached. Sometimes the perianth segments are doubled, resulting in what horticulturalists term a double flower. Doubles occur in both species and hybrids, although the regularity of the extra whorls of segments varies considerably. On a typical, single flower the outer segments are pure

white, while the inner segments have a green mark at the apex, near the little notch at the tip, and sometimes another one lower down towards the base. Galanthus nivalis and G. plicatus have an apical mark only, usually described as an inverted V above the notch. In G. plicatus ssp. byzantinus and many forms of G. elwesii a basal mark is also present; this may be guite separate or may coalesce with the apical mark to varying extent, occasionally forming a solid green block. It used to be easy to say that G. elwesii always had two marks, while a snowdrop with glaucous, supervolute leaves but only one mark was G. caucasicus. However, research by Dr. Aaron Davis of the Royal Botanic Gardens at Kew has shown that the plants known in horticulture as G. caucasicus are in fact merely forms of the widespread (in Turkey) and variable G. elwesii.

Davis has recently completed a long-awaited monographic review of the genus *Galanthus*, which is being



Parts of a Snowdrop Flower (Galanthus elwesii)

published by Timber Press. To supplement it from the gardener's perspective, Matthew Bishop, Aaron Davis, and I are preparing a book that aims to describe all named cultivars and provide an accurate record of their origins. Much of the interest in snowdrops comes from knowing their origins and pedigree-many have some little story behind them, perhaps how they were found behind a cowhouse or rescued from a churchyard just before a tidy-minded vicar dug it up. Another, possibly slightly snobbish, frisson of interest is given by the frequent possibility of tracing a chain of gifts from discoverer to donor to donor and ultimate recipient. It will be some time before this book reaches the publication stage, but my fellow authors and I hope it will prove to be the essential guide to snowdrops for the Twenty-First Century.

Almost all snowdrop cultivars are derived from the three species G. nivalis, G. plicatus, and G. elwesii, and the hybrids between them, although several other species are quite widely cultivated. These include the autumnflowering G. reginae-olgae, which starts the snowdrop season off, usually appearing in October. However in 1997 the first of the season in my garden in Maidenhead opened on 29 September; the last snowdrop faded on 1 April, just as the first peony opened. The peak flowering period of this extended season-from over 250 cultivars-was in mid-February. The latest species to open is usually G. ikariae, a large-flowered species with dull green, convolute leaves found on a few Greek islands.

Remarkably, most cultivars have arisen purely by chance as self-sown seedlings, particularly in gardens where combination of the three commonly grown parents are located. There has been very little deliberate breeding of snowdrops. Most vary only in size or shape from the parent or parents and retain the parental pattern of markings on the flower, but a range of color variants has been selected, with flowers with green markings on the outer segments, flowers with no markings, or where the green markings are replaced by yellow. Similar patterns of variation exist throughout the genus, and similar variants can be found in all three of the commonly grown species; these characters can also appear in hybrids and doubles.

Of all the variants, yellow snowdrops probably excite the most interest; not only have their green markings been replaced by yellow, but they are often rather yellowish in the leaf as well. Not surprisingly, they can be rather feeble and need a lot of care in siting if they are to do well. The best known is G. nivalis Sandersii Group (photo, p. 298), formerly known as 'Lutescens' or 'Flavescens', which all originated in woods in Northumberland, England. They are small and almost waif-like, but very charming. The double yellow G. nivalis 'Lady Elphinstone' (photo, p. 299) appeared in a garden about a hundred years ago and is either loved or loathed. The uncharitable liken her yellow petticoats to a burst fried egg, but others admire the soft yellow glow and are prepared to pay quite large sums to possess a bulb. Perhaps the finest of all yellow snowdrops is a hybrid (G. nivalis x plicatus) that appeared in the garden of the late Primrose Warburg near Oxford and has been named after Unfortunately 'Primrose her. Warburg' is still very rare, and it will be some time before it becomes available; at least it seems to be a vigorous plant.

Green snowdrops are distinguished by extra green coloration on the outer segments, although this varies

between clones from a few faint streaks to an overall wash. The most frequently seen is G. nivalis 'Viridapice', which has a distinct green mark at the tip of the outer segments, as well as an often enlarged spathe (the membranous structure from which a snowdrop flower emerges). The most extreme form of spatheenlargement is seen in G. nivalis 'Scharlockii' (photo, p. 299), in which the spathe forms two leafy, ear-like structures that wave above the flower. Double forms of G. nivalis occasionally have a faint mark on the outer segments, as do some forms of G. elwesii; it is unusual in G. plicatus, although examples are known. Perhaps the greenest snowdrop is G. nivalis 'Virescens', which was imported to Britain from the European continent prior to 1891. It has entirely green inner segments, and the outer segments are heavily green-tinged. The leaves are very gray, and it flowers rather late, making it immediately distinct from anything else. It is very slow to bulk up and remains a rare plant, being offered in one nurseryman's list

this spring for £12.50 or approximately \$20 US. Much easier to grow is *G. nivalis* 'Greenish', discovered in Austria in the 1960s, but it does have a paler flower.

When the green color disappears entirely a pure white or "poculiform" snowdrop results; they are usually very beautiful. My favorite snowdrop is one of these white ones, a cultivar of *G. nivalis* called 'Sandhill Gate'. Its segments are of equal length and spread slightly, permitting the anthers to apparently glow, tingeing the whole flower with reflected yellow light. Although I keep experimenting with it in different spots I do not find it easy to grow, a problem that many have with the poculiform cultivars.

A few of the hybrid cultivars must be mentioned in any review of snowdrops, and I would recommend five first-class, vigorous clones that should be the foundation of any snowdrop collection.

'Atkinsii' is named after a 19th century English snowdrop grower, in whose garden it appeared. It has elongated, tear-drop-shaped flowers,



applanate e.g., Galanthus nivalis



explicative e.g., *Galanthus plicatus*

supervolute e.g., *Galanthus elwesii*

Leaf Arrangement in Galanthus

Diagrams show a transverse section of the shoot as it emerges from the basal sheath appearing relatively early in the season.

'S. Arnott' (photo, p. 298) has a more rounded flower and is a hearty thing, holding its flowers on stiff, erect stems; they have a particularly strong fragrance. Its raiser, Samuel Arnott, was the provost of Dumfries, Scotland.

These and 'Straffan' are typical, one-spotted snowdrops, probably all being hybrids between G. nivalis and G. plicatus. 'Straffan' arose in an Irish garden, supposedly in 1856, near a colony of G. plicatus that the owner, Lord Clarina, had brought back from the battlefields of the Crimea. Rather like the poppies of Flanders, the soldiers of



the Crimean War were Galanthus plicatus ssp. byzantinus at Cresbourne astonished by the snow-

drops appearing from the war-torn ground, and many sent bulbs home. 'Straffan' flowers late in the season and is unusual in always bearing two flowers from between the same pair of leaves.

'Robin Hood' is yet another 19th century plant, a hybrid between *G. plicatus* and *G. elwesii*, raised by James Allen in Somerset. It nearly died out but hung on in one or two gardens, from which it was rescued and propagated. The flowers are rather pointed in outline and are held close to the scape; the inner segment has an elongated, cross-shaped marking that is easily recognized.

Finally, my essential collection would include 'Hill Poë', another Irish find (photo, p. 297). It is a double, with five outer segments looking as if they are stretched out over the inner segments, forming a perfectly neat rosette of green-and-white frills. Again it is probably a *G. nivalis* x *plicatus* cross.

All these will grow well in rich soil in partial shade, that neither bakes in summer nor floods in winter. I find that they do very well under rose bushes, which are leafless at snowdrop flowering time but provide shade and comparative dryness in summer. Some people grow them in isolated clumps, the white flowers contrasting nicely with the brown soil, but I prefer to see them among other early flowers—crocuses, *Eranthis*, and *Cyclamen coum*, for example, creating a quilt of color that catches the eye in the dark days of February.

Snowdrops are usually planted "in the green," while actively growing.

This is certainly a convenient moment to move them, as they are still visible, and planting sites can be selected before summer vegetation covers the ground. Seeing the plant in flower also lessens the chance of getting an impostor by mistake. My personal opinion is that snowdrops are best moved, like any other bulb, when dormant in summer, avoiding the stresses that transplantation in growth can bring. The big problem with this method is that snowdrop bulbs must not become baked and desiccated in high temperatures. That is easily avoided by keeping them in a cool place, packed in peat or sand, or planting them immediately. A dry death has been the fate of many of the millions of wild-dug Turkish snowdrops, which only too often reach suppliers in a moribund state and then fail to perform in the garden. Although remarkably frost hardy in the open ground, a snowdrop will be killed outright if planted in a poorly-drained container that becomes frozen solid; excessive heat and humidity in summer are also unsuitable. Planting deeply (they are quite happy at depths of 6-8") may well help them survive climatic extremes.

Visitors to England in February can see good collections of snowdrops in several private gardens that open to the public on specified days, or at the Royal Horticultural Society's Garden at Wisley, where a national collection of Galanthus is held. It is always worth remembering that snowdrops flower at the coldest time of year and that inspecting them in the garden can be a very cold, back-breaking experience. An alternative, warmer, option is to visit the February Flower Show held at the Royal Horticultural Society's Hall in Westminster, London (to be next held February 16-17, 1999). Here exhibitors display snowdrops at a comfortable height, and informal gaggles of galanthophiles gather to discuss their favorite flower. Snowdrops can be purchased at such events, or from specialist nurseries, some of which are prepared to ship abroad.

SOURCES OF GALANTHUS IN THE UNITED STATES

- McClure & Zimmerman, PO Box 368, Friesland, Wisconsin 53935
- Old House Gardens, 536 Third St., Ann Arbor, MI 48103-4957
- Van Engelen, Inc., 23 Tulip Drive, Bantam, CT 06750
- Jacques Amand, PO. Box 59001, Potomac, MD 20859

John Grimshaw gardens in Maidenhead, Berkshire, United Kingdom. He is a member of the Committee of the Alpine Garden Society. He authored *The Gardener's Atlas*, addressing the origins of garden plants. He will speak on the NARGS tour in January 1999 and will lead a botanical tour for the AGS to East Africa in June 1999. Photo by author. Drawing, Panayoti Kelaidis.



HABRANTHUS IN EASTERN NORTH CAROLINA

by Michael Chelednik

The genus *Habranthus* is a group of small, bulbous plants eminently suited to garden culture in the South. *Habranthus* means delicate flower, and indeed the blooms are graceful. The flowers range in color from whites and yellows through shades of orange and pink; there is even a near-blue lavender. *Habranthus* species rarely grow taller than 8–10" and are unobtrusive when not in bloom because of their scant foliage. Perfect for the rock garden, many are vigorous enough for the front of the border.

Habranthus are members of the New World Amaryllidaceae. The centers of distribution for the genus are in temperate areas of southeastern South America and in northern Mexico. Habranthus is similar to the genus Zephyranthes, and indeed many species have at one time or another been classified in both genera. The primary difference between the two is that in Habranthus the blooms nod forward slightly (botanically termed oblique or declining), although this is not very pronounced in some species. Also, in Habranthus the six stamens are of four different lengths, while in Zephyranthes (photo, p. 294) they are of two lengths.

There are at this writing approximately 20 recognized species of *Habranthus.* Some probably remain yet to be discovered. What follows is a list of species that I have grown long enough to be familiar with. I grow many more distinct variants that came to me without a name or label and some species, too, that I've acquired so recently that I know little of their requirements.

The Species

Habranthus robustus is probably the most commonly cultivated species in eastern North America and is worthy of its popularity. With scapes to 8-10", it bears prolific blooms of a beautiful shade of pinkish-lavender from June through early September. Flower color is somewhat variable in this species, and true pink forms exist, as well as a form with blush, near-white blooms that circulates under the name "Florida Strain." For H. robustus the specific epithet is very appropriate, for it is vigorous enough to hold its own in a perennial border. The bulbs offset very quickly, and this species is also one of the most cold hardy; occasional dips to 0°F pose no problem.

Habranthus originates in southeastern South America.

Habranthus martinezii is another species from South America-this one with white to pale-pink flowers that have a greenish-yellow throat. It is smaller than H. robustus, blooming intermittently from May through August. This delicate species, 6-8" tall and with scant foliage, is probably more suited to the rock garden; in a border it could easily disappear under the growth of more vigorous plants. In spite of its delicacy, I have found this species easy to grow. It increases steadily by means of offsets and has been cold hardy for me to 8°F in eastern North Carolina.

Habranthus magnoi has relatively large flowers borne on scapes 8–10" tall in late spring and again in early fall. They are a creamy white with a deep-green throat. My original bulb has survived and flowered but has shown no sign of vegetative increase in the three years that I've had it.

Habranthus brachyandrus (p. 294) is the giant of the genus and seems to be everyone's favorite. The large flowers, up to 3.5" in diameter, are carried on scapes that reach up to 16" in some forms. The blooms are pink-lavender shading to deepest burgundy at the base; the burgundy coloration sometimes is also displayed in the upper two-thirds of the scape, making for an extremely striking plant. The blooms never open fully, but this does nothing to detract from the beauty of the plant. Habranthus brachyandrus is fully cold hardy in eastern North Carolina and requires only a fair amount of sun and a reasonably well-drained soil.

The only problem associated with *Habranthus brachyandrus* is the difficulty in securing it. While seed and to a

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lesser extent plants are available with a little searching, the resulting plants are almost invariably not the true brachyandrus but its hybrid with H. robustus, H. x floryi. This problem occurs when both plants are grown together and are in flower at the same time (which is likely to occur considering the free-flowering habit of robustus). Habranthus robustus will cross with H. brachuandrus, the latter acting as the mother plant. In this situation seed from H. robustus will always produce straight H. robustus seedlings, whereas 90% of H. brachyandrus seed will produce intermediate seedlings if H. robustus has been grown nearby.

What results is a variable though garden-worthy series of plants combining the profligacy of H. robustus with the attractive bloom characteristics of H. brachyandrus. Plants usually have the burgundy throat of H. brachyandrus combined with the shorter stature of H. robustus: but variation does occur. I have a form from Marion Drummond of Baton Rouge that towers to nearly 20" and forms bulbs the size of racquetballs. Another form from a breeder in Louisiana has the deepest color saturation of any Habranthus I've seen, with blooms of a uniform, medium purple tinged with magenta; he calls this 'Purple King'. 'Russell Manning' is a readily available selection usually listed as a form of H. robustus; it belongs here. Rather thin petals give the flower a somewhat spidery, unkempt appearance. It has the bad habit of multiplying at the expense of bloom, but this can be remedied by planting the bulbs more deeply. Once established, it is a prolific bloomer.

Habranthus tubispathus (including H. texanus, photo, p. 294) is another commonly cultivated species and the only one native to the US (in Texas and southwest Louisiana). It is also native to southeastern South America, a curious distribution pattern that will be discussed later. The blooms are somewhat conical, almost thimble-shaped, and an attractive bronze-orange on the outside and golden yellow within. It flowers for me from early summer through fall and never fails to attract the attention of garden visitors. This is a vigorous species, but one that needs to be planted where the flowers can be admired at close range. It blooms on scapes 6-8" tall. There is also a pink form that occurs in the South American population, var. roseus, with dingy pink flowers that open more widely than the species.

Habranthus tubispathus var. roseus has flowers that can range from pale pink through a dingy shade to an odd, though attractive buff.

Habranthus tubispathus has an unusual distribution pattern with separate populations in Texas and in Argentina and Brazil. This is a distribution pattern shared by a number of bulbous plants, including Zephyranthes chlorosolen and Herbertia lahue (pronounced law'way). In the past botanists chose to separate the two forms, labelling the South American form H. tubispathus and the Texan form *H. texanus* or *H. tubispathus* var. texanus. Today botanists are generally of the consensus that the two forms are conspecific. Yet there are minor differences. The foliage of the South American variety tends to be more lush and more upright than the Texas variety, which has leaves that are somewhat lax and sometimes grow in a spiraling fashion. Also, the blooms of H. tubispathus var. texanus are generally larger and open more widely than those of the South America H. tubispathus var. tubispathus.

Habranthus gracilifolius (syn. H. estensis) is my favorite of the genus

and a lovely plant. It has thread-like foliage (hence the specific epithet) and flowers like H. x floryi in miniature: pink-purple with a burgundy base. The blooms, on 6-7" stems, nod slightly and don't open very widely. The nodding trait detracts from the beauty of most Habranthus species but adds grace to this one, I think. It originates in South America. Plants and seed offered in this country as such are very often forms of H. tubispathus var. roseus. They can be difficult to distinguish, but H. gracilifolius usually has thinner foliage. Also, the petals on H. gracilifolius do not overlap noticeably, whereas on forms of *H. tubispathus* var. roseus the petals do overlap, with three outer ones and three inner ones.

Habranthus concolor (p. 294) is a species that I wish I could grow more successfully, as the blooms are a luminous shade of chartreuse. It is a desert species and requires both excellent drainage and lime. I have had much better success growing it in pots than in the open garden. It stands 8–9" tall in flower.

Habranthus howardii is another desert species, again with yellowgreen blooms of strong substance. I have had more success with this species outside in the ground, where it has grown for three years. It has not increased but has held its own, blooming fitfully through the summer with relatively large flowers on 10" scapes.

There are no truly excellent reference books for *Habranthus* and no current monograph. The genus is definitely in flux, with numerous taxonomic additions and changes every year. Most tropical and subtropical genera of bulbs pose similar taxonomic challenges. Nevertheless, the plants are sufficiently charming that it is worth braving these academic hurdles. *Habranthus* Culture

Simply stated, most Habranthus species are easy to grow, happy as long as they have at least a half day of sun and a reasonably well-drained soil. Although a slightly alkaline medium is sometimes prescribed, I have not found this to be necessary. Exceptions include the desert species, such as H. concolor and H. howardii, which demand both an extremely friable, alkaline soil and maximum sun. I have found both more successful in pot culture. Although all the species described here are hardy in my garden in eastern North Carolina, I generally grow newly procured species and variants in pots until I have enough to risk planting outside. Pot culture is fairly simple, and for gardeners in colder areas it may be the only option. A commercial potting soil is sufficient for most species, although one may add perlite or grit to ensure good drainage (most mixtures have a tendency to become compacted after about six months). Small pots are sufficient, and for clumping species they can be beneficial, as slightly pot-bound plants will bloom more profusely. Light requirements are high (as they are outdoors), as is the need for moisture during the growing season. I fertilize Habranthus using a balanced, time-release fertilizer, such as Osmocote, at medium rate. In the winter, I let my plants rest and water only when they are very dry. Culture for the desert species is similar, except that a bit of dolomitic lime should be added to the growing medium and less water should be given.

Habranthus are very easy from seed, provided that the seed is extremely fresh. The seed has a half-life of approximately six months; i.e., half the seed dies in that time. Any seed older than one year is nearly worthless. Due to the short viability, there are few sources for seeds. Probably the best are the seed exchanges of the various gardening societies. NARGS is very good, and I have also had luck with both the Alpine Garden Society and the Scottish Rock Garden Club. The International Bulb Society is also an option. Relatively few nurseries sell *Habranthus*. Yucca Do in Texas has a few, as well as We-Du, Plant Delights, and Arrowhead Alpines. Woodlanders offers two distinct forms of *H. x floryi*, which they sell as *H. tubispathus* and *H. brachyandrus*, respectively.

SOURCES OF HABRANTHUS

- Arrowhead Alpines, PO Box 857, Fowlerville, MI 48836. Catalog price, \$2.
- Plant Delights Nursery, 9241 Sauls Road, Raleigh, NC 27603. Catalog price, 10 first-class stamps or a box of chocolates.
- We-Du Nurseries, Route 5, Box 724, Marion, NC 28752. Catalog price, \$2.
- Woodlanders, 1128 Colleton Ave., Aiken, SC 29801. Catalog price, \$2.
- Yucca Do Nursery, Rt. 3, Box 104, Hempstead, TX 77445. Catalog price, \$2.

Mike Chelednik lives and gardens in Greenville, North Carolina. His diverse interests in plants and seeds include most bulbous plants, hellebores, and any "new" plant. He sows about 200 species each year.

AWARDS

AWARD OF MERIT

Thomas W. Stuart

Few people in recent years have impacted upon the North American Rock Garden Society in so many ways as this recipient. Active on both the local and national level, Tom served as Chair of the Hudson Valley Chapter for two terms, headed NARGS' Grants, Membership, and Internet Committees, and has recently become a Director of the Board.

As a growth project for his Chapter, he conceived and produced *Rock and Alpine Gardens*, a handbook and source list for beginning rock gardeners that was distributed nationally and sold out by our chapters, and shortly will be posted on the Internet.



An offshoot of this project was the publication of *Rock Garden Plants of North America*, an anthology from the *Bulletin of the American Rock Garden Society*, that was conceived by Tom and implemented with the help of Anne Spiegel and Jacques Mommens and an army of over 100 volunteers who read and evaluated every article that had been published. This beautiful volume reflects admirably the aims and purposes of our national organization and is a sterling tribute to Tom's vision and efforts.

A facilitator *par excellence*, Tom has galvanized many of us into action on projects that have changed the face of our organization. One early effort was organizing the participation of five metropolitan NARGS chapters in a joint rock garden presentation at the New York Flower Show that won several awards, including a gold medal for "Best Educational Exhibit."

In 1994, when no chapter could be persuaded to host the International Interim Conference, Tom got together an appropriate group of horticulturists and gardeners in Utah that subsequently became the Wasatch Chapter. He put together a support group for volunteers from both coasts who journeyed there to help midwife the newly-born chapter and the 1996 Annual Meeting ultimately held in that area.

While many had talked of the difficulty of germinating seed of certain shortlived species, no one had done anything about it until Tom single-handedly established the Ephemeral Seed Exchange, an international effort that once again galvanized many of our members into action.

Perhaps the most compelling of Tom's achievements has been to bring NARGS into the cyberworld. He has dragged NARGS (and many of its members) headlong toward the Twenty-first Century. Because of Tom's vision and insistence, we now have an internet committee and a NARGS website on the internet that is the envy of every horticultural organization—or should be, for it is a model of what can be done with this great educational and promotional tool.

We are enlisting new members of NARGS daily through the medium of the internet and introducing them to the wonders of rock gardening. With its help, we are spreading the gospel of alpines and rock plants more effectively than we ever did in print. In a word, it is revolutionary...and we are greatly indebted to Tom Stuart for getting us there.

Hence, this richly-deserved Award of Merit.

—Larry Thomas

Andrew Pierce

Andrew Pierce is an internationally known horticulturist, plantsman, lecturer, and author. He has had experience in gardening from childhood on. Andrew was trained in England at Kent Horticultural Institute; obtained the Kew Certificate from the Royal Botanic Gardens at Kew; and earned the prestigious National Diploma in Horticulture from the Royal Horticultural Society. He worked in England and Bermuda before arriving in Denver in 1976 to join the staff of Denver Botanic Gardens, where he served in many positions, including Interim Acting Director.



Andrew was an early leader in the development of the Rocky Mountain Chapter and served two terms as its President in the formative years and then again in 1995–96. He also served two terms on the Board of Directors of NARGS. Andrew chaired the Steering Committee for the 1982 NARGS Annual Meeting in Boulder, Colorado, in 1982 and four years later served as chairman of the Steering Committee of Alpines '86, the Second Interim International Rock Garden Plant Conference at Boulder.

Andrew has served as a member of Vail's Betty Ford Alpine Garden Board of Directors, where he was Secretary to the Board and deeply involved in the planning and development of Vail's perennial garden and new alpine garden.

He served as president of the Colorado Garden and Home Show Board of Directors; was a board member of the Perennials Section of the Colorado Greenhouse Growers Association; and served as co-chairman of the regional and national Perennial Plant Association meeting in Denver in 1997. He was Plant Portrait Coordinator for the Rocky Mountain Chapter publication Saximontana.

Since 1994 Andrew has been on the staff of Hudson Gardens in Littleton, Colorado, currently serving as Director of Horticulture. He has guided the development of this 35-acre garden from the beginning. The grounds are home to a 250-ton, massive rock garden of dark red Navajo Sandstone boulders, including a section devoted to Colorado natives. Ultimately this rock garden will be expanded to 15,000 square feet.

Andrew has authored more than 60 articles and papers in horticultural and gardening magazines and professional journals. He has also conducted highly popular garden tours of Great Britain under the sponsorship of the Denver Botanic Gardens and Hudson Gardens.

Andrew co-chaired the 1996–97 NARGS Phase II Seed Exchange and has assisted the Chapter in an infinite number of ways. He always finds time to visit about plants and his charm and wit have won him hundreds of friends. In 1996 Andrew was honored with the T. Paul Maslin Award from the Rocky Mountain Chapter for his "unfailing good spirit, his zest for people and for life itself, for his integrity and his vision."

Andrew lives with his wife Gina on the flank of Independence Mt. near Evergreen, Colorado, at 7800'. Here he finds time to work in his own montane garden, where perennials and alpines are happily growing on granite gravel and pockets of soil diligently hauled in and placed so that a naturalistic setting is accomplished. Andrew well deserves the NARGS Award of Merit—along with our thanks.

-Pat Carter

Jane McGary

Although Jane might be described as a relatively recent (and definitely youthful) member of the Society, her contributions exceed those of many of the veterans and elders who sustain a group like ours.

Jane has held many offices in the Columbia-Willamette Chapter and has edited the newsletter. But she would deserve this award alone for her yeoman's service on behalf of our Seed Exchange these last few years: it seems that she has done practically all the work on the first phase of the Exchange the last two years. Most significantly, she did it with such finesse and good humor that she made it seem like duck soup. Amazing!



Jane is a linguist and wordsmith by trade, editing books and articles, and the sort of editor who can thoroughly massage a piece, leaving authors looking brilliant—and thinking they did it all by themselves. She is a paragon of tact, good taste, and judgment.

Finally Jane is a consummate gardener. She has possibly the most extensive collection of bulbs in North America at present, grown to perfection. She has explored for alpines from Alaska to the southern Andes, having explored both

hemispheres on earth as well as in her brain.

What is particularly gratifying is to know that Jane is so young and has so much more to offer our Society in the coming years.

—Panayoti Kelaidis

MARVIN BLACK AWARD

Wayne Roderick

During Wayne's long career with plants he has converted many a casual observer to a dedicated member of the horticultural community. His enthusiasm for all types of plants, especially rock garden plants and bulbs, has made him a favorite with members of plant organizations all over the world.

As curator of the California Native Section at the University of California Botanical Garden in Berkeley, he created an impressive alpine area with choice specimens from mountain ranges in California. He also designed and constructed a serpentine barren, giving visi-



tors a rare opportunity to see plants from both these areas in cultivation. Later, as director of the Regional Parks Botanic Garden, he began an annual series of lectures on California native plants that were extremely informative, entertaining, and inspiring. Since his retirement these lectures have been continued by the current director, Stephen Edwards, and named The Wayne Roderick Lectures in his honor. At both these botanical gardens, he organized groups of volunteers who grew plants and supported the gardens.

Wayne was one of the founding members of the Western Chapter of NARGS. He organized the first Winter Study Weekend hosted by the Western Chapter and has been one of the principal planners of all the Study Weekends our Chapter has sponsored, whether he was officially chairman or not. Most of the time he was chairman or co-chair. He was indispensable in the planning and execution of the NARGS Annual Meeting at Tahoe in 1990. Being actively involved in the lectures and the all-important field trips, Wayne was working out details well in advance, taking us on the trails, and inspiring the rest of us to make the meeting a success. Even now he is working on Study Weekend plans for the year 2000, when our chapter will once again host this event.

Wayne has personally hosted a large number of foreign visitors to California and guided them on well-planned field trips to significant botanical areas up and down the West Coast. His generosity has encouraged many botanical experts to share their slides and knowledge at our local and regional meetings. He has written articles for many horticultural journals, including *Fremontia*, *The Four Seasons*, and *Pacific Horticulture*, as well as our own Rock Garden Society publications. His good slides and enthusiastic lectures for all kinds of horticultural societies in the Bay Area and also in far off places have won many converts to rock gardening. He makes field trips a pleasant educational experience, and casual observers end up taking an active interest in the plants. The annual open house at his own garden in Orinda attracts many visitors, introducing them to many rare and beautiful bulbs and rock garden plants in troughs and containers as well as in his hillside garden.

Through all these activities, Wayne has attracted many people to our Rock Garden Society and encouraged their active participation in our organization. His generosity and patience in sharing his knowledge, seeds, and plants with all of us have encouraged novice and plantsman alike. His friendly and jovial manner and encyclopedic knowledge of the distribution and growth habits of innumerable plants have made him an inspiration for us all. He is certainly deserving of our recognition, and it seems fitting to honor him with this award, established in honor of his good friend, Marvin Black.

-Margery Edgren

MARCEL LEPINIEC AWARD

Charles Oliver

Quietly remote in the hills of western Pennsylvania is a small nursery where an exciting hybridizing program has produced a number of stunning new cultivars. Two of the plants were awarded First Prize Gold Medals from the prestigious Holland Royal Society for Horticulture and Plant Biology in September 1997 (*Heucherella* 'Quicksilver' and *Heuchera* 'Regina').

Charles Oliver has introduced these hybrids through his nursery, The Primrose Path. His early hybridizing efforts with phlox produced some lovely plants such as Phlox 'Sunrise', currently



available through Mt. Tahoma Nursery, and my personal garden favorites *P. subulata* 'Allegheny Smoke' (a delightful fall bloomer) and *P. nivalis* 'Dark Eye'.

By the early 1990s, Charles was beginning to devote more time to the development of some lower and more compact *Heuchera*, *Tiarella*, and *Heucherella* plants, including such gems as the 8"-tall coral bell 'SanPico Rocita', introduced in 1995. I have *Heuchera* 'Petite Marbled Burgundy' and *H*. 'Petite Pink Bouquet' growing happily in my garden. Both plants are under a foot in height and are lovely.

A commonalty in his breeding program is his interest in developing hybrids that will withstand the heat and humidity we have in western Pennsylvania along with the low winter temperatures. His plants are found in many of the finest nurseries that specialize in rock garden plants, including Siskiyou Rare Plants, Greer Gardens, Roslyn Nursery, the aforementioned Mt. Tahoma Nursery, and more.

Clearly, Charles is a plantsman who is leaving an indelible mark as one of the most exciting young hybridizers to devote time and energies to the small gems we rock gardeners covet. His educational background includes a BA from Harvard in Biology and a PhD from Yale in genetics. His accomplishments and qualifications make him eminently suited to receive the Marcel LePiniec Award.

-Al Deurbrouck





The Piedmont Chapter invites you to a NARGS Eastern Winter Study Weekend January 29-31, 1999 The Sheraton Imperial Hotel Research Triangle Park between Raleigh and Durham, N. C.

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Variegated Plants in Color, by Yoshimichi Hirose. 260pp.,1,350 color photographs. List \$65; member \$55 (15%).

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Himalayan Cobra-lilies—Their Botany and Culture (2nd rev. Ed.)*, by Udai C. Pradhan. 100pp., 4 color plates, 16 b&w photos, 32 line drawings. List \$28; member \$25 (10%)

United Kingdom:

The RHS Plant Finder 1998/1999 (no illus.) List £12.99, member \$19.50 (10%) (This annual publication, although primarily used to locate suppliers of plants in the UK, it is extremely useful to identify all the currently available cultivars of a species and is the recognized authority on nomenclature.)

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APOLOGY/CORRECTION:

In the Complete List Summer 1998, issued with the Summer *Quarterly*, the listing for *Bitterroot*, by Jerry DeSanto was mistakenly listed as having no color pictures. There are actually nearly 40 color photos along with the history, cultivation and uses of *Lewisia rediviva*, the Montana state flower. (Paper, 120pp. Member price \$10.50.)

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