

June 1985

American Horticulturist

The background of the cover is a close-up photograph of a lush green fern. The fronds are densely packed, showing the intricate, feathery structure of the leaves. The lighting is bright, highlighting the various shades of green and the texture of the plant.

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The mustard family contains a wide variety of ornamental garden plants, from the much-loved candytuft to the less well known gillyflower or common stock, shown above. For more on this interesting group of plants, turn to page 28. Photograph by Dick Keen.

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On the Cover: After the initial burst of riotous spring color, many gardens have turned a more sedate, lush green by the month of June. The lovely fronds of these maidenhair ferns, *Adiantum pedatum*, are growing in an unusual garden devoted to the lush green color of ferns and foliage—Cary Arboretum's Fern Glen. Join author/photographer Margaret Parke for a tour of the Glen on page 22. Photograph by Margaret Parke.

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Apology of a Novice Gardener

Often when I'm talking with Society members, they will quickly move from general conversation about our membership programs to a horticultural question. I wonder how many members have noticed my apprehension when I am faced with a query like, "What shall I plant in my dry, shady garden?" I quickly pull out of my hat the names of our staff horticulturists, a trick at which I've become an expert.

For, although I work for the American Horticultural Society and do my best to support its aims and programs, I am not a trained horticulturist by any means. A classic liberal arts major, I have not one whit of formal training in horticulture. Every now and then, I'm gently reminded of my ignorance when I've raised an idea for a Society program or event that strikes the horticultural mind as singularly unsuitable. My horticulturist co-workers will say, "Well, naturally, you wouldn't have known why that won't work—you're not a horticulturist."

It's true—and it's also true that I need to be restrained and corrected when I develop concepts that some gardeners will not like. As my colleagues start rattling off botanical names with an air of authority, however, I must remind myself that I am not completely ignorant as far as plants are concerned. In fact, I've been a plant lover as long as I can remember.

When I think of my childhood, I remember roaming outdoors for hours, learning in intimate detail the topography of our semi-rural acre, with its flower beds, huge vegetable garden, 60-year-old maples and wooded ravine on two sides. The trees seem to arch across my memory when I think of those times. The French philosopher Gaston Bachelard, in *The Poetics of Space*, summed it up when he said, "A tree becomes a nest the moment a great dreamer hides in it." I spent many hours in trees—until I was too frequently detected trying to hide in the branches! The sensation of being lifted and held, the closeness of the miraculous leaves and the particular way



David Wear

certain branches seemed to be arranged as seats—all these qualities of various pines and maples seemed designed to give a child dreaming space.

Dream I did, and often about flowers. The type of flower I dreamt about varied from hydrangea to zinnia to tulip to (for special occasions) rose. Perhaps I was varying them seasonally, according to what was blooming in our big yard.

Then there was the pure excitement of following my father behind his plow, dropping the seed corn into the furrows he made, learning that these kernels would—with luck and work—become stiff, rustling stalks and, later still, the carefully wrapped yellow ears we ate for summer dinners. Roaming about our orchard of dwarf fruit trees, I learned about the tightly packed, nascent green fruits—that they would actually become edible apples, peaches and cherries.

I believe it is just this kind of primitive knowledge, acquired while playing outdoors and helping in the garden, that begets a sensitivity not only to plants but to the natural world as a whole. My horticulturist co-workers have told me they are concerned that many children growing up now won't have this sensitivity, because

gardening is no longer an integral part of life for most families. If this is true, people will be robbed of an enormous source of joy and recreation, and many of our compatriots may lose an appreciation for the need to conserve our natural resources. For it is perhaps the ability to dream of a plant as a wondrous, nurturing thing—or, at the very least, as an irreplaceable source of visual pleasure—that gives gardeners and non-gardeners alike an appreciation for the need to preserve our natural environment.

The American Horticultural Society's purpose is to promote gardening in this country and to provide American gardeners with educational resources and programs. According to a recent reader's survey conducted by the Society, the majority of Society members are advanced amateur gardeners. These members, along with our many professional members, help make the Society what it is: one of the leading voices in American horticulture. Yet other gardeners—including the dabblers and the one-house-plant-a-year types like myself—are also an important part of the Society. For the Society can profit from the views of any gardener, from the professionally trained to the novice amateur. It is by reaching gardeners and horticulturists at all levels that the American Horticultural Society will be successful in promoting gardening in America.

Ogden Nash once wrote, "My garden will never make me famous. I'm a horticultural ignoramus." Of course, I don't have to remain one. And I know that, as soon as this article is printed, Steve Davis, our Director of Grounds and Buildings, will be approaching me with a spade, a smile and an offer of "recreational activity" during lunch hours. Thanks to AHS, it's never too late to learn.

—Connie Clark,
Membership Director

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The Purslane Family

The silken blossoms of portulaca—silver-dollar-size, in white or cream, or shades of pink, gold, rose or orange-red—spread a sheet of color across the land. Also commonly known as moss rose, rose moss or sun plant of Brazil, this popular annual is *Portulaca grandiflora*. From coast to coast, it embellishes gardens both large and small.

This well-known garden annual is a member of the purslane family, Portulacaceae, consisting of more or less succulent herbs that are especially well represented in America and South Africa. The botanical name chosen for the family refers to the juicy qualities of its members, which carry (*porto*) milk or sap (*lac*). “Purslane” is a corruption from the French. Most species have mucilaginous, often acid stems and leaves. The fleshy, simple, alternate or opposite leaves enable the plants to survive in warm, dry regions. Flowers are generally small, except in a few species cherished by gardeners, including *P. grandiflora*. Typical flowers are regular and bisexual, and have two sepals, four or five petals that fall early, and few or many stamens. The flowers have nectar and are pollinated by insects. Fruit is a many-seeded capsule.

The characteristics of purslane family members are readily apparent in the many species of *Portulaca*. The garden annual *P. grandiflora* is native to the hot, sunny plains of southern Brazil. It is a sprawling plant that carpets the ground. Its small, fleshy, needle-like leaves contribute to the plant's resistance to heat and drought by enabling it to store water and by limiting surface evaporation.

The National Garden Bureau has designated 1985 as “The Year of the Portulaca.” *Portulaca* merits recognition for its resistance to heat and drought, its adaptability to a wide variety of growing conditions, and its generous production of appealing, colorful flowers.

Moss rose blossoms are one to two inches across, and may be single, semi-double or double. The singles are like little five-petaled cups; semi-doubles and doubles resemble miniature roses. These satin-textured flowers, like the flowers of some other members of the purslane family, close on



LEFT: *Claytonia virginica*, commonly called spring-beauty. ABOVE: Showy *Portulaca grandiflora*, rose moss or sun plant.

cloudy days or in the evening. Currently, hybridizers are devoting much of their attention to developing cultivars with flowers that do not close for lack of bright sunshine. Selections of these hybrids are already available from a few seedsmen. There are many brightly colored variants of *P. grandiflora*, and breeders are working to segregate colors so that gardeners will be able to order seeds of separate colors. Hybridizers are also trying to produce dwarf, compact, non-creeping plants for pot culture.

The moss rose is one of about 100 *Portulaca* species. A very close relative in the genus is common purslane or pusley, *P. oleracea*, a plant that has been cultivated since classical times as a salad green and potherb. A common garden and roadside weed, it is found in all 50 states, all over southern Canada, and in much of the rest of the world.

There are variations in the species. The wild form of *P. oleracea* grows low to the ground, spreading by reddish or purple-tinted stems with greenish-purple leaves. *P. oleracea* var. *sativa* is more erect, with thicker stems and larger leaves of golden yellowish-green. In both types, leaves are thick and fleshy, and stems are juicy. Centered in a rosette of almost opposite leaves

is a tiny golden flower of five to seven petals and with elegant golden stamens. The cultivar ‘Giganthes’ has double flowers about an inch across and is grown as an ornamental.

For most gardeners, purslane is a persistent weed. The soft stems root at the joints when in contact with soil; thus, even when hoed out, the plants manage to spread. Purslane is very hardy, grows in any kind of soil, and thrives in heat and drought. The plant's water-retentive leaves enable it to ripen seed even after being pulled up. Purslane reseeds itself, and seeds are viable in the soil for many years.

Gerard described the nature and uses of purslane in his *Herbal or General Historie of Plants* (1597): “It spreadeth upon the ground; it cometh up of its own accord in allies of gardens and vineyards. . . . Raw, it is much used in salads with oil, salt and vinegar.” Gerard also credited purslane with a variety of medicinal properties.

Purslane may have been introduced to Massachusetts as a salad green or potherb by the colonists as early as 1672. Interest in this herb continues today. Its mild flavor, palatability and mucilaginous qualities give it a wide range of uses as a kitchen vegetable. Stems and leaves can be eaten raw, alone or mixed with other greens. The

STRANGE RELATIVES

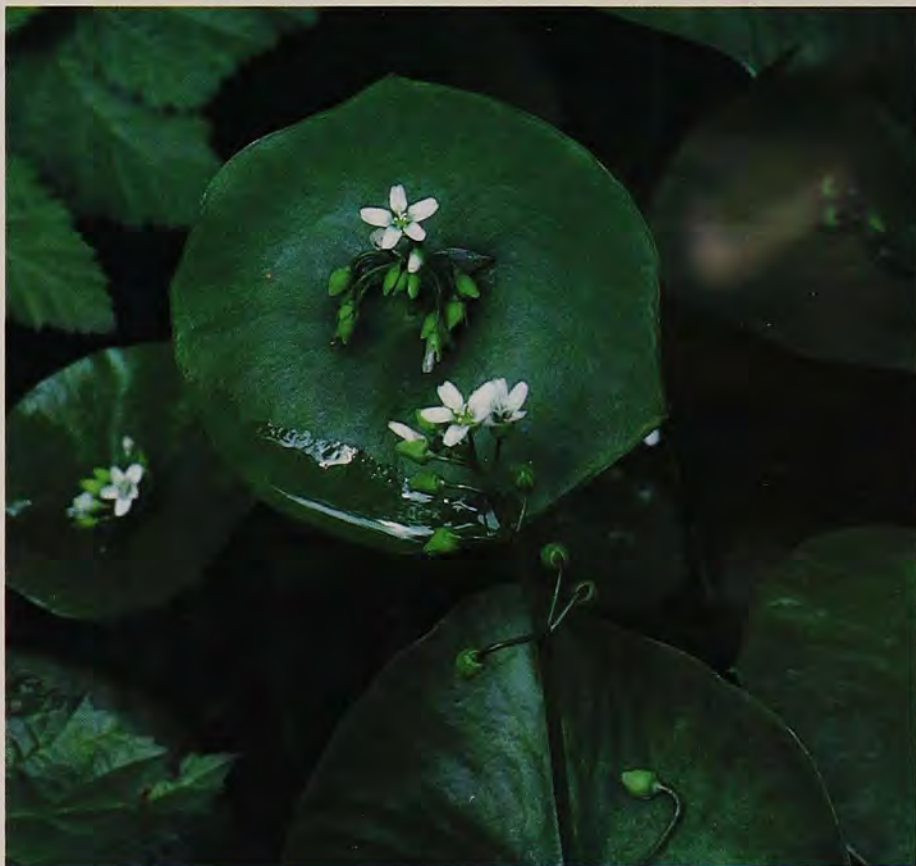


Pat O'Hara

plant can also be cooked like spinach. In his book *Walden*, Thoreau wrote of making "a satisfactory dinner of a dish of purslane which I gathered and boiled." Purslane can be frozen like spinach, or it can be dried and stored in jars for year-round use as a tasty cooked green with a flavor entirely different from that of fresh purslane. However, some gardeners consider storage impractical, and prefer to use purslane as a salad green.

According to the *Field Guide to Medical Wild Plants*, purslane is "earth-embracing" and unusually rich in important minerals and vitamins. It has an especially high iron content, and its acid flavor is due to a large amount of vitamin C. Although neither the Indians nor the colonists knew of the importance of minerals or vitamins, they recognized the healthful qualities of the plant they called pusley. The Indians prepared decoctions of the tender tips, stems and seeds to bring about relaxation and sleep, and to relieve various ailments.

Twentieth-century gardeners who wish to add to the variety of salad greens in their culinary repertoire can obtain purslane seeds from some mail-order seed sources. (See "Sources" on page 38.) Or, when the growing season is under way, a weed or two can be transplanted into a



Marv Poulson

ABOVE: *Lewisia rediviva*, commonly called bitter root. BELOW: *Montia perfoliata*, miner's lettuce or winter purslane.

vegetable garden row.

Another genus in the purslane family is *Lewisia*. The genus name honors Captain Meriwether Lewis (1774-1809), senior leader of the Lewis and Clark Expedition dispatched by President Jefferson to trace the course of the Missouri River across the continent. At one encampment, Lewis saw the Indians drying the white, starchy roots of a food plant; it was bitter root, *Lewisia rediviva*. Later, after he found the plant growing, Lewis gave the name bitter root to a river, a valley and a range of mountains in the territory he had explored.

All twelve species of the genus *Lewisia* are natives of western North America. Known for the striking beauty of their blossoms, they are collectors' pieces for the alpine garden or cold greenhouse. Their flowers arise singly or in branched clusters directly from a rosette of basal leaves. These fleshy perennials have starchy roots and are practically stemless; some plants are so short-stemmed that they seem to be sitting on the ground.

When lewisias were introduced, they were thought to be rigidly lime-hating and not very easy to grow. Now we know that although they prefer lime-free soil, they will endure some alkalinity if they are given plenty of humus in the form of acid peat.

Best known of the *Lewisia* species is *L. rediviva*, the state flower of Montana. The botanical name *Lewisia rediviva* was assigned by Frederick Pursh (1774-1820), a German explorer, collector and author who made distinguished contributions to American botany during the 21 years of his life in the United States. Some years after the Lewis and Clark Expedition returned home, Pursh sorted the collected plants in Philadelphia. While examining herbarium specimens, he discovered signs of life in bitter root; he planted some roots, which grew and flowered the following year. The epithet *rediviva* (meaning revived) thus refers to the unbelievable tenacity of the plant's roots.

The many-petaled flowers of *L. rediviva* are rose or white and borne on two-inch stems. They bloom from early spring to summer and are found in the rocky or gravelly foothills or mountains of northern California, north to British Columbia and east to the Rocky Mountains.

L. cotyledon blooms from early spring to summer in the mountains of northern California and southern Oregon. This succulent evergreen bears candy-striped flowers on 10-inch stems.

L. tweedyi is probably the most attrac-



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tive species for the garden. Large blossoms, one to three on a stalk, are two inches across, with eight to nine salmon-pink petals and 12 to 25 stamens.

L. tweedyi is one of the few species in the genus *Lewisia* that will not interbreed with other species; generally, *Lewisia* species are easily hybridized. In fact, those strains and named hybrids that have resulted from interbreeding not only surpass the species in beauty, but are far better garden plants than the species from which they originated. As wall plants, they are magnificent.

Spring-beauty is one of perhaps two dozen species of the genus *Claytonia*, another member of the purslane family. This small, spring-blooming, tuberous-rooted perennial with grass-like foliage was named in honor of John Clayton (1686-1773), an early plant explorer who came from England to Virginia in 1705.

Claytonia species, all of which are a foot or less in height, are native to western North America, as well as South America and the Old World. Many have edible leaves and tubers, and all are good for naturalizing in moist, woody soil.

Found in eastern North America, *C. virginica*, commonly known as spring-beauty or Mayflower, is a woodland species that blooms before forest leaves unfold. The flowers, white or streaked with red, are fleeting. Honey at the base of each petal is accessible to short-tongued insects. *Claytonia* spp. exhibit interesting movement: after pollination, the flower stalk bends down, then resumes an erect position when the fruit is ripe; the valves of the fruit, a capsule, contract as they dry, and expel the seeds with force.

C. caroliniana, Carolina spring-beauty, is a southeastern species. The plant is similar to *C. virginica*, although its flowers are smaller. Species from western North America include *C. megarhiza*, *C. parvifolia* and *C. rosea*, all of which bear pink or white flowers marked with pink or red.

A plant known as miner's lettuce or winter purslane is *Montia perfoliata*, from western North America. During the gold mining era in California, when it was difficult to get fresh vegetables, miners resorted to this and other plants for salad greens; they probably learned this use from the Indians or from the Spanish along the Pacific coast. Miner's lettuce is also called Cuban spinach; it grows wild in Cuba, where it was introduced and has naturalized.

The genus name honors Prof. Guiseppe

Monti, botanist from Bologna. The name *perfoliata* indicates that the leaf surrounds or embraces the stems. In this species, the stem is six inches to a foot tall and arises from basal leaves that are borne on long petioles and vary from narrow to nearly round. More than halfway up the stalk, the plant bears a single pair of leaves that form a disk or cup that completely encircles the stem. Above these two leaves is a cluster of small white or pinkish flowers. An odd and dainty plant, it grows more coarsely in cultivation than in the wild.

Montia species, including *M. chamissoi*, a floating aquatic or creeping perennial adapted to bog gardens or shallow pools, can be found throughout the West. *Montia* species from both water and alpine habitats are among the wildflowers of Australia. These species are similar to *Claytonia* spp. but grow from fibrous roots instead of from tubers.

Portulacaria, which resembles *Portulaca*, is commonly known as elephant bush or *spekboom* in South Africa, where it is native. There is only one species: *P. afra*, a succulent shrub or small tree that is soft-wooded, maybe eight to 12 feet high, and produces small, pink flowers. It is the favorite food plant of elephants; it is relished by other animals as well, and is commonly used as fodder for livestock.

In cultivation, *P. afra* is grown in the open in coastal California, or elsewhere as a greenhouse oddity. The species or its cultivars 'Tricolor' and 'Variegata' are often represented in collections of succulents. David Fairchild, upon first seeing this odd plant, described its branches and stems as "having the puffy appearance of the arms of a doll . . . a weird thing reminding me of a giant purslane."

Another succulent purslane of interest to collectors is *Anacampseros*. This African genus contains over 50 tender species that have miniature rosettes with fleshy leaves. The flowers—white, rose, red or cream—are solitary or arranged on a coiled stalk. They open only in the sun. The genus includes examples of the two succulent growth forms: stem succulents and leaf succulents. The plants are prostrate, and form mats of foliage. Some species are green and shining, but cobwebbed with long hairs in the leaf axils. The genus name *Anacampseros* comes from a belief among South African natives that it is an effective ingredient in love potions used to bring back lost love; therefore, members of the genus are known as love roses, and the species, *A. telephiastrum*, is called love plant.

Blossoms of *Talinum*, farnesflower, are showy but ephemeral, as is true of certain other purslane family members. *Talinum* species are used in border plantings and rock gardens, or as tub plants for their foliage interest.

T. paniculatum, jewels-of-Opar, is a tuberous-rooted, two-foot-tall perennial with three-inch, elliptical leaves. The red to yellow flowers, borne on 10-inch stems, open on sunny days from June to October. This species is native to the southern United States and southward to Central America. One form with white-edged leaves is used as an ornamental foliage plant for tubs or pots.

T. calycinum, rock pink, is a wildflower that is native from Nebraska south to Mexico, and is occasionally grown in the rock garden. An erect six- to 12-inch plant, its pink, one-inch flowers, which are borne in few-flowered clusters, arise from basal leaf clusters in June.

T. triangulare is a fleshy perennial from tropical America; its tubers are sometimes eaten as a vegetable. Collections of succulents often include this ornamental species.

Calandrinia, rock purslane, is a genus that bears the name of an eighteenth-century botanist from Geneva, J. L. Calandrin. Some species are of easy culture if treated as hardy annuals; they are suitable for border or rock gardens, although their blossoms are fleeting. The leaves of some species are colorful and more conspicuous than the flowers.

Redmaids or kisses, *C. ciliata*, is a one-foot annual with rosy-purple flowers. *C. ciliata* var. *menziesii*, a variety found in western North America, is two feet tall, with crimson or rose-red flowers. Its three-inch leaves may be eaten as a garnish or as greens.

C. umbellata, also called redmaids, is a trailing plant from Peru and Chile that bears crimson-magenta flowers and is suitable for the rock garden.

For a family of modest size, Portulacaceae affords a surprising variety of horticultural possibilities. Whether one is interested in developing a garden devoted to a favorite flower and its relatives, or in initiating a plant-collecting specialty or hobby, or even embarking on a taste-testing venture, purslane family members are suitable candidates to consider. ♀

—Jane Steffey

Jane Steffey is an active AHS volunteer and serves as Editorial Advisor to *American Horticulturist*.



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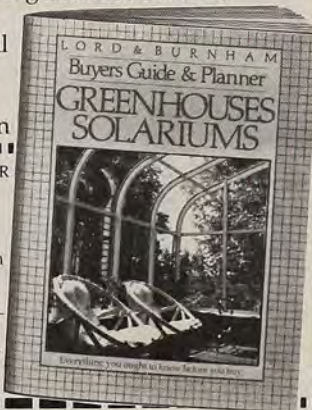


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Daisies



Michael Selig

The American naturalist John Burroughs once said, "The most human plants are the weeds. How they cling to man and follow him around the world. . . !" This is especially true of an American favorite, the oxeye daisy, *Chrysanthemum leucanthemum*. Looking out across a field of weeds during the summer months, it is hard to believe that all the oxeye daisies there are descendants of immigrants; there are no oxeye daisies indigenous to North America.

The story of the oxeye daisy and its trek across the world is similar to that of many of our weeds and wildflowers. The seeds were probably brought to this continent mixed in with forage seeds such as clover or meadow grasses, or perhaps with hay used as packing material by the early settlers. Whatever the mode of transportation, the seeds flourished once they arrived.

The Pilgrims took a special liking to the oxeye daisy because it reminded them of the common English daisy, *Bellis perennis*,

which they had left at home. They cared for and nurtured the oxeye, and helped it take a firm foothold in their new land.

Although a relative newcomer to North America, the oxeye daisy has been known for centuries in Europe and Asia. A design resembling the daisy was found on artifacts from the Minoan civilization on Crete dating back 4,000 years. The daisy was probably originally from China; the Chinese hybridized the native flower and produced many beautiful forms that eventually became the parents of our garden chrysanthemums.

Throughout the centuries, oxeye daisies have been used for a variety of purposes, both medicinal and magical. During the Middle Ages, they were used to treat a number of ailments, including smallpox, tumors, jaundice, boils and skin rashes. Sometimes called banewort (for "bane" meaning bone and "wort" meaning food or medicine), daisies were often made into a salve and applied to broken bones. A

solution from the plant was used to soothe rough or chapped skin. Daisies were also reported to be useful in removing warts and curing insanity. According to superstition, if you ate three daisies after having a tooth pulled, you would never again be bothered with toothaches.

Perhaps the most unusual medicinal use of the daisy was described in *The American Herbal* (1801). The author stated that "the leaves and flowers [of the daisy] loosen the belly and are good for diseases arising from the drinking of cold liquors when the body is hot." Many also believed that eating the roots of the daisy plant would stunt one's growth. It was thought that feeding daisy leaves to puppies soon after the animals were born would keep them from growing too large.

Along the Rhine River in Western Europe, oxeye daisies were referred to as *johanneskrut* or St. John's Day Flower. Residents of the area believed the yellow center of the flower had the power to ward off

thunder and lightning, and often hung daisies indoors for protection against storms.

Over the centuries, the daisy has been considered a kind of fortune teller. For instance, to dream of the daisy in the spring has been said to bring a summer full of happiness and good fortune. However, to dream of the daisy in the fall is thought to bring months of bad luck. Tradition also tells us that by plucking off the petals of a daisy one by one and chanting "he loves

me, he loves me not," we can determine the true feelings of our beloved. (Actually, the people who began this superstition knew exactly what they were doing, because 90 percent of daisy flowers have an uneven number of petals; if we begin with "he loves me," chances are we will end with the same phrase.)

The common name "daisy" is derived from "day's eye"; the flowers of *Bellis perennis*, the English daisy, open in the morning and close at night. Chaucer called dai-

sies "ee of the daie," and Ben Jonson wrote of "Day's-eye." The oxeye daisy was called "marguerite" by the French, in honor of Margaret of Anjou (1430-1482), an English queen who was raised in France. She adopted the daisy as her symbol and used three of these flowers in her coat of arms.

The botanical name for the oxeye daisy, *Chrysanthemum leucanthemum*, is quite descriptive; *Chrysanthemum* is derived from the Greek words for yellow and flower, and *leucanthemum* is from the Greek words for white and flower. Since oxeye flower heads are composed of yellow disc florets surrounded by white ray florets, this name seems particularly appropriate.

Bellis perennis, the English daisy, whose popularity among the early settlers is partially responsible for the oxeye's successful establishment in this country, also has its share of names and traditions. The name *Bellis* may have come from the Latin word *bellus*, which means handsome. The name may also be derived from the Latin word *bellum*, meaning war, since the plant was once used to stanch the flow of blood on the battlefield.

A common weed in Europe, *B. perennis* is sometimes called whiteweed or the "flower of spring." According to Mrs. Stephen Batson in *The Summer Garden of Pleasure*, spring is said to have arrived when one "can cover nine daisies with one impress of a foot."

In Scotland, daisies are called *gowan*, and in Yorkshire their name is *bairnwort*, or "beloved by children." The Germans call them *ganesblume*, or goose flower, presumably because of the color of the blossom. Daisies are also sometimes called *tausendschon*, which means one thousand times beautiful, or *massliebchen*, which means love's measure. The Swedes call the daisy *prastkrage*, or priest's collar, because of its resemblance to the ruffled collar of Lutheran ministers. The flower's shape and color have also earned it the names moon-flower and moon daisy.

Almost from the moment it arrived in this country, the modest oxeye, known and loved for centuries in Europe, became one of America's best-loved immigrants. Now found everywhere—from cracks in sidewalks to the grounds of the most magnificent homes—the oxeye daisy has truly taken root in its adopted land. ☼

—Laura C. Martin

Laura Martin is a free-lance writer and lecturer from Atlanta, Georgia. She is author of *Wildflower Folklore*, published by The East Woods Press.

Daisies for Gardens

Daisies did not escape the attention of horticulturists, and today many gardens are graced with yellow and white flowers that resemble the wild oxeye.

Luther Burbank was foremost among the scientists who took an interest in developing showier daisies for the garden. Burbank developed the lovely and popular Shasta daisies, named for Mt. Shasta, which he could see from his laboratory window in California. Shasta daisies, *Chrysanthemum* × *superbum*, are, according to *Hortus Third*, "presumably a hybrid between *C. lacustre* and *C. maximum*."

Shasta daisies (*Chrysanthemum* × *superbum*, but often listed as *C. maximum*) are among the hardiest and most satisfying of all perennials. By choosing several cultivars, one can have daisies all summer long. There are dwarf plants for the front of the border, taller ones for the back, and cultivars that can provide cut blossoms in the house.

All Shastas like full sun, but some of the double-flowered cultivars may do better with a little afternoon shade. The soil needs to be rich, moist, but well drained, for soggy winter soils can kill the plants. Although generally free from pests and diseases, the plants should be examined in the spring for aphids and other pests. Set plants out in the fall or spring, and place them one foot apart. To maintain healthy plants, divide the rootstocks every other year. Deadheading is recommended to prolong the blooming period.

Among the many cultivars of Shasta daisies are the following:

- **'Aglaya'**. (Also known as the lace daisy.) The most fully double, white, densely quilled, long-lasting flowers. One of the hardiest. (2 ft.)

- **'Alaska'**. One of the best-known older varieties. Strong grower and heavy bloomer.

Known for its hardiness. Flowers good for cutting. Feed in winter.

- **'Beaute Nivelloise'**. White with frilled petals. (3 ft.)

- **'Cobham Gold'**. Closest to a true yellow Shasta. Free-blooming, with large yellow-cream blossoms. Deep yellow, high-crested centers. (15-18 in.)

- **'Diener's Giant Double Strain'**. Wide variety of types on the same plant. Full doubles, singles, frilly- and plain-edged. (2 ft.)

- **'Esther Read'**. Double white. (1½ ft.)

- **'Horace Read'**. Similar to 'Esther Read' but not as free-flowering. Larger double white flowers, 4 inches across.

- **'Little Miss Muffet'**. Semi-double white blossoms developed by a Swiss plantsman. Flowers July and August. (14 in.)

- **'Majestic'**. Very large, single, white blossoms, 4 to 5 inches across. (2 ft.)

- **'Marconi'**. Double-frilled, very large (6-in.) blossoms. Good cut flower. Blooms in June. (2 ft.)

- **'Mayfield Giant'**. Large, creamy-white blossoms. (3½ ft.)

- **'Mount Shasta'**. Crested center with large (4-inch) blooms. Flowers for many weeks. Best treated as a biennial, for it tends to die out. (2-3 ft.)

- **'Polaris'**. Large single blossoms. Blooms heavily in June and July, and later if flowers are cut back. (2 ft.)

- **'Silver Princess'**. Single white with golden centers. (2 ft.)

- **'Snow Cloud'**. Anemone-centered double flowers, 3-4 inches across. (2-3 ft.)

- **'Snow Princess'**. Large white petals with fringed edges. (3 ft.)

- **'Wirral Pride'**. Bushy plants. Flowers with wide, short petals that are heavily crested in the center. Flowers are long-lasting on the bush and when cut. (2 ft.)

- **'W. L. Harkness'**. Large, single white flowers. (2½ ft.)

Book Reviews



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LEAVES: The Formation, Characteristics, and Uses of Hundreds of Leaves Found in All Parts of the World.

Kjell B. Sandved, photographs. Ghilleen Tolmie Prance, text. Crown Publishers, Inc. New York, New York. 1985. 244 pages; hardcover, \$35.00. AHS member price, \$26.25.

"Leaves, leaves, leaves. They are all around us. They color our world green. For each person on earth there are millions of green leaves bringing nourishment to all flesh and sustaining the oxygen level in the air we breathe. And yet we know so little about the diversity of these senior inhabitants of earth. As urban creatures, we have lost touch with nature, so much so that most of us see in a leaf only a repetition of the next one. How true it is that the common things in life are too often taken for granted and overlooked, and leaves are among them."

With this paragraph, photographer Kjell B. Sandved sets the tone for his lavish book celebrating the beauty and incredible variety of the world's leaves. The book is divided into chapters illustrating the many diverse kinds and uses of leaves, such as variegated leaves, succulent leaves, leaves that move, modified leaves, leaves that serve as homes, leaves that defend their plants, fossil leaves and leaves of prey. Each chapter is illustrated with many of Sandved's stunning photographs, which were taken all over the world. Although this is primarily a picture book, each chapter has a text introduction, and there are chapters on the functions and structures of leaves, as well as on leaf shapes and arrangements.

Luther Burbank once wrote, "The most wonderful thing in the world to me is this: the leaf of a growing plant." Any gardener, after turning through the pages of this book, could not help but share this sentiment.

BALL RED BOOK: GREENHOUSE GROWING.

(14th Edition.) Vic Ball, Editor. Reston Publishing Company. Reston, Virginia. 720 pages; hardcover, \$26.95. AHS member price, \$22.65.

An essential reference book for any nurseryman's library, this new edition of the *Ball Red Book* is, like its predecessors, a basic text on commercial production of horticultural crops. The book provides extensive information on such topics as fuel-efficient heating, mechanization, automatic watering, soil mixes, germinating seed, environmental control and insect control. It also includes a brand-new section on computer applications in horticultural production. Over 425 pages are devoted to the cultural requirements of specific crops, from ageratum to zinnias. This section includes extensive discussions on how to produce azaleas, spring bulb crops, foliage plants, hydrangeas, lilies for Easter, poinsettias, hanging baskets, and a variety of cut flowers.

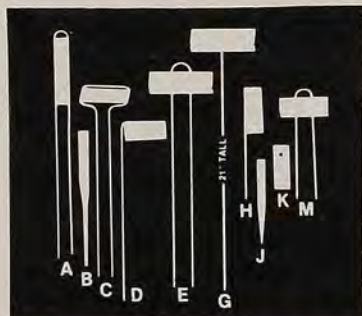
Although designed and written with the commercial grower in mind, this book will be extremely useful to amateurs who are considering entering the commercial field, or to any individual interested in knowing how horticultural crops are produced.

Two Field Guides

OAKS OF NORTH AMERICA.

Howard A. Miller & Samuel H. Lamb. Naturegraph Publishers, Inc. Happy Camp, California. 1985. 327 pages; hardcover, \$14.95; softcover, \$9.95. AHS member price, \$13.45 (hardcover), \$8.95 (softcover).

This useful field guide lists and describes over 75 species and varieties of oaks (*Quercus* spp.) found in North America. The species are divided into four regional groups: Eastern oaks (43 species and va-



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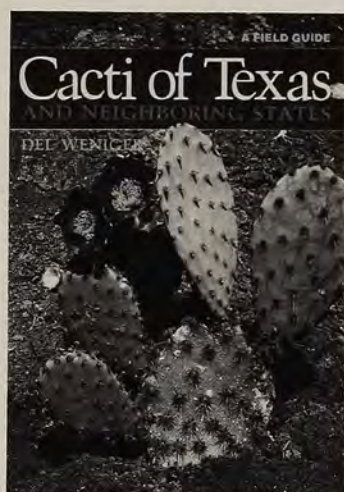
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rieties); oaks of Texas west of the 100th meridian (9); Southwest oaks (16); and Pacific Coast oaks (11). In addition to describing the growth habits and other characteristics of each species, the book includes detailed range maps and photographs of leaves, bark, winter twigs and acorns for most species. Each section devoted to a regional group is preceded by a key, which will help the user identify the various species in the region. The book also includes a list of oaks whose ranges overlap the Mexican border, as well as a key to 112 oak species found in Mexico. The introductory sections of this guide are also interesting; they contain a history of the uses of oaks, an explanation of the value oaks have for wildlife and a discussion of the pests of oaks.

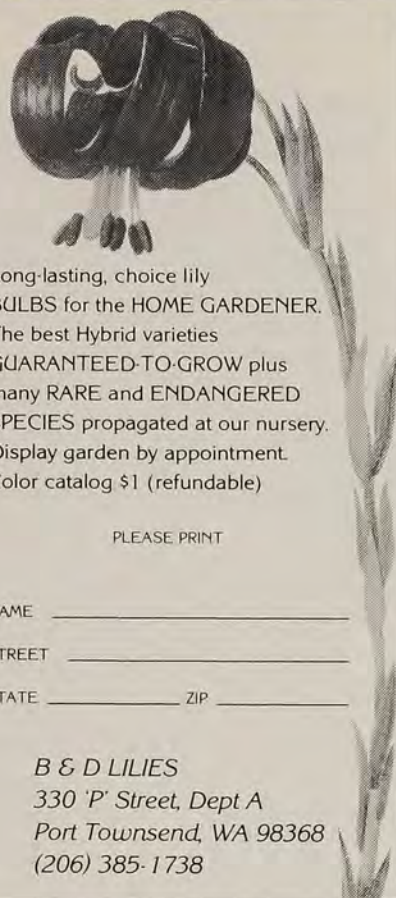


CACTI OF TEXAS AND NEIGHBORING STATES.

Del Weniger. University of Texas Press. Austin, Texas. 1984. 356 pages; hardcover, \$24.95; softcover, \$14.95. AHS member price, \$19.95 (hardcover), \$11.95 (softcover).

This guide to nearly 200 species and varieties of cacti found growing in the Southwest is a useful reference for any native plant enthusiast living in Texas, New Mexico, Oklahoma, Arkansas or Louisiana. *Cacti of Texas and Neighboring States* begins with a key to all 11 genera of cacti found growing in the region, and includes keys to the species in the larger genera—*Echinocereus*, *Echinocactus*, *Mammillaria* and *Opuntia*. Each species and botanical variety included in the book is illustrated with a color photograph, and the author provides an extensive description, common names and range notes for each taxon.

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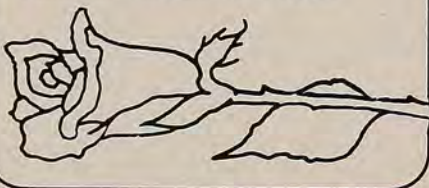
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BOOK REVIEWS



THE AMERICAN WOMAN'S GARDEN.

Rosemary Verey & Ellen Samuels,
Editors. Little, Brown & Company.
Boston, Massachusetts. 1984. 191 pages;
hardcover, \$29.95. AHS member price,
\$26.95.

As its title suggests, this sumptuous book is a companion to *The Englishwoman's Garden*, an extremely popular collection of essays by British women about their gardens and gardening in general. The editors (Rosemary Verey was co-editor of *The Englishwoman's Garden*) have collected essays from 30 American women who garden. Each of these gardeners presents the history of her own garden, her thoughts about the gardens she has created and cared for, and her personal insights into gardening. The essays, each of which is illustrated with superb photographs, are grouped according to the type of garden each woman maintains—historic, city and town, estate, perennial and country gardens, as well as gardens of collectors and specialists. Rosemary Verey's introduction, "An English View of the American Woman's Garden," and Ellen Samuels's epilogue, "Notes of an American Garden Traveler," complete the book.

Although many of the gardeners featured in this book garden on a much grander scale than is possible for many Americans, the essays and accompanying photographs are inspirational. Each essay not only gives insight into the ways in which another person approaches gardening, but also presents individual design philosophies and recommends favorite plant combinations. These women gardeners come from all over the country—from California to Massachusetts, and from Minnesota to Georgia—and gardeners from every state will find something of value in this book.

BONSAI: THE ART AND TECHNIQUE.

Dorothy S. Young. Prentice-Hall, Inc.
Englewood Cliffs, New Jersey. 1985.
423 pages; hardcover, \$29.95. AHS
member price, \$26.50.

Bonsai: The Art and Technique has much to offer the advanced bonsai enthusiast, as well as the gardener who has recently become interested in this ancient art. The author has included extensive discussions of wiring, pruning, container mixes, and design and potting techniques, as well as chapters on saikei (tree and rock plantings) and two Chinese styles of bonsai—the Lingnan grow-and-clip method and rock plantings. Gardeners who do not have the facilities for growing traditional bonsai out-of-doors will find the chapter devoted to indoor bonsai especially useful. The second part of this book is devoted to an extensive list of species that are suitable for bonsai. Each species is described, and specific cultural notes are provided.

The text is informative, and the many black-and-white photographs and line drawings are useful. More important, the book is American, and devotes space to American methods for growing and training bonsai, as well as the traditional Japanese and Chinese methods. An essential component of any well-rounded bonsai library, Dorothy Young's book is undoubtedly destined to become a classic for American bonsai growers.

New In Paperback

CARNIVOROUS PLANTS.

Adrian Slack. The MIT Press.
Cambridge, Massachusetts. 1985. 240
pages; softcover, \$12.50. AHS member
price, \$10.00.

This fascinating guide to the world's carnivorous plants and how to grow them has, until now, been available only in hardcover. The author describes the major groups of carnivorous plants, and has included extensive information on cultivation. The book is illustrated throughout with color and black-and-white photographs, as well as line drawings. ☉

—Barbara W. Ellis

Barbara W. Ellis is Editor of *American Horticulturist* and Publications Director for the American Horticultural Society.

Vines

Vines are one of the most versatile living forms in a gardener's design vocabulary. Grown around trellises, arches and arbors, or anchored in drifts of perennials, vines can quickly give added dimension and shade to a featureless landscape and make large spaces more intimate. Like lines drawn in a painting, the weight, mass and texture of different vines can direct the eye up, across or deeper into a garden composition.

Trained around doorways and porches, and against walls, vines can lend distinction to an otherwise flat or non-committal house facade; the delicate foliage and flowers of some vines lighten heavy architecture, while others impart substance.

Vines can also play an important role in integrating a house and garden. At Nymans in Sussex, England, for example, roses (which, of course, aren't really vines) and honeysuckle create a tapestry against the ruins of the manor house. These climbing plants—rising from among *Cistus* and huge, silvery mounds of *Senecio*, with its yellow, daisy-like flowers—re-enforce the romantic character of the structure and tie the building in with surrounding gardens. Without this vertical display, the great windowless and roofless hulk would sit starkly on its stretch of open lawn.

While Nymans is large, the essential elements in this scene are similar to what many of us confront on a smaller scale when integrating architecture with garden and landscape. To bridge the gap, we must do more than plant a few yews or rhododendrons around a foundation or on either side of a doorway.

Frequently, when trying to establish a legitimate and sensitive relationship between architecture and garden, there are



Although not true vines, climbing roses can lend vine-like distinction to the landscape.

divergent elements that must be reconciled, whether harmoniously or in dramatic contrast. In the case of a recent design project of mine, a single vine accomplished this quite neatly.

At a much-used entrance to a kitchen, along a short path from the driveway, there was simply too much going on; where garage met house, four different roof lines merged in a jigsaw of angles and architectural styles. With fences, gates, drainpipes and roofs, visitors didn't know where to look. In fact, from the drive, it wasn't clear this was an entrance at all. Also, an opportunity was lost to play up a magnificent view of surrounding mountains through this mishmash of roofs and gates. The simple addition of *Hydrangea anomala* subsp. *petiolaris*, commonly called climbing hydrangea, helped not only to unify the various structures, but also to clarify the scene so that the mountain could be seen more clearly as part of the composition.

On the other hand, it isn't always the placement or relationships of plants and structures that give a garden meaning. Sometimes it can be a single plant or setting that evokes the quintessential qualities of shade or sunlight, and the qualities of that single plant become the essence of a sea-

son. Here, again, vines can play a crucial role.

One of my richest garden memories is of a sagging porch, listing wicker chairs and a thick bower of Dutchman's-pipe. Here was a scene of timelessness, of mild decay, evoking a sense of summer's ease. No elaborate gazebo, planted with the most artfully selected vines and roses, could have said it as succinctly or as sweetly.

Apparently, this blowzy vine was chosen years ago simply to provide deep shade and privacy. Dutch-

man's-pipe, *Aristolochia durior*, grows rapidly and has rounded, coarsely textured leaves that sometimes reach a foot in length. With its small, scentless flowers (rather like meerschaum pipes in shape), barely visible beneath its voluminous foliage, this old-fashioned porch vine is not something one would grow for deliberate dramatic effect. The only care this enthusiastic vine ever received was a twice-yearly chop with a large kitchen knife, just so people could get through the door. But for all of this—or because of it—this vine's character was important in establishing the mood of this garden corner.

Of course, one cannot throw together a couple of disjointed elements—a trellis here, a vine on a porch or a stone wall there—and expect the result to be a satisfying garden. It is important to consider how a wall, like one between a lawn and meadow, separates space physically and stylistically, as well as what happens in the resulting space. Nevertheless, the success of this one-time country garden—and many other gardens—lies in its stylistic integrity, in the ability of the gardener to understand the character of a vine or other plant, then place it with simple conviction. ☘

—Margaret Hensel

Margaret Hensel is a landscape designer and writer living in western Massachusetts.



Lutea Hybrid
Tree Peonies

Imagine a collection of giant roses blooming on tropical-looking shrubs with deeply notched foliage. One, resembling a huge, strawberry-red camellia, is labeled 'Banquet'. Another, adorned with ruffled rosettes of butter-yellow, is called 'Age of Gold'. Rising like a mushroom explosion is one filled with mahogany blooms that sizzle with crimson sparks inside stylishly waved petals. (The label says 'Thunderbolt'.) Yet another is hung with oversized pompoms of yellow flushed and edged with red, like a prop for a science fiction movie. Lifting this one ('Souvenir de Maxime Cornu') to the nose, we notice the scent of freshly cut grapefruit.

Lutea hybrid tree peonies once existed only in the imagination. Imagine a fully double peony blossom the color of a daffodil! Although at one time such a flower had no more substance than a sigh, it now bears the name 'Alice Harding' and sells for about \$15.00 for a three-year-old plant.

The peony world's "Midas touch" began with the discovery of *Paeonia lutea* about 100 years ago by French missionaries in southern China. Hybridists like Victor and Emile Lemoine, Louis Henry and A. P. Saunders used this shy, shrubby peony with flowers the color of buttercups to infuse the Chinese and Japanese tree peonies (*P. suffruticosa*) with genetic gold. The task, long neglected by nature, was suddenly taken up by man with a vengeance. Where none existed before, in one lifetime over 100 yellow-flowered peonies sprang into being, as though a bank of clouds had suddenly parted and the sun at last showed through.

The early European breeders worked with the "thousand-petaled" Chinese cultivars of tree peonies. Combining the nodding habit of *P. lutea* with such full flowers resulted in many hybrids with blooms that frequently hide in the foliage. (These blooms are best admired floating in a bowl, where their shyness turns to boasting.) In the United States, A. P. Saunders used the lighter, stiffer-stemmed Japanese tree peony cultivars for his crosses. These crosses resulted in far more garden-worthy plants that display their blooms with pride. Saunders also used *P. delavayi*, which is similar to *P. lutea* except for its black-red flowers, to produce some of his hybrids. This line produced such dark-hued peonies as the dramatic 'Black Pirate' and 'Vesuvian', which erupts into giant blooms that look like 'Crimson Glory' roses.

Lutea hybrid tree peony 'Angelet' was developed by the well-known peony hybridizer A. P. Saunders.

Today, as always, peony breeders are more inclined to concentrate on herbaceous peonies, the type most familiar to gardeners. A notable exception has been the Gratwick-Daphnis collaboration in which second-, third-, and even fourth-generation hybrids were worked over to reveal some of the deeper-seated genetic possibilities of *Paeonia*.

Lutea hybrids bloom about the time lilacs and Japanese tree peonies are fading, and roses and herbaceous peonies are coming on stage. They are not an intermission between acts, however. Rather, they are a show in their own right, worthy of serious selection and placement.

My favorite use of a tree peony is as a single, uncluttered specimen at a focal point on a lawn. Such strong understatement is in character with the tree peony's quiet, but commanding nature. Its rich flowers, shimmering against a spring-green lawn, create a hypnotic effect and an urge to get the camera. As a rule, the fully expanded leaves of a peony should not extend over grass. If the grass comes too close to the trunk, widen the circle around the plant.

One popular ritual is to line herbaceous peonies up along a driveway. This makes a handy cutting garden in the spring, an attractive green border during the summer, and a clear area for piling snow in winter. Tree peonies, however, are not suited to such regimentation. For one thing, they are less symmetrical than the regular perennial peonies. And their woody stems, which bear next year's buds above the ground, should not be subjected to traffic. Gardeners with a penchant for soldier-like line-ups might want to arrange a row along a wall (though not too close), a fence or a walk. A convex curve in the row that keeps the furthest plants out of view will add movement to the formation.

Beds are for petunias, not tree peonies. These unique shrubs, which may exceed five feet in height and breadth, do not fit in with mass planting schemes. The gardener who is not planning or managing an estate planting should not contemplate a group larger than three in one spot. If this is too confining, consider a ring of six or more encircling a sitting area, a pool or a sundial—or a border along the sunny sides of a patio. (Bear in mind, though, that these bushes provide only a quiet green color after their seasonal burst of bloom.)

Tree peonies are sturdy plants, but they will not stand up to competition with trees and other shrubs. Any mixing is best done with bedding annuals such as ageratum and marigolds or such docile perennials as

catmint (*Nepeta mussinii*), *Heuchera* and *Platycodon*. Peonies are not compatible with sprawlers, creepers and invaders. Bushes with a more aggressive nature than *Potentilla* or hybrid tea roses should be kept far away.

A lutea hybrid should be situated where its beauty may be observed without distractions. It need not be isolated, however. Tree peonies can be put to good use in the summer by permitting them to cascade by a stairway or to associate with a piece of garden sculpture. They also furnish graceful contrast to bolder, darker plants such as rhododendrons. In landscaping, they provide an element of informality, if desired. Keep them away from foundations, and avoid boxing them in among shrubbery. Also, leave plenty of space around them, and keep them forward; they are not background plants, tall as some may be.

Tree peonies should be planted in the fall. Choose a planting site that is well drained, doesn't bake in the hot afternoon sun, and is not a wind tunnel. An open location with some afternoon shade is best. Dig a generous hole, as you would for a fruit tree, and fill it with only good soil mixed with plenty of compost and/or peat moss, plus two pounds of bone meal per planting hole. The junction between the stem(s) and the roots should be four to five inches below the surface. Space the plants six feet apart, and don't pound the soil around the roots. Flood the area around the plant with a couple of buckets of water. If wind is a problem, place a heavy stake (I recommend an aluminum pipe for permanence) in the planting hole when the roots are set, centering the stake as nearly as possible. As new stems develop and the plant becomes bushy, the stems may be loosely tied to the stake with thick gray, green, black or brown yarn. Tie the youngest stems in early summer when they have stopped growing.

Keep a coarse, five- to six-inch mulch over the roots the first winter. Straw, oak leaves or wood chips are ideal. Thereafter, a two-inch mulch of finer material, such as dried grass clippings, is beneficial.

One annual feeding of low-nitrogen fertilizer, right after the tree peonies bloom, is sufficient nourishment. I have used bone meal—about a cup scratched into the soil around each plant—for years with excellent results. Like other peonies, these plants must not be pushed, just nudged a bit. Once planted properly, a lutea hybrid tree peony needs little attention except for routine weeding, cultivating and/or mulching.

Give it a good drink in prolonged dry weather. Tree peonies don't need pruning; a branch that juts out where you don't want it, or a dead branch, is all the wood that need be removed. (These cultural tips, by the way, apply to Japanese tree peonies as well as lutea hybrids.)

Finer points of culture are subject to opinion, which suggests that peonies adapt rather well to people. I contacted some tree peony enthusiasts and specialists, and asked them to share their views and experiences. These growers have been active in the development and popularization of lutea hybrid peonies.

"My 'pet hybrid' ('Alice Harding') must be very early, as it has shown considerable growth," writes octogenarian Father Joe Syrový of Iowa. "I have a cardboard box around it! Don't laugh!" Does this remind you of the pampering you give some pet of your own? Unlike Father Syrový's favorite, most lutea hybrids are in no hurry to leaf out in the spring. Consequently, the buds (brown and dead-looking through the winter) escape injury from late-spring frosts.

"Father Joe" likes to feed his tree peonies several times a year with wood ashes that contain burned bones. (I got a chill in my spine when I first read that.) He sometimes uses bone meal, and mulches with old sawdust. There are numerous variations on this phosphorus-potassium theme. Specialist Don Jenkins of North Carolina uses a mix of cottonseed meal, potash and phosphoric acid in March and late April, and mulches with wood chips. Louis Smirnow of New York, an importer of tree peonies from China and Japan, feeds his lutea hybrids superphosphate three weeks after blooming. Silvia Saunders, who resides in New York and is the daughter of the great hybridist A. P. Saunders, uses Rapid-Gro and Sequestrene. And Minnesota specialist W. G. Sindt uses 10-10-10 fertilizer after bloom and in very late fall. Under no circumstances should that first number in the chemical trinity (the proportion of nitrogen to phosphorus and potassium) be higher than the other two. Lawn food, with its high nitrogen content, must not come near these plants if you want them to bloom lavishly and enjoy a long life—two traits for which peonies are famous.

Tree peonies are sub-zero hardy, but in the far North, exposed stems may winter-kill. My tree peonies are in Maine, on the border of USDA Zones 4 and 5. We live in a protective microclimate that was once an apple orchard, so I do not cover my



Pamela Harper

Paeonia lutea, parent to the lutea hybrids, has nodding flowers.

plants. But snow cover has been uncertain in recent winters, and if I lived in a more exposed location, I might follow one or more of W. G. Sindt's suggestions: oak leaves in a frame; excelsior tied in and around each plant; Styrofoam rose cones; or bales of hay around the plant. The folks to the south may laugh at this, but it is no funnier than protecting the flowers from the broiling sun with beach umbrellas. Incidentally, tree peonies thrive further south than do herbaceous types. But no matter where you live, even if the local folk say you can't grow them, try a couple; they are surprisingly adaptable.

A striking difference between herbaceous peonies and the trees is that you won't find ants congregating on tree peony flower buds as they develop. And the tendency to blight, especially during a wet spring, is less. I have never sprayed my peonies, and I have lost few buds to botrytis. However, in other climates and under other conditions, it might be useful to spray in early spring with a fungicide. Don Jenkins sprays with a mixture of Cygon 2E, Benlate and a spreader-sticker. "Father Joe" uses Bordeaux Mixture.

The toughest question I asked these growers was which *one* lutea hybrid they

would not be without. Silvia Saunders, faced with an awesome array of hybrids (including many created by her father), reluctantly picked 'Renown' (Saunders), for its unique and beautiful color. It bears bright, light copper-red flowers with yellow overtones, and sometimes reblooms in July or August (a trait inherited from *P. lutea*).

For Louis Smirnow and Roger Nelson (a Nebraskan), the choice is 'Coronal' (also a Saunders hybrid), a beautifully furled, bell-shaped flower of rich ivory and palest yellow hue. The blooms are delicately edged and flushed with rose.

'High Noon' (Saunders) is the first choice of W. G. Sindt. A bright lemon-yellow, it is semi-double, reliable, and occasionally reblooms.

Don Jenkins's reason for choosing 'Gauguin' (Daphnis) is that "it grows better, produces more, and is a beautiful flower." Each petal of 'Gauguin' has red lines on the inside, with streaks of yellow from the base to the top. The back of the petals is golden-yellow with red streaks. The center of the flower is red, and the anthers are yellow.

My own favorite is 'Souvenir de Maxim Cornu', for the vigor of the plant and



Anthony De Blasi

'Princess' bears large, dusky-mauve flowers that are suffused with gold.

the sunset hues that illuminate the petals.

Selecting cultivars to grow is a bit like choosing specimens in a gem and mineral shop; the choice is overwhelming. Here are some (not yet mentioned) that keep surfacing on lists of favorites. (The hybridizers are indicated as follows: D = Daphnis; L = Lemoine; S = Saunders.)

'Angelet' (S). A tall plant with semi-double, yellow flowers that are faintly edged in rose and have a dark center. Resembles a yellow Japanese tree peony.

'Chinese Dragon' (S). Semi-double, bright crimson. Fringed blossoms on attractive plants with distinctive, bronze-tipped foliage that is finely cut.

'Chromatella' (L). Fully double, pure sulfur-yellow, large and fragrant.

'Hesperus' (S). Old rose pink single with yellow undertones, deep pink veins and purple flares. Provides a radiance of color. Reblooms on occasion.

'La Lorraine' (L). Refined, soft yellow, double rosette, with red hiding in the depths. Haunting fragrance. A low plant and late bloomer.

'Marchioness' (S). Single to semi-double blend of yellow, apricot and rose. Heart is dark and dramatic. Fine style, substance and performance.

'Mystery' (S). Large, single flowers of pearled lavender, with dark shadings and varied with very pale green.

'Roman Gold' (S). The best yellow single, according to David Reath of Michigan, who describes it as "phosphorescent yellow with deep red flares. Petals of gold substance, well carried on one of the best plants for landscaping."

'Silver Sails' (S). A favorite of A. P. Saunders. This is an elite garden plant that covers itself with large, single, silvery-yellow blossoms, faintly flushed and flared.

'Tria' (D). Three bright yellow, single flowers proudly held on each stem, opening in sequence to prolong the blooming period. Excellent garden plant.

Two persistent problems crop up when breeding lutea hybrid tree peonies. One is the weak stems and nodding habit of *P. lutea*, characteristics that take a genetic ride along with the desired yellow pigment. These problems have been overcome in some of the European hybrids ('L' Esperance', for example), most of the Saunders hybrids and all of the Daphnis hybrids. Infertility is the second breeding problem. To date, specialists have had difficulty wheedling nature into producing seeds beyond the first generation.

So far, the most successful specialist in this regard has been artist Nassos Daphnis of New York, whose goal has been the creation of hybrids in which the bad characteristics of *P. lutea* are eliminated and all the best qualities of *P. suffruticosa* (also called *P. moutan*) are retained. He is now working on an advanced generation of crosses that have $\frac{1}{8}$ lutea and $\frac{7}{8}$ suffruticosa "blood." The augmented suffruticosa inheritance also increases both male and female fertility. These new developments promise to lead to many more flowerers still existing only in the breeder's imagination. One suggestion that has been made for adding strength and hardiness is the introduction of some *P. potanini* 'Tall Yellow' (F. C. Stern) blood into the luteas.

The surge of interest in tree peonies in the last decade is due not only to their artistic beauty but to the fact that these "garden aristocrats" grow and respond to normal care. They are, in fact, much less demanding than roses. They are also neat, and stay put. When given a good start, they live and bloom for generations. Getting them well started means that you should:

1. Order stock that is at least three years old from tree peony specialists. Do this in the summer, so that your plants arrive promptly in the fall.

2. Plant them correctly, in a suitable place.

3. Keep them watered, weeded, fed and (if necessary) fenced off from animals, including two-legged types.

4. Don't push them with fertilizer, chemical or organic. Do *not* place any fertilizer (except bone meal) in the planting hole, whether it is slow-release or not. Do not expect immediate results; you're not planting tulips.

Father Syrový believes that tree peonies offer rewards for everyone, from the housewife or the tired businessperson, to the senior citizen or the overwrought youngster. Specifically, they provide peace and beauty, and something to look forward to each year with joy and satisfaction. Indeed, the show put on by the pink or red buds of a tree peony—as they explode in the spring and mushroom into waves of foliage and sensuous flowers—keeps us all wondering and keeps us young.

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Coaxing Iris from

"Iris slipped on her cloak, / And in that thin embrace of shining colours / She was a rainbow fleeting through the skies. . . ."

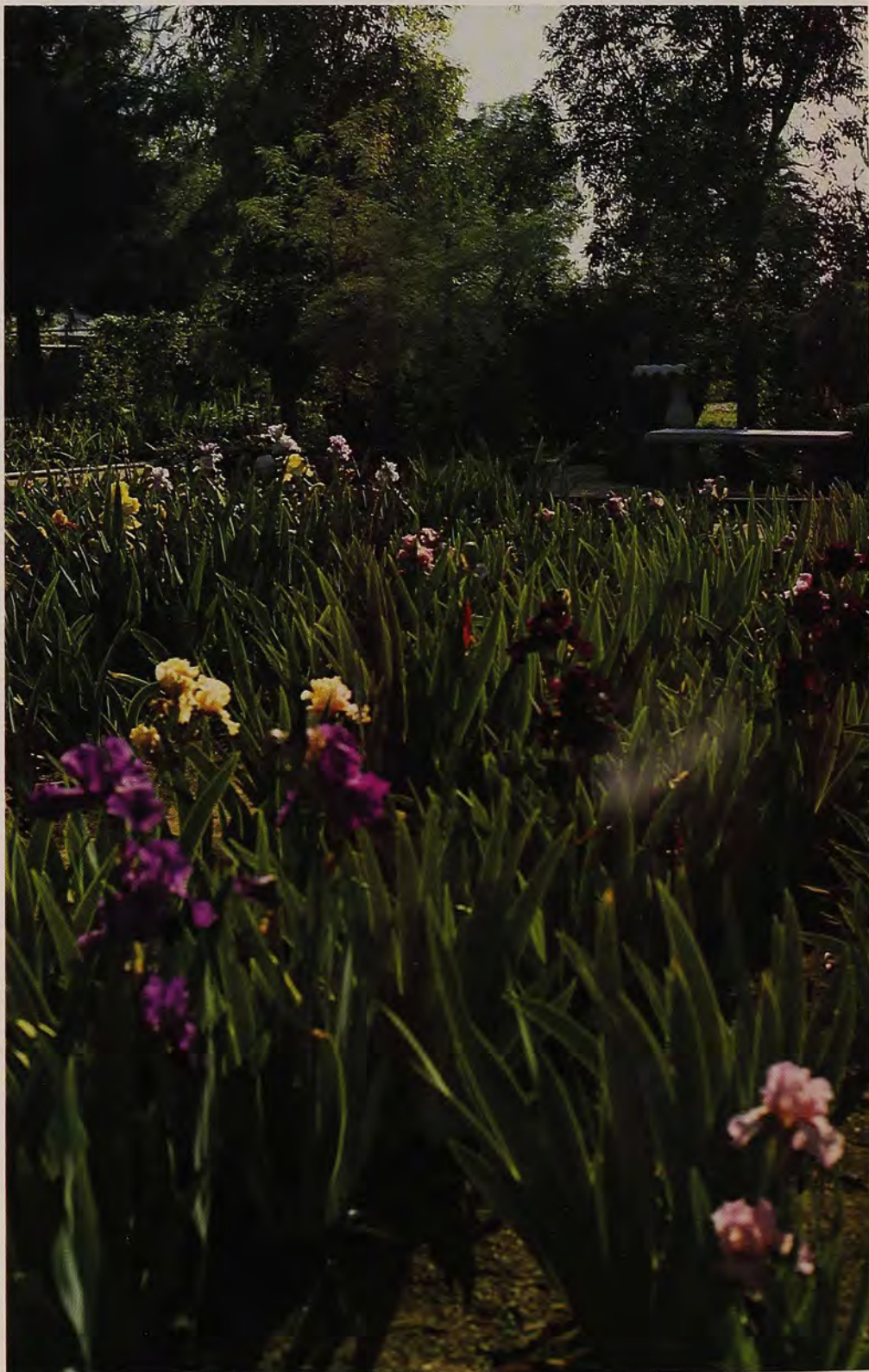
In *The Metamorphoses* Ovid makes several references to Iris, the goddess of the rainbow. Iris, Jove's courier to Earth, often carried her messages over the rainbow. It is fitting, then, that a flower of so many colors carries the name of the mythological goddess.

Today, iris grow happily in a city named after a mythological bird that rose from its ashes—Phoenix, Arizona. These "flowers of the rainbow" thrive thanks largely to the efforts of Bobbie and Dorald (Don) Shepard, who have pioneered the cultivation of iris in the desert during the last two decades.

Seventeen years ago the Shepards were given a handful of tall bearded iris. Unfamiliar with their cultural requirements, the Shepards planted them in the shade of a tall ash tree. "They grew foliage the first year, but didn't bloom until the second," Bobbie recalls. "We had 'Tournament Queen', a purple, and 'Snow Queen', a white. We entered them in a local show and won a blue ribbon by pure luck. We enjoyed the iris so much, we went to several nurseries in search of more rhizomes, but to no avail. *Iris* was not supposed to grow well in the desert, and since there was no demand, local nurseries stocked only limited supplies."

The Shepards began mail-ordering from California. They also found a few rhizomes at a local garden show hosted by the Sun Country Iris Society. "We bought 30 plants at the first sale," Don reminisces. "We were like children with new toys; we were fascinated by the colors and textures."

Each year their collection grew by several dozen rhizomes. The Shepards also began collecting prize ribbons and exhibition trophies from local flower shows. In 1972, the Sun Country Iris Society received a shipment of 300 rhizomes from Bernard and Celeste Hamner of Perris, California; only the Shepards had room for them. Once these new acquisitions were planted, the Shepards formally opened their backyard garden as an iris nursery.



the Desert

BY MAIRE SIMINGTON



Bob Simington

LEFT: Rows of iris fill the Shepards' Arizona garden. ABOVE: Tall bearded iris 'Persian Berry'.

From the street, the view into the Shepards' garden is overwhelming. The fans look like an emerald-green sea as they sway in warm desert breezes. Some 800 iris of all kinds cover three-quarters of an acre. The tall bearded, arilbred, spuria, median and Louisiana iris are all members of the genus *Iris*. There are also representatives from two other genera, *Dietes* and *Moraea*, whose members are commonly called iris. In the spring, the garden glistens with blossoms in jewel tones of amber, amethyst and aquamarine.

During the peak blooming period in April, several hundred people wander through the garden making their selections for fall purchase. Many stay for hours soaking in the ambience of the rich pastoral setting.

Sheep amble lazily in a neighboring yard and occasionally acknowledge the visitors with a deep, vibrating "baa." A few houses further down, cows graze contentedly, seemingly unaware of all that is around them.

Adjacent to the main iris fields are a few side gardens to surprise the discerning eye. A row of Louisiana iris, daylilies and *Watsonia* ushers one to the entrance of the cactus garden. A marker at the entrance reads, "The kiss of the sun for pardon / The song of the bird for mirth / One is nearer God's heaven in a garden / Than anywhere else on earth." Here, a host of succulents and desert wildflowers grow harmoniously. Silky-petaled, orange-red California poppies (*Eschscholzia californica*),

dusty-mauve-flowered Mexican evening primroses (*Oenothera berlandieri*) and rich rose-colored blooms of verbena soften the harsher lines of tall euphorbias, totem-pole cactus (*Lophocereus schottii* 'Monstrosus') and golden barrel cactus.

From the cactus garden, a crushed granite walkway winds through the circular garden, around the Shepards' home, and into the formal front entry area. One side of the walkway is flanked by a rose garden; the other is lush green. Fiddle-leaf figs, several myrtles and a Sago palm hug the arched, stuccoed entrance. Pink fairy lilies (*Zephyranthes*), lemon-yellow-flowered daylilies and a few Australian natives—strawflowers (*Helichrysum bracteatum*) and at least two species of kangaroo-paws (*Anigozanthos manglesii* and *A. flavidus*)—add bursts of subtle color to the deep green.

It is from this point that serious study of the iris garden can begin. All visitors are greeted by the high-pitched yips of the Shepards' long-haired Chihuahuas, DeeBee and El Tigre, two ankle-high fluffs of dog that scamper in excitement with each new arrival to the garden.

"When we first began showing iris several years ago, people asked us how large our greenhouse was," Bobbie muses. "They were amazed to learn that all our flowers are grown in the field under the desert sun. In fact, iris will grow better in Arizona than in any other part of the country. Our growing season lasts for nine months of the year, and there are virtually no diseases or borers to plague the rhizomes. The worst problem we have is sun scorch."

Proper planting is the key to a successful iris garden in the Southwest. Endless rows of hills and furrows line the rectangular beds at the Shepards' garden. All but the Louisiana and spuria iris are planted on top of the hills. (When grown in Arizona, Louisianas also seem to fare better with afternoon shade.)

"The rhizomes perched on the hills are kept dry as water seeps down into the rooting area," Don explains. "We also plant the toe of the rhizome toward the southwest. The sun comes up and over the back, minimizing the potential for sunburning."

Continued on page 39

Cary Arboretum's FERN GLEN

TEXT & PHOTOGRAPHY BY MARGARET PARKE

Luxuriant billowy fronds, dappled shade, green coolness, peace. . . . All are suggestive of the world when it was young, say 400 million years ago, when ferns first appeared on earth. And all can be found on a mere two acres of land at Cary Arboretum's Fern Glen in Millbrook, New York, an area known to carriage horse fanciers and antique hunters. The Hudson River is 15 miles to the west, as the crow flies; some 80 miles south lies the River's Baghdad, New York City. Tossed into the bargain is the Glen's backdrop of oaks, maples, native viburnums, witch hazels and azaleas, fragrant hemlocks, pines and wildflowers, along with the sound of running water and birdsong. It is, as one visitor was overheard saying when he emerged from the tranquil Glen, "a respite from a busy world."

This particular fern glen is more than just a pretty place for philosophic meanderings, however. Part of the 2,000-acre Cary Arboretum—an outpost of the New York Botanical Garden (NYBG) that was founded in 1971—the Fern Glen has a mission.

Cary Arboretum is a resource center for ecological and evolutionary studies that complement programs of systematic botany, biochemical research and horticulture at the NYBG in the Bronx. The Fern Glen is a botanical collection for education and display, and a research laboratory for testing plant hardiness. For the Sunday afternoon visitor, however, the Glen is simply a garden for pleasure, to be enjoyed on many levels. Overall, it is the successful merging of botanical goals with natural and created beauty that makes the Glen such a special place.

John T. Mickel, Senior Curator of Ferns

at the NYBG, was instrumental in the development of the Fern Glen. When he is not lecturing or making field trips to Mexico or the West Indies, he can often be found in his tucked-away office at the NYBG, surrounded by dried specimens of *Elaphoglossum*, one of the largest and most difficult genera of ferns to classify. The living fern collection at the Garden—both under glass and in outdoor plantings—is one of the finest in the world, perhaps second only to Kew in England, and the Cary Arboretum project is an extension of this collection. The development of the Fern Glen has been one of Mickel's chief preoccupations since the early 1970's, when he, Carlton Lees (former Vice President of Horticulture at the NYBG) and Robert Hebb (former Chief Horticulturist at Cary Arboretum) began planning it.

"The goal of the Fern Glen as we saw it in the early days," said Mickel, "was to collect and display as many northeastern ferns (there are about 100) and fern allies as possible. These were then to be used for education and experiments." The term "fern allies," he explained, refers to whisk ferns, clubmosses, spikemosses, quillworts and horsetails. These plants, like ferns, reproduce by spores. In primeval times, some of these fern allies (not the ferns, as some people might suppose) soared to 100 feet and had "trunks" three feet in girth. (During a field trip to tropical America, Mickel found himself standing in a field of giant horsetails, *Equisetum* sp., that were almost 25 feet high. "The scene lacked only a dinosaur," he reminisced.) Today, a stand of shining clubmoss (*Lycopodium lucidulum*) with aerial branches and needle-like leaves, such as that found in the Glen, reaches a height of only about six inches.

Just as important as amassing and displaying a fern collection are the research and testing opportunities the plants in the collection provide. "We wanted to bring in ferns from other parts of the United States, and from different countries—ferns that hadn't been tried in this climate—to see which ones would be hardy here," said Mickel. "There are literally hundreds of possibilities—other species which would grow outdoors here—and we want to find out which ones they are."

Initial funding for the Glen was obtained in 1977 from an IBM Community Service Grant, and bulldozers and wheelbarrows, many of them manned by 18 teen-age members of the Youth Conservation Corps, went into action. Mickel and Hebb, with the help of the American Fern Society, began to assemble the collection. Some ferns were collected during field trips or purchased; others were donated by the Fern Society and botanical institutions in other parts of the world.

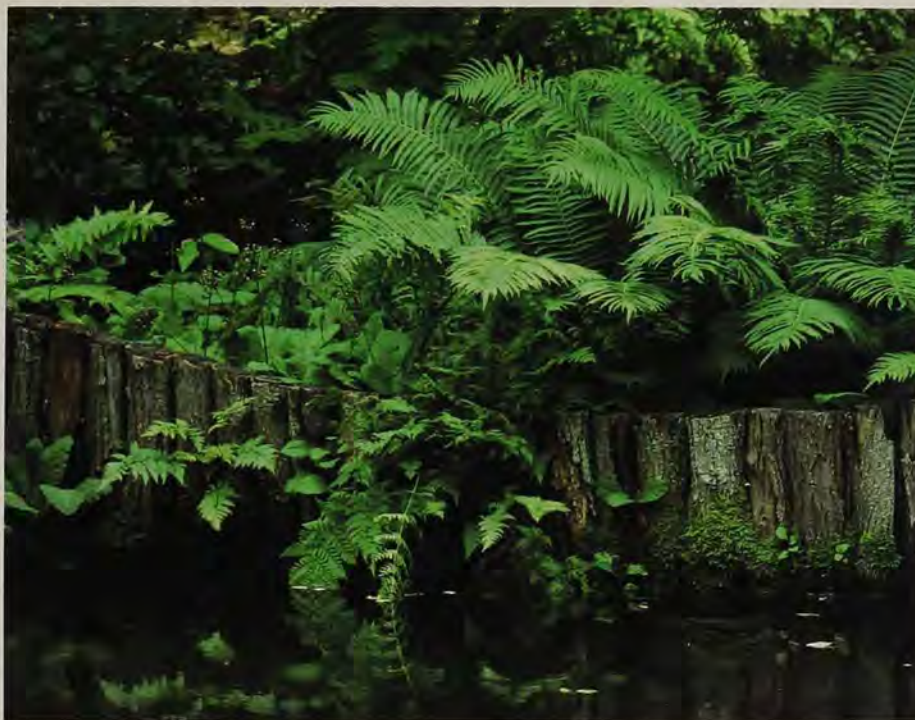
The Fern Glen is now six years old, and the collection contains about 125 species of ferns and fern allies. Fifty-eight of these are native to the Northeast; the others were collected from other parts of the United States, northern Europe, Japan, the Alps, and the Himalayas, and at high elevations in Mexico. Volunteers of the New York Chapter of the Fern Society (begun by Mickel in 1973), including Lorraine Ramsey and Dorothy and Ed Linde, propagated most of the non-native ferns from spores in Cary's greenhouses.

"We've already had some surprises at the Fern Glen," Mickel said. The author

Brightly colored primroses are interspersed with ferns throughout the Glen.







LEFT: The lush, green fronds of maidenhair ferns, *Adiantum pedatum*. ABOVE: Ferns spill over the locust posts that edge the pond.

of two books as well as many articles in scientific publications, he still becomes animated when he speaks of ferns. "It's been known that many European ferns—particularly the crested ones such as the male fern, *Dryopteris filix-mas*, and the lady fern, *Athyrium filix-femina*—and even several from Japan do well here. But we wanted to find out about others. We obtained the miniature variant of our northern maidenhair, *Adiantum pedatum* var. *subpumilum*, from British Columbia, and the Himalayan maidenhair, *Adiantum venustum*, and have found them to be hardy, even in the -25° F temperatures of the Arboretum."

Ferns from Mexico and from our southern states have also survived the harsh winters in the Glen. *Dryopteris ludoviciana* and *D. australis*, rescued nine years ago from a woods that was being developed into a shopping mall in downtown Baton Rouge, are thriving so far. Mickel and other botanists studying fern distribution are baffled, since these ferns occur in the wild only as far north as North Carolina.

After a fern passes muster for hardiness at Cary, "the step from there is getting it into production," according to Mickel. "It doesn't do any good to get all excited about these ferns if they aren't available for those who want them." Spores are harvested and sent to a select list of nurseries specializing in ferns or rare plants for propagation. In a few years, these species will help widen the selections commercial nurseries will offer to meet the growing demand for hardy

ferns. (The American Fern Society's list of fern sources for 1983 mentions 110 hardy fern species and botanical varieties and cultivars; of these, about 42 are native to temperate North America and are currently available at nurseries.)

Lees, Mickel and Hebb took an ecological tack when they began scouring the 600 acres of the Arboretum that are open to the public for a site for the Fern Glen. According to Hebb, now Director of the Lewis Ginter Botanical Garden in Richmond, Virginia, "We searched for the best possible site for the group of plants that we wanted to grow, rather than arbitrarily saying, 'Let's make it here because this is a pretty spot.'" The final choice was a two-acre parcel that rises up from the east branch of Wappinger Creek. The land includes a dry wooded hillside, a wet wooded hillside, a more or less level swampy-boggy area, and a stream—varying habitats that support the cultural needs of many different kinds of ferns.

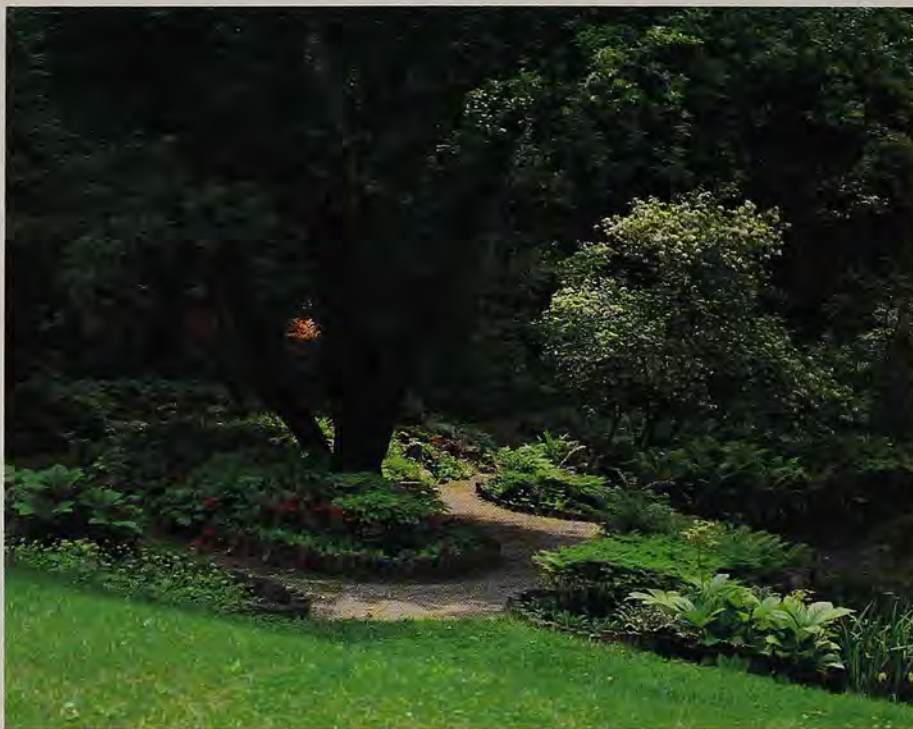
When a count revealed that 30 species of ferns and their allies were growing in apparent harmony with the existing tree cover and woodland plants, the dowsing rod was put away. As Mickel explained, "If it was good enough for our native ferns, we thought it would be good enough for adding others to it."

Mickel noted, too, that hybridization was taking place among the *Dryopteris* ferns, whose various and wide-ranging species are found both in the swamp and in the higher and drier woodland. "Hybridiza-

tion is going on right there in the swamp, all by itself, without our having to do anything to induce it." Generally, several *Dryopteris* species grow together, and this results in frequent hybrids. There are four different species of this genus occurring naturally in the Glen, and from them, three different hybrids have resulted. Mickel hopes someday to have a botanical display in the Glen of this minor phenomenon. (Natural hybridization occurs in other ferns, too.) The *Dryopteris* species and their hybrids will be displayed side by side, all neatly tagged and ready for botanical inspection. It will provide a good study, perhaps available in no other fern glen.

Dryopteris species are known not only for their crossbreeding habit, which bamboozles systematic botanists and makes it nearly impossible for them to describe and list the plants in the genus, but also for their classic fern beauty. Of the many species in this large genus, it is purported that there is not an unattractive one in the bunch. Their leaves are often leathery, much divided, dark green and often evergreen. Furthermore, they make vase-shaped clumps and stay fresh-looking all summer.

Diverse as it is, the Glen provides no natural limestone for the many lime-loving plants. Nor was there a pond for water ferns, such as the clover-like water fern *Marsilea*, when the Glen was begun; a pond had to be dug, an undertaking that provided a bit of drama. The bulldozer had scarcely left the scene when the hillside facing the south bank began to slide into



ABOVE: Under an old apple tree at the entrance to the Glen, *Rodgersia*, *Podophyllum*, primroses, viburnums and ferns co-exist happily. Behind the apple tree lies the limestone cobble. RIGHT: Japanese primroses add a touch of color to the green foliage of ferns, *Peltiphyllum peltatum*, *Rodgersia* and other plants growing at the edge of the pond.

the freshly dug pond. Some frantic scurrying ensued, and hundreds of railroad ties later, the bank was securely buttressed. Unlike many landscape designers, Hebb is not partial to railroad ties, so a wall was constructed using locust posts to conceal the ties. Carlton Lees, in an inspired moment, had the top of the wall cut into sweeping, undulating curves. The wall now holds back the hillside containing the limestone cobble, and gracefully enhances the pond.

Japanese painted ferns, cinnamon ferns and other plants have now gained toe-holds in spaces in the wall—proof that the plants approve of their artificial environment and that the underlying ecological concepts were correct. When the light is right and the waters, still, the wall—with its patterns of ferny tracery—makes beguiling reflections in the pond.

The overall scheme for the two-acre Glen is a framework of islands. "It's the island-bed approach to herbaceous perennials translated to ferns," Hebb explained. "The main island is the cobble. There's a beautiful old apple tree there which anchors the island and provides shade for the ferns."

The other islands are interconnected by a path system designed to provide an easy walk and to accommodate wheelchairs. Hebb pointed out that the trail "wends its way and gently leads, without the need for directional signs." The winding trail led this lone visitor through copses of Christ-

mas ferns (*Polystichum acrostichoides*), *Dryopteris goldiana* and other wood ferns, New York ferns (*Thelypteris noveboracensis*), marsh ferns (*T. palustris*), cinnamon ferns (*Osmunda cinnamomea*) and royal ferns (*O. regalis*), as well as maidenhairs (*Adiantum pedatum*), sensitive ferns (*Onoclea sensibilis*) and hay-scented ferns (*Dennstaedtia punctilobula*).

Boardwalks with handrails span the boggy places to preserve the delicate ecological balance of the fern habitats and to keep visitors' feet dry. Two decks are placed at scenic spots along the trail: one overlooks a stream with splashing water, where lady ferns cover the rocks with green; the other is in the middle of the lush Glen, surrounded by cinnamon ferns, some several feet high, and royal ferns growing side by side with that ubiquitous botanical proletarian of the swamp, skunk cabbage. There are deck chairs from which one can survey the ferny glade, or perhaps doze, and fancy that soon Queen Mab will appear driving her chariot with elves to the stream's edge.

The showplace is the limestone cobble (known as the Clayton Linde Memorial Cobble) above the pond at the entrance to the Glen. The cobble was made from a donated stone wall from a limestone area in Connecticut with the help of Karl Grieshaber, rock garden specialist at the NYBG. Here, the collection of ferns and companion plants becomes a distinctive

garden where the most ornamental ferns are planted in huge masses and combined with unusual woodland plants. The wiry stems and delicate leaflets of the popular maidenhair—a fine choice for grouping—make a sedate splash under the apple tree. "It is almost a weed in its willingness to proliferate, given half-decent conditions," observed Hebb. *Athyrium goeringianum* 'Pictum' (often sold as *A. nipponicum* 'Pictum'), Japanese painted fern—with its tricolored fronds, deep burgundy mid-veins, and light gray-green and dark green along the margins—is even more dramatic when used in large drifts, such as in the cobble.

Rare and difficult-to-grow species are displayed in the cobble in random clusters. Anyone who thinks, "If you've seen one fern, you've seen them all" would be put to shame by the array of diverse textures, shapes and shades of green—even shades of pink, as in the juvenile leaves of maidenhair and *Woodwardia*. There is also a Japanese autumn fern, *Dryopteris erythrosora*, which has bronze fronds that turn dark green, and which bears fruiting dots, or sori, that are bright pink.

Fern fronds vary in their degree of dissection, or the number of times a leaf or leaflet is divided. When a fern is divided three or four times, as is the soft shield fern, *Polystichum setiferum*, it has a very lacy look. At the other extreme are the ferns with undivided, or simple, leaves. The

Continued on page 44



ORNAMENTAL MUSTARDS

BY GAIL GIBSON

When we see fields of wild mustard blooming yellow in the spring, it is sometimes hard to imagine that many well-known plants are related to this rangy, but often beautiful weed. A complete list of mustard relatives would include about 350 genera and 3,200 species of herbaceous plants, many of them weeds that are less beautiful than wild mustard.

All members of the mustard family bear four-petaled, cross-shaped flowers; hence the botanical name assigned to the family, Cruciferae. Edible genera within the family include not only mustard, but also broccoli, cabbage, cauliflower, radish, horseradish, Brussels sprouts and watercress. Ornamental members of the family include an even more diverse assortment of well-known plants. I had been growing and enjoying sweet alyssum for years before I noticed that each of its tiny white flowers bears the four cruciform petals characteristic of the mustard family members. When I began to search out other relatives (botanists classify them by both flower and seed pod form), it became apparent that it is possible to plan a spring and early summer garden featuring members of this interesting family.

Annual sweet alyssum (*Lobularia maritima*) and most perennial or annual candytufts (*Iberis* spp.) bear white- or pastel-colored blossoms, but several related genera bear blooms that are as intensely yellow as wild mustard. Perennial alyssum, *Aurinia saxatilis*, is commonly known as gold-dust or basket-of-gold, and it is one of the most popular and reliable of the yellow-flowered crucifers. Drabas (*Draba* spp.) and many cultivars of wallflowers (*Erysimum* spp. and *Cheiranthus* spp.) also bear bright yellow or orange flowers. Other ornamental mustard family members bear flowers with pink, rose, cream, mauve, violet, purple, red-purple or crimson petals.

Most of the ornamental members of the mustard family are native to cooler regions

of the Northern Hemisphere (they seldom grow in the tropics), and most grow best in sandy or gravelly, neutral to limy soil. They prefer full sun or light shade; many do not tolerate hot sun well. With a few exceptions, mustard family members are easy to grow. The cultural preferences of the low-growing or trailing mustards make them ideal candidates for a rock or wall garden. The taller members of the family are attractive as edging or front-of-the-border plants.

Drabas (*Draba* spp.) are perfect for the rock garden. These dainty plants open their bright yellow blossoms in the very early spring when light snow still lies on the ground. Each plant is a cushiony tuft of leaves, and the blossoms emerge from the center of these rosettes of foliage. Because drabas do not spread as vigorously as many other members of the family, they should be protected from more aggressive neighbors. These perennial species grow from a long taproot, and should not be disturbed once they are established. Given these conditions, drabas are easy to grow if they are given full sun and a well-drained, gravelly soil. Species and cultivars offered for sale by the leading mail-order retailers include *Draba aizoides*, which is four inches tall and bears bright yellow flowers; *D. haynaldii*, a two-inch, tufted plant with yellow to orange flowers; and *D. sibirica* 'Repens', a cultivar that grows in a loose rosette and bears yellow flowers on prostrate stems. Other less well known cultivars of *Draba* bear clusters of white or rose blossoms.

Hutchinsia alpina is a species that resembles *Draba* spp., but it bears white flowers in one-inch clusters during April and May. Commonly called alpencress, *H. alpina* is also a perennial for the rock or wall garden. It forms a mat of feathery leaves barely four inches high, and will tolerate shade if well established in limy soil. The dark green leaves persist through most winters. Seeds of *H. alpina*, which

are occasionally offered for sale, germinate easily if sown during the spring where the plants are to grow. Established plants can be easily propagated by division.

Perennial alyssum (*Aurinia saxatilis*, formerly *Alyssum saxatile*) is one of the most popular plants for rock or wall gardens. Its spreading or cascading mounds of gray-green foliage are topped in early to mid-spring with masses of yellow flowers. This popular plant thrives in sunny spots with unfertile, well-drained soil. Its bright yellow flowers bring splashes of warmth to the cool spring garden, and the blooms contrast well with other pink, white, purple or violet mustard family members. *A. saxatilis*, which is native to Europe, is also called rock madwort; the name madwort refers to the fact that alyssum was once thought to be a cure for bites inflicted by mad dogs. If the plant's spreading growth becomes rangy, spent blossoms may be sheared off to keep the plants tidy. Many cultivars of this useful old favorite are available. Retailers offer seeds or plants of 'Citrina', 'Golden Queen' and 'Silver Queen', all of which grow six to 12 inches

Mustard family members *Aurinia saxatilis*, commonly called basket-of-gold, and *Iberis sempervirens*, candytuft, grace the rock garden at the Brooklyn Botanic Garden.





Barbara W. Ellis

tall and boast flower clusters of a much softer yellow than the species. 'Tom Thumb' is a dwarf cultivar that grows only three or four inches tall and does not spread as much as the species.

Mountain alyssum, *Alyssum montanum*, is a useful garden plant because of its low mounds of silvery, almost evergreen leaves. The plants spread along the ground, and the broad clumps produce bright yellow flowers during April and May. This species is quite vigorous, and it thrives almost anywhere in the garden.

Both *Aurinia* and *Alyssum* are best propagated from seeds sown in the fall or spring where the plants are to grow. Sow seed on the surface of the soil; the seedlings will bloom a year after planting. Established plants may be propagated by cuttings or division.

Although perennials are the basic plants for any rock garden, well-restricted, hardy annuals also have a place. One of these is violet cress, *Ionopsidium acaule*, a mustard family member from Portugal whose delicate, violet-blue flowers add contrast and interest to the early spring garden. Sow seed of *I. acaule* in the fall where the plants are to bloom. They prefer a shady spot, and will not tolerate warm temperatures. Violet cress only blooms well in areas where

the spring is long and cool; under these conditions, the plants will send forth three-inch stems topped by masses of delicate, violet-blue flowers that sparkle in the sun. In cool areas, where cultural conditions are perfect, this species can reseed abundantly and become a nuisance. However, kept within bounds, it is a charming and unusual addition to the rock garden.

Aubrieta deltoidea, purple rock cress, is a well-known spreading or cascading perennial native to both Italy and Greece. It has proved itself hardy, vigorous and free-flowering in very poor soil. However, it requires shade from the hot sun and adequate moisture. Purple rock cress adds a note of colorful drama to the rock garden during April, May and June. Hybridizers have developed a number of named cultivars; plants or seeds are now sold in many shades of red, deep blue, or mauvish-pink, and many have larger blooms than the species, or even semi-double blossoms. Color combinations using even a few cultivars serve as an attractive cover for spring bulbs. *A. deltoidea* does not form as dense a mat as some of the other crucifers, and this open texture, combined with a shallow root system, provides a sympathetic climate for more deeply planted yellow or white crocuses or daffodils. *Aubrieta*'s period of

bloom is long for a perennial, and when the blossoms fade, the attractive gray-green foliage may be reshaped by careful and, if necessary, extensive shearing.

Several species in the genus *Arabis* are valued for their delicate spring flowers. *A. alpina*, commonly called mountain rock cress, and *A. caucasica* (formerly *A. albidia*), commonly known as wall rock cress, are two very similar species that are easy to grow. Like most *Arabis* species, they thrive in poor, gravelly soil. Although they need protection from very hot, dry weather, these species are more sun-tolerant than most spring-blooming mustard family members. Several popular cultivars are available, and these produce light-textured sprays of white, pink or rose flowers in April and May. The flowers may be single or double. The plants produce six- to eight-inch trailing stems that are especially attractive cascading over rocks or wall ledges. *A. blepharophylla* is a California native that bears fragrant, rose-purple flowers on 12-inch stems in May. The flowers emerge from flat rosettes of dark green leaves, and the plants look especially at home in rock crevices.

I prefer to purchase plants of rock cress when they are available, since seedlings often do not establish themselves quickly

as uniform, wide-spreading mats. Plants may be set out during cool weather in spring or fall, and are shallow-rooted enough to grow over "giant" crocuses and early tulips. After all of the flowers have faded in early summer, cut the stems back by half to encourage new growth. All established plants may be divided readily in the fall.

Perennial candytuft, the popular crucifer *Iberis sempervirens*, is an important source of vivid white flowers for the rock garden. (*Iberis* derives from the ancient name for Spain; the species *I. sempervirens* is native to southern Europe and was introduced into England as early as 1739.) This candytuft blooms profusely during May, usually just after yellow perennial alyssum begins to fade. In most sections of the United States, it remains evergreen, but in the coldest regions, foliage will brown off and become sparse during winter. Popular cultivars sold by nurserymen and mail-order firms include 'Snowflake', 'Purity', 'Autumn Snow' and 'Pygmea', all of which form low-growing, tidy plants that have attractive foliage and flowers. *Iberis* seed may be sown where the plants are to grow, but, since germination is unpredictable, it is best to rely only on seedling plants to fill gaps in plantings. All of the cultivars can be propagated by division.

Candytuft will thrive throughout the country in almost any well-drained soil, in sun or open shade. However, in periods of drought, it may shed its blossoms and set seed. A regular schedule of light watering will help prolong its blooming period; when the blossoms do begin to fade, it is best to shear off all the attractive flat seed clusters that form on the stems (these may be dried and used in flower arrangements).

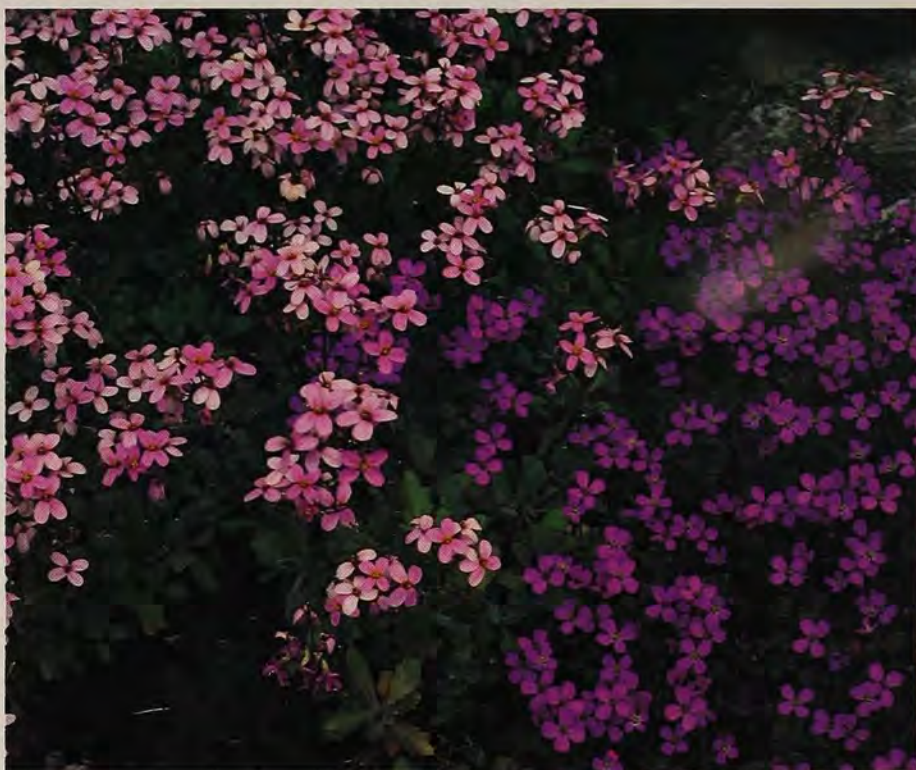
This cushiony plant with dark green, narrow leaves has proved to be one of the most reliable perennials in my garden, and I delight each spring in watching its flower clusters unfurl from concentric circlets of pale greenish buds. I rely on it as an accent in the rock garden and as an effective (and pest-free) substitute for white, low-growing azaleas in the border garden. Some gardeners caution that candytuft's white flowers are too vivid for many plantings, and rightly so. But candytuft does add crispness when coordinated with the clear and deep pinks not only of azaleas but also of *Arabis* and *Aubrieta*.

Aethionema coridifolium, commonly called Lebanon stone cress, is often listed as *Iberis jucunda* and called pink candytuft in catalogues. This low-growing, sun-loving plant bears delicate pink flowers just after the blossoms of *Iberis sempervirens* fade. *Aethionema coridifolium* is easy to grow in light, sandy soils, but it will require



Dick Keen

LEFT: Common stock or gillyflower, *Matthiola incana*, is grown for its lovely single or double flowers, which are very fragrant. This cultivar is 'Purple Heart'. BELOW: Purple-flowered *Aubrieta* and pink *Arabis* make an attractive pair.



Pamela Harper

a protective covering of straw during the winter in the coldest parts of this country. Mail-order companies also offer seeds of *A. grandiflorum*, Persian stone cress, which bears tallish, 12- to 15-inch stems topped by pink- or rose-colored flowers. Both of

these plants may readily be raised from seed sown in the spring where the plants are to grow, or from cuttings taken in the summer.

Annual candytufts, the most popular of which are cultivars of globe candytuft, *Iberis*

umbellata, bloom from June until late summer. Among the most useful of the globe candytufts for the rock garden or for edging are the Dwarf Fairy series cultivars, which grow only eight inches tall. These plants produce vivid flowers in a wide range of colors, including white, pink, maroon, crimson and violet. Globe candytufts bloom best in open, sunny locations as long as summers are not too hot and dry. Their blooming period can be lengthened by an occasional watering and by shearing off all seed pods as they form. To prolong spring bloom, sow outdoors in early spring where the plants are to grow, and make another sowing again during late May and early June. If the seed bed is kept moist, the seedlings will produce buds six to eight weeks after sowing.

Florist's or rocket candytuft, *I. amara*, is a taller annual species grown for its elongated blossom clusters, which are white, pleasantly fragrant, and attractive as cut flowers. Cultivars of this candytuft, which grow 12 to 15 inches tall, do not transplant well and are best raised from seed sown in spring where the plants are to bloom. *I. amara* is an excellent plant for the middle of the border or for the cutting garden.

For spring and early summer splashes of golden yellow, bright orange or red, consider the showy crucifers commonly called wallflowers or blister cresses, with their large, four-petaled flowers arranged in bold clusters. Although plants in the genus *Cheiranthus* are also known by these common names, the best wallflowers for American gardens belong to the genus *Erysimum*. This genus includes several spring- and early-summer-blooming species for gardeners to consider: *E. pulchellum*, a perennial with deep orange flower clusters topping 12-inch stems; *E. kotschyianum*, Kotschy erysimum, a dwarf perennial bearing bright yellow, fragrant flowers on three- to four-inch stems; and *E. asperum*, western or prairie wallflower, a popular biennial with bright orange flowers on 12-inch stems. All of these species are easy to grow, and prefer full sun and well-drained soil. Most are reliably hardy, but it is wise to give young plants protection in the North. To propagate, sow seed outdoors in the early spring or late fall at a depth of one-quarter inch.

In most sections of the United States, *Erysimum* spp. are easier to grow than the well-known English wallflower, *Cheiranthus cheiri*, which only performs well in areas where temperatures remain cool. In this country, *C. cheiri* should be treated as an annual or biennial in the North (it is best grown from seed sown in early spring in a cold frame, or outdoors where the

plants are to grow); in the South, this species may produce a good show of flowers during mild winters if sown as a winter crop and timed to be in flower during the six coldest months of the year. Hot spring and summer weather will usually kill the plants. Cultural difficulties aside, when *C. cheiri* does bloom, the fragrant, bright gold, orange or scarlet flowers lend a feeling of warm nostalgia to any garden.

Stocks are summer-blooming crucifers that also bring a hint of nostalgia to the border garden. *Malcolmia maritima*, commonly known as Virginia stock, was adopted as a favorite by cottage gardeners in Victorian England. Today, it is enjoyed in this country for its compact, six- to 12-inch, upright growth habit, its gray-green foliage, and its fragrant clusters of blossoms. The flowers of *M. maritima* come in appealing shades of lilac, red or white. It is possible to sow *Malcolmia* seeds outdoors in sun or light shade during early April, and enjoy a first show of bloom by late May. Successive sowings during May and June will ensure masses of bloom for front-of-the-border plantings.

Virginia stock is easier to grow than its cousin, *Matthiola incana*, commonly known as common stock or gillyflower. Despite the more exacting cultural requirements of gillyflower, it has been enjoyed in this country since the seventeenth century, when New England colonists purchased garden seed of "stockielliflowres" or "stocke giloflowres." These single or double, white- or purple-flowered plants were described as "floures of divers coulours, greatly esteemed for the beautie of their floures and pleasant smell." Today, stocks are found naturalized in California, and they are still admired as garden plants for their fragrance and wonderful single or double blooms that come in white, cream, rose, red, lilac, dark blue or purple.

Stocks are often planted in historic garden restorations, and they are worth trying in home gardens if they can be protected from hot sun. If well-grown plants are not available from local nurseries, it may be difficult to raise them from seed. Stocks need cool temperatures for germination (55° to 60° F), and the seed should be sown in pots indoors in February on the surface of sterile soil, then watered lightly. Cover the pots with clear polyethylene until the seedlings show two sets of leaves. It is important to use treated seed and sterile soil, because damping-off is a major cause of seedling loss. Seedlings need plenty of sun if they are to grow into strong transplants for the garden. Transplant to a lightly shaded spot in the border after all danger of frost is past. Weak plants are subject to

mildew, and the plants must be kept shaded from hot sun; stocks thrive in cool weather.

Night scented stock, *M. longipetala* subsp. *bicornis*, is an excellent plant for edging a garden that is close to a patio or window. Its inconspicuous lilac or purple flowers open only in the evening to release their honey-laced fragrance.

Sweet alyssum, *Lobularia maritima*, also has a fragrance reminiscent of honey. This popular annual is one of the best low, mound-shaped plants for edging any garden, and it blends as effectively with its mustard family cousins as it does with most other flowering plants and dwarf shrubs. Gardeners should look for 'Carpet of Snow', which has a neat trailing growth habit; 'Snowcloth Improved', which is a low-growing, early-blooming cultivar; 'Sweet White', a dwarf cultivar; purple-flowered 'Royal Carpet'; or 'Rosie O'Day', which has pink blossoms.

Even though sweet alyssum is easy to raise from seed, I prefer to purchase a few plants each spring to transplant to the garden after all danger of frost is past. As these plants begin to bloom, I fill in bare spots in the edging with seedlings, which I start in trays indoors in March and grow in a sunny, cool window until late May. If there isn't cool sun indoors, seeds may also be sown outdoors during April, May and June, but the seed bed must be kept evenly moist until germination occurs (in one or two weeks). Young plants will require periodic watering during their first months of growth, and also during the dry, hot days of summer. Although sweet alyssum may bloom sparsely during late summer, it is best to shear the top growth at that time to encourage bloom in the fall. This dependable little plant will produce its myriad of charming, delicate flowers until frost.

Many other mustard family members are worth trying in the garden: tall *Lunaria*, called honesty or silver dollar because of its silvery seed cases; old-fashioned *Hesperis*, dame's rocket; or rare *Heliophila*, cape stock, which grows 12 to 15 inches tall and is admired for its blue, flax-like blossoms.

The mustard family includes old favorites and new ones, easy-to-grow and temperamental plants, pastel- and brightly-colored flowers. All add character, color and variety to gardens and should not be overlooked when you are planning a rock garden, decorating a garden wall or edging a border. ☉

Gail Gibson gardens in Potomac, Maryland. She is the author of "The Bamboo Alternative," which appeared in the October 1982 issue of *American Horticulturist*.

Pronunciation Guide

Adiantum pedatum var. *subpumilum*
ah-dee-AN-tum peh-DAY-tum
sub-PEW-mill-um
A. venustum a. ven-OOS-tum
Aethionema coridifolium
ee-thee-OH-nee-mah core-id-i-FOE-lee-um
A. grandiflorum a. grand-i-FLOOR-um
Alyssum montanum
ah-LISS-um mon-TAN-um
A. saxatile a. sacks-ah-TILL-ee
Anacampteros telephium
an-ah-camp-SAIR-us tel-eh-fy-ASS-trum
Arabis albida AIR-ah-biss al-BIDE-ah
A. alpina a. al-PINE-ah
A. blepharophylla a. bleh-fair-oh-FILL-ah
A. caucasica a. kaw-KASS-i-kah
A. procurrens a. pro-CURE-enz
A. sturii a. STIR-ee-eye
Armeria formosa
are-MARE-ee-ah for-MOE-sah
A. maritima a. mah-RIT-i-mah
A. plantaginea a. plan-tadge-i-NEE-ah
A. pseudarmeria a. sue-dar-MARE-ee-ah
Astilbe chinensis

as-STILL-bee chi-NEN-siss
Athyrium filix-femina
ah-THIGH-ree-um FILL-icks FEM-i-nah
A. goeringianum a. gair-rinj-ee-AY-num
A. niponicum a. ni-PON-i-kum
Aubrieta deltoidea
aw-BREE-shah del-toe-EYE-dee-ah
Bellis perennis BELL-iss per-EN-iss
Calandrinia ciliata
kal-an-DRIN-ee-ah sil-ee-AH-tah
C. umbellata c. um-bell-AY-tah
Campanula carpatica
kam-PAN-yew-lah car-PAT-i-kah
C. poscharskyana c. posh-ar-sky-AY-nah
Campylosorus camp-toe-SORE-us
Ceratostigma plumbaginoides
ser-at-oh-STIG-mah
plume-bag-in-oh-EYE-deez
Cheiranthus cheiri care-AN-thus CARE-eye
Chrysanthemum lacustre
kris-AN-thah-mum lah-CUSS-tree
C. leucanthemum c. loo-KAN-thee-mum
C. maximum c. MAX-i-mum
C. × superbum c. sue-PER-bum

C. weyrichii c. way-RICH-ee-eye
Chrysogonum virginianum var. *australe*
kris-OG-oh-num vir-jin-ee-AY-num
aw-STRAL-ee
Cimicifuga sim-i-si-FEW-gah
Claytonia caroliniana
clay-TONE-ee-ah care-oh-lin-ee-AY-nah
C. megarhiza c. meg-ar-EYE-zah
C. parvifolia c. par-vi-FOE-lee-ah
C. rosea c. ROSE-ee-ah
C. virginica c. vir-JIN-i-kah
Coreopsis verticillata
kor-ee-OP-siss ver-tiss-ill-AY-tah
Cupressus sempervirens
kew-PRESS-us sem-per-VEER-enz
Dennstaedtia punctilobula
den-STEED-tee-ah punk-ti-LOB-you-lah
Dianthus die-AN-thuss
Dietes die-EE-teez
Draba aizoides DRAB-ah az-oh-EYE-deez
D. haynaldii d. hay-NALL-dee-eye
D. sibirica d. sigh-BEER-i-kah
Dryopteris australis
dry-OP-ter-iss os-TRAIL-iss
D. erythrosora d. air-ee-throw-SORE-ah
D. filix-mas d. FILL-ix MOSS
D. goldiana d. gold-ee-AY-nah
D. ludoviciana d. lood-oh-viss-ee-AY-nah
Elaphoglossum ee-lof-oh-GLOSS-um
Equisetum ee-qui-SEE-tum
Erysimum asperum
ee-RISS-i-mum ASS-per-um
E. kotschyianum e. kot-ski-AY-num
E. pulchellum e. pull-KELL-um
Gaillardia gah-LAR-dee-ah
Geranium dalmaticum
jer-AY-nee-um dal-MAT-i-kum
Heliophila hee-lee-oh-FILL-ah
Hepatica hep-AT-i-kah
Hesperis HESS-per-iss
Heuchera americana
HUE-ker-ah ah-mer-i-KAN-ah
Hosta lancifolia
HOSS-ta lan-si-FOE-lee-ah
H. venusta h. ven-OO-stah
Hutchinsia alpina
hut-CHIN-see-ah al-PINE-ah
Iberis amara EYE-ber-iss AM-ah-rah
I. jucunda i. jah-KOON-dah
I. sempervirens i. sem-per-VEER-enz
I. umbellata i. um-bell-AY-tah
Ionopsidium acaule
eye-on-op-SID-ee-um aw-CALL-ee
Iris cristata EYE-riss kris-TAY-tah
Kalmia CAL-mee-ah
Leucothoe lew-KOH-thoh-ee
Lewisia cotyledon
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L. rediviva l. red-i-VIVE-ah
L. tweedyi l. TWEE-dee-eye
Lobularia maritima

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 ly-ko-POH-dee-um loo-SID-you-lum
Lysichiton liss-i-KITE-on
Malcolmia longipetala subsp. *bicornis*
 mal-COAL-mee-ah lawn-jee-PET-al-ah
 by-CORE-niss
Marsilea mar-si-LEE-ah
Matthiola incana
 mat-thee-OH-lah in-CAN-ah
M. maritima m. mah-RIT-i-mah
Montia chamissoi
 MON-tee-ah kam-iss-OH-eye
M. perfoliata m. per-foe-lee-AY-tah
Moraea more-AY-ee-ah
Nepeta mussinii
 ne-PEE-tah moo-SIN-ee-eye
Oenothera missouriensis
 ee-no-THAIR-ah miss-ore-EN-siss
Ophioglossum off-ee-oh-GLOSS-um
Osmunda cinnamomea
 oss-MUN-dah sin-ah-moh-MEE-ah
O. regalis o. re-GAL-iss
Paeonia delavayi
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Platycodon plat-ee-COH-don
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 poe-doe-FILL-um hex-AN-drum
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 pol-i-STY-kum ah-cross-ti-ko-EYE-deez
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 por-tew-lack-AIR-ee-ah AFF-ra
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 SILL-ah too-ber-jen-ee-AY-nah
Sedum kamtschaticum
 SEE-dum kam-SHOT-i-kum
S. maximum s. MAX-i-mum
S. sieboldii s. see-BOLD-ee-eye
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 tah-LIN-um kal-ee-SIN-um
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THE PURSLANE FAMILY

The following nurseries offer purslane family members.

Plants

Appalachian Wildflower Nursery, Route 1, Box 275 A, Reedsville, PA 17084, catalogue \$1.00.

Boehlke's Woodland Gardens, W. 140 N 10829 Country Aire Road, Germantown, WI 53022, catalogue free.

Country Hills Greenhouse, Route 2, Corning, OH 43730, catalogue free.

Daystar, Litchfield-Hallowell Road, R.F.D. 2, Litchfield, ME 04350, catalogue \$1.00.

International Growers Exchange, P.O. Box 52248, Livonia, MI 48152, catalogue free.

Kartuz Greenhouses, Inc., 1408 Sunset Drive, Vista, CA 92083, catalogue \$1.00.

Logee's Greenhouses, 55 North Street, Danielson, CT 06239, catalogue \$3.00.

Mesa Garden, P.O. Box 72, Belen, NM 87002, catalogue free.

Seeds

Far North Gardens, 15621 Auburndale Avenue, Livonia, MI 48154, catalogue \$2.00.

Harris Seeds, Joseph Harris Company, Inc., Moreton Farm, 3670 Buffalo Road, Rochester, NY 14624, catalogue free.

J. L. Hudson, Seedsman, P.O. Box 1058, Redwood City, CA 94064, catalogue \$1.00.

Geo. W. Park Seed Company, Inc., P.O. Box 31, Greenwood, SC 29647, catalogue free.

Thompson and Morgan, P.O. Box 1308, Dept. AH5J, Jackson, NJ 08527, catalogue free.

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Gardeners who are interested in learning more about the lutea hybrid tree peonies will want to join the American Peony Society. For more information on memberships, write the American Peony Society, Greta M. Kessenich, Secretary, 250 Interlachen Road, Hopkins, MN 55343, (612) 938-4706.

The following nurseries offer a good selection of lutea hybrid tree peonies.

Klehm Nursery, 2 East Algonquin Road, Arlington Heights and Algonquin Roads, Arlington Heights, IL 60005, catalogue \$1.00.

David Reath, Hybrid Peonies, P.O. Box 521, Vulcan, MI 49892, catalogue \$1.00.

Smirnow's Son, P.O. Box 251, Glen Head, Long Island, NY 11545, catalogue \$2.00.

Wayside Gardens Company, Hodges, SC 29695, catalogue \$1.00.

White Flower Farm, Litchfield, CT 06759, catalogue \$5.00.

COAXING IRIS FROM THE DESERT

For those interested in visiting the beautiful iris garden described by Maire Simington, the address is 3342 W. Orange-wood, Phoenix, Arizona 85021, (602) 841-1231. The Shepards' iris garden is open to the public every Saturday and Sunday during April, and by appointment.

The Annual Convention of the American Iris Society will be held April 14-18, 1987 in Phoenix, Arizona. For more information, write the American Iris Society, 7414 E. 60th Street, Tulsa, OK 74145.

PERENNIALS FOR THE FRONT OF THE BORDER

Pamela Harper's perennials are available from the nurseries listed under "Daisies" and "Ornamental Mustards." Seed for these species is available from the companies listed in this section under "The Purslane Family."

Perennials: How to Select, Grow & Enjoy by Pamela Harper and Frederick McGourty (Retail price: \$9.95) is available from the Society at a member price of \$9.70, including postage and handling. To order a copy, write Jeanne Eggeman, American Horticultural Society, P.O. Box 0105, Mount Vernon, VA 22121.

DAISIES

ORNAMENTAL MUSTARDS

The following nurseries offer a wide variety of daisies and mustard family members. For a list of companies that offer seed of these species, see the "Seed" source list under "The Purslane Family."

Bluestone Perennials, 7211 Middle Ridge Road, Madison, OH 44057, catalogue free.

Busse Gardens, 635 East 7th Street, Route 2, Box 13, Cokatom, MN 55321, catalogue \$1.00.

Carroll Gardens, Box 310, 444 East Main Street, Westminster, MD 21157, catalogue \$2.00.

The Country Garden, Route 2, Box 455A, Crivitz, WI 54114, catalogue \$2.00.

Garden Place, 6780 Heisley Road, Mentor, OH 44060, catalogue free.

Holbrook Farm and Nursery, Route 2, Box 223 B, Fletcher, NC 28732, catalogue \$2.00.

International Growers Exchange, P.O. Box 52248, Farmington, MI 48152, catalogue free.

Lamb Nurseries, E. 101 Sharp Avenue, Spokane, WA 99202, catalogue \$1.00.

Louisiana Nursery, Route 7, Box 43, Opelousas, LA 70570, catalogue \$3.50.

Milaeger's Gardens, 4838 Douglas Avenue, Racine, WI 53402, catalogue \$1.00.

Rakestraw's Perennial Gardens and Nursery, G-3049 S. Term Street, Burton, MI 48529, catalogue \$1.00.

Rice Creek Gardens, 1315 66th Avenue, NE, Minneapolis, MN 55432, catalogue \$1.00.

Rocknoll Nursery, 9210 U.S. 50, Hillsboro, OH 45133, catalogue 44¢ in stamps.

Sweet Springs Perennial Growers, 2065 Ferndale Road, Arroyo Grande, CA 93420, catalogue free.

Van Bourgondien Brothers, P.O. Box A, 245 Farmingdale Road, Route 109, Babylon, NY 11702, catalogue free.

Andre Viète Farm and Nursery, Route 1, Box 16, Fishersville, VA 22939, catalogue \$1.00.

Wayside Gardens Company, Hodges, SC 29695, catalogue \$1.00.

White Flower Farm, Litchfield, CT 06759, catalogue \$5.00.

COAXING IRIS FROM THE DESERT

Continued from page 21

This is especially important the first year rhizomes are planted here. When plants begin clumping after the first season, they naturally protect themselves."

Each year during the month of April, Bobbie and Don wander through the waist-high rows of flowers, answering endless questions about iris culture. "We want to make sure the person can grow what he or she purchases," Don emphasizes. "If the planting is a failure, it will create frustration. We want people to enjoy the iris blooms in their own yards as well."

When not talking with customers, the Shepards are busy hand-watering the thousands of iris, picking spent blossoms or dabbling in their newest venture, hybridizing. Bobbie and Don do all the work on the 1¼-acre site. This is especially remarkable when one considers that Don works full-time as a supervisor for a commercial construction company.

Don began seriously studying the techniques of other hybridizers about five years ago. "Each one has his or her own technique," he says. "We patterned our methods after those of Neva Sexton, a two-time Dykes medal winner from Wasco, California. We found it to be the easiest of all methods because of its simplicity. She pollinates with a toothpick, transferring pollen from one flower to the other."

Don does his hybridizing in the field in the early morning hours, before pollen dries out or gets eaten by thrips and aphids. Seed pods are picked when ripe in July. To stimulate faster germination, Don plants his seeds as soon as the pods split. Many growers wait until October, though, before sowing.

It has taken the Shepards five years to finally introduce their own iris. "It's mind-boggling for novice gardeners to realize that of 1,000 seeds planted, we'll only keep two or three," Bobbie says. "We have to judge new seedlings on the structure of the plant, size of the foliage and bud count; there must be seven or more buds for us to keep the iris. Unless the flower has an unusual color or other exceptional quality, we must discard it based on our judging criteria."

The Shepards' efforts have blossomed. Recently, Bobbie and Don sent for their first set of registration papers for five new iris cultivars, all of which are tall bearded. Three of these will be introduced in their mail-order catalogue this spring. One, a grape and white plicata, has a rich, deep purple background that is dusted with flecks

of white. It also has a clear, opaque stripe down the center of the fall. The second is a dark rust flecked with honey-spice markings, and the third is a solid ruby-red.

Even after the spring flurry of business has peaked, activity at the Shepards' garden does not cease. About the first of July, they spread a screen netting that provides about 80 percent shade over their beds to keep the foliage green. They do not water from July through September. "We do this from a commercial standpoint because we begin digging in the early part of July to fill orders for fall planting," Bobbie explains. "A homeowner would not dig until the end of August for replanting in mid-September, when the temperatures hover around the 100-degree mark."

With a shovel "and a little back labor," the two dig and store the thousands of rhizomes. Each rhizome must be kept hard like a potato to prevent soft rot from setting in. The herculean task is completed almost two months later, when orders are delivered locally or shipped throughout the country.

"We find our desert-acclimated irises do well in colder climes," Don notes. "They reverse-acclimate. Our irises grow well in the northern parts of the state—in Flagstaff and Payson—where winter snow is deep. We also have reports that they're doing fine in Ohio and Pennsylvania."

Interestingly, the Shepards have discovered from firsthand experience that iris that have adapted to the cold will not fare well in the heat. They now check the parentage of any new plant they bring into the garden in order to determine if it is likely to be successful in the desert.

Although awareness of iris culture in desert areas is growing, the Shepards are still doing their part to spread the word. "After all these years, there are still misconceptions of what will and will not grow in the desert," Bobbie says. Any doubts should be completely cleared in April of 1987, when the Sun Country Iris Society of Phoenix hosts the national convention of the American Iris Society. (For more information, see "Sources" on page 38.)

In less than two decades, the Shepards have almost single-handedly taken the iris from a plant considered unsuitable for desert gardens to one that is fast becoming a feature of many a spring garden in the American Southwest. ☼

Maire Simington is a free-lance writer and Garden Editor of *Phoenix Home/Garden*. She is also Director of Communications for the Samaritan Medical Foundation in Phoenix.

AHS Travel Program

The American Horticultural Society is sponsoring an exciting program of horticultural explorations for the 1985 season. Plan to join fellow AHS members on one or more of these interesting garden-related tours. Use the coupon below to request information on any of these tours.

Tropical Ecology: The Amazon

(June 26-July 15) Join Dr. Mildred Mathias, Emeritus Professor of Botany at UCLA, and other distinguished scientists for an in-depth look at the plant and animal life in remote, undisturbed habitats along the Amazon River. This trip is designed as a wilderness experience for the adventurous traveler.

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YES! Please send me more information on the tours I have checked below:

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Perennials for the Front of the Border



Photographs by Pamela Harper

Flower border or island bed? Whichever design style you choose, there are gains and losses. However, if you opt for island beds, one thing to bear in mind is that you'll have more edges and will therefore need a greater proportion of low-growing plants. Some, although excellent as ground covers, spread too fast to be trusted in the border. Among these are blue plumbago (*Ceratostigma plumbaginoides*), *Campanula poscharskyana* and my latest vagabond—the late-flowering, mat-forming *Chrysanthemum weyrichii*.

Unwillingness to stake perennials was one of the factors that led to the breeding and selection of shorter kinds for use in island beds. Well-known perennials of moderate height include *Iberis sempervirens*, commonly known as candytuft ('Snowflake' is a particularly good selection); silver-mound artemisia, which is

better in cool climates than in hot ones; *Campanula carpatica* (watch out for slugs); cushion-forming asters and chrysanthemums; and border pinks (*Dianthus*), dwarf irises, sundrops (*Oenothera missourensis*) and coralbells (*Heuchera*). Some newer ones have quickly become popular. Most garden centers are likely to have the dicentras 'Luxuriant' or 'Bountiful', *Gaillardia* 'Goblin' (longer-lived in poor soil than in rich), and the shortest of the Shastas, 'Little Miss Muffet'. Hostas are now very popular, but the smaller ones seldom turn up at the garden centers. Two I can recommend are the tiny, but quite rapidly spreading *Hosta venusta* and the yellow-leaved *H. lancifolia* 'Kabitan'. Both are at their best in partial shade and rich soil.

Other perennials of moderate height, including those described below, may not all be on show at garden centers but are readily available from mail-order nurseries.

Primroses come first because they are first in my affections. At garden centers you'll find the brilliantly colored Pacific Giants, which I've found to be short-lived. Those I grow in quantity are the very hardy Barnhaven hybrids of *Primula vulgaris* (formerly *P. acaulis*), which is the wild yellow primrose of English woods. Some of the Barnhaven primroses are brightly colored, but none are gaudy, and the size of the flower is no bigger than a primrose ought to be. A catalogue makes you feel like a kid in a candy store; the color range includes candy pinks and butterscotch, along with home-fires (orange-red and flame), tartan reds, Barnhaven blues and traditional yellow. Can't decide? Take the Springtime Mixture, a lucky choice. My first ones were grown from mixed-doubles seed, which yielded both doubles and singles in dozens of different colors. Since then, I've added transplants in my pre-



LEFT: Barnhaven hybrid primroses and blue-flowered *Ipheion uniflorum* 'Wisley Blue' in the author's garden. TOP RIGHT: *Chrysogonum virginianum* var. *australe*, commonly called green-and-gold or golden star. ABOVE: *Sedum sieboldii* in the summer. Commonly called October plant, it bears pink flowers in autumn.

ferred color ranges. These are not little seedlings but husky little plants that bloom the following year. Deep, moist, heavy soil is ideal, but in parts of my garden these plants make do with sand mixed with peat or leaf mold. They have shade from afternoon sun, and I divide them every third year. This task is best done a month or more before extremely hot, cold, dry or windy weather arrives. These very hardy primroses are winter-dormant in cold regions but evergreen in USDA Zone 8. In the South, however, they sometimes go partly dormant in dry summers. A sprinkling of flowers can often be seen at Christmas, but peak display is in March and April, over a period of several weeks. Slugs are the only real problem, but after many years in the same patch of ground, primroses sometimes seem to exhaust some element they need and do better when moved to another part of the garden. Fertilizer

doesn't help; in fact, the fertilizer bag is best kept away from primroses. Leaf mold and well-rotted cow manure are beneficial.

Golden-star or green-and-gold (*Chrysogonum virginianum*) is native from Pennsylvania south, usually in thin woodlands with sandy or rocky soil. This species is Zone 6 hardy, but can be brought through Zone 5 winters more often than not with the help of a protecting evergreen bough or two. In the wild, golden-star is variable; plants may be prostrate to a foot in height, and clump-forming or matting and slowly creeping. The leaves may be glossy or grayish with hairs, and the flowers vary from less than an inch across to nearly twice this width. The form usually sold, *C. virginianum* var. *australe*, is more or less prostrate, with gray-green leaves that form a spreading, easily divided patch. The plants are spattered with five-rayed stars in spring and bloom sporadically through summer. Golden-star will not grow in a desert or a bog but is otherwise versatile and enduring.

Golden-star can be grown in full sun where summers are cool and the soil is moist, but it needs some shade to protect it from heat and drought. This is also true with astilbes, which need moisture not so much for survival but because the ferny leaves can look so scorched and shabby in dry soils that the plants are not worth growing. *Astilbe chinensis* 'Pumila' is easier to accommodate than most, and does well for me as a border edging in dappled shade and soil that dries out for short periods in summer. It is completely dormant in winter, so the same patch of earth is also occupied by *Scilla tubergeniana*, which bears short stems of baby-blue flowers in March. Most astilbes are clump-forming, but 'Pumila' is stoloniferous. It grows densely enough to make a ribbon between lawn and border without being invaded by grass. Division is seldom necessary, and at less than a foot, it is just the right height for the front of the border. There's a chunky look to the abundant, upright spikes of mauvish-pink, late-summer flowers. It is amply hardy in Zone 5.

An arabis that is not yet well known is *Arabis procurrens*, and I can't do better than quote from the catalogue of a grower whose experience echoes my own: "We've tried other selections of the gray, fuzzy-leaved forms of arabis, but the heat and humidity usually do them in. We prefer, from trial and error, this green-leaved species with white, four-petalled flowers and yellow stamens. This is a low grower suitable for the very front of the border or the

rock garden. It prefers a well-drained soil with a tad of lime around its feet." I add that for me, it is evergreen, nine inches high when in flower in April, and manages nicely without the lime. It is Zone 4 hardy. For the rock garden, I'd choose *A. sturii*, which is a miniature version of *A. procurrens*.

I've had a bit of trouble with *Geranium dalmaticum*, which did a great deal better in a friend's Zone 5 garden. After much shifting around, it is now thriving. "Easy in any good soil and sun," says Ingwersen's *Manual of Alpine Plants*. And so it was in England. In coastal Virginia, however, it needs deep, humus-rich soil that doesn't get dry, and light afternoon shade. In early summer, baby-pink, rounded flowers about an inch across hover over the rounded, dark leaves, which are deeply divided. There's also a white-flowered form with a somewhat less robust constitution.

Among the very best foreground plants are two yellow-flowered selections that like full sun and sandy soil. *Coreopsis* 'Goldfink' has spear-shaped, glossy-green leaves in crowded clumps that are easy to divide; lift them, and they practically fall into separate, smaller clumps. 'Goldfink' doesn't run, but the clumps increase in girth so fast that there are enough divisions in a year or two to make a substantial ground-cover planting. Broad, overlapping petals make up a sunny-yellow, circular flower with a jagged rim. These flowers are borne in such abundance (one to each short, stiff stem) that daily deadheading in early summer is a time-consuming, though enjoyable job. One of my favorite combinations is blue and yellow, and I grow 'Goldfink' with cultivars of veronicas from the *Veronica incana*/N. *spicata* complex. These plants, which are evergreen in my area, make mats of gray or green leaves, and have spires of blue or pink flowers. One kind, sold as 'Royal Blue', flowers the first year from seed.

Threadleaf coreopsis, *C. verticillata*, makes dense bushlets whose slender leaves and starry flowers (with pointed, more widely spaced petals than those of 'Goldfink') give them a kind of airy look. The one most often seen is 'Golden Shower', with flowers the yellow of winter aconites. About two feet in height, it is not too tall for the front of large borders. For smaller ones, there's the new 'Zagreb', a facsimile of 'Golden Shower' but half the height. A pale primrose-yellow form, sold for quite awhile by one wholesale nursery simply as *C. verticillata* but more recently as 'Moonbeam', is taller than 'Zagreb' but shorter

than 'Golden Shower'. It is the longest flowering of the three cultivars. (Several nurseries still list 'Moonbeam' as *C. verticillata*; watch for the description "light yellow" or "pale yellow.") I see threadleaf coreopsis described as able to withstand dry soil, but in my hot garden it does not thrive unless I add sufficient organic matter to the sand to keep it moist. However, I have discovered that the soil need not be high in nutrients.

Where poor, dry soil cannot be improved, I cannot recommend the thrifts (*Armeria* spp.) too highly. These plants are found under the names *A. plantaginea*, *A. formosa*, *A. pseudarmeria* or *A. latifolia*. Common thrift, *A. maritima*, often splays out and looks shabby, but I haven't had that happen with these taller, less mossy thrifts, which are sometimes found at garden centers in mixed colors grown from seed. A good named cultivar is 'Bees Ruby', which bears carmine, globular flowers on very tough, wiry stems. The flowers rise a foot or so above the basal tufts of leaves, which are wider than those of the common thrift.

Two of the best sedums for the front of the border are *Sedum kamtschaticum*, which is partially evergreen in mild climates, and has masses of starry-yellow flowers in late spring or early summer; and the deciduous 'Ruby Glow' (also sold as 'Rosy Glow'), with bright pink flowers that attract butterflies in late summer. Both like sun and well-drained, moderately fertile soil. *S. kamtschaticum*, of which there's a very pretty form with leaves variegated in cream and pink, stays neat. 'Ruby Glow' on the other hand, sprawls in a manner well suited to the top of a wall or alongside a path, and is less than ideal adjoining a lawn. I prefer *S. sieboldii*, a mass of pink in late summer and autumn, but have found it harder to establish. There's a lovely new one called 'Vera Jameson', with purplish-gray leaves and dusky-pink flowers. A chance seedling in an English garden, it is possibly a hybrid between 'Ruby Glow' and the two-foot, purple-leaved *S. maximum* 'Atropurpureum'. It has crossed the Atlantic, and if the more rigorous climate here does not test its mettle too severely, this may well become the best front-of-the-border sedum. Watch for it. ☉

—Pamela Harper

Pamela Harper owns Harper Horticultural Slide Library in Seaford, Virginia. She is co-author (with Frederick McGourty) of *Perennials: How to Select, Grow & Enjoy*, published recently by HP Books.

Plants & People: The Renewal of Life

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CARY ARBORETUM'S FERN GLEN

Continued from page 26

"tongue" ferns belong to this group: hart's tongue (*Phyllitis* spp.), adder's-tongue (*Ophioglossum* spp.) and walking fern (*Camptosorus* spp.). Most ferns fall between these ranges. Other curious variants include ferns with ruffled edges on leaves or leaflets, and fronds with forking at the tips.

The most bizarre of the crested ferns, according to Mickel, is the so-called tatting fern, *Athyrium filix-femina* 'Frizelliae'. Its leaflets are short, like buttons on the main stalk, and the frond tips are heavily forked, causing them to bend to the ground. There are several clumps of this cultivar in the cobble, as well as the closely related cultivars 'Fieldiae', 'Victoria' and 'Cristatum'. The limestone cobble is also the meeting ground for spleenworts—ebony, maidenhair and Scott's—polypody fern, bulblet bladder fern and its ruffled cultivar, the closely allied fragile fern, the walking fern and more.

Just as one begins to feel he or she has reached the saturation point amid all this fernery, one or another of the distinctive companion plants intermingled with the ferns sparks new interest. While experimenting with unusual perennials at Cary (many propagated from seed collected during plant expeditions abroad or obtained by exchange with many botanical gardens around the world), Hebb made some exciting finds, several of which are put to good use in and around the cobble. These, along with other low-maintenance woodland companions (Solomon's-seal, wild gingers, *Hepatica*, *Iris cristata*, baneberry and hardy relatives of the African violet), are shade-loving perennials that require the same conditions as their fern companions: part shade, part sun and evenly moist soil conditions.

One attention-grabber at the Fern Glen is Chinese mayapple, *Podophyllum hexandrum*. This mayapple has huge, glossy leaves (some are almost 10 inches wide) and looks like a magical plant that has escaped from a child's storybook. It has proved to be a sensational companion for ferns. Chinese mayapple bears its flower on top of the leaf and, as does our native *Podophyllum*, the "apple" underneath. Hebb prefers the Asian variety because our native species has a running root system and can become extremely invasive, while *P. hexandrum* stays in place. Another foliage plant that is just becoming available in this country is *Rodgersia*, a large, stunningly elegant plant. Hebb considers rod-

gersias among the easiest of all plants to grow: "They live forever, and have beautiful blossoms—like giant astilbes." The few garden books that mention them warn that they are not hardy anywhere north of New York City. The six different selections growing in the Glen have all been hardy to -25° F. However, one year a very late frost in May nipped some of the buds, and the show was not as spectacular as usual.

Experiments with some other plants, just as eagerly begun, have failed. For example, *Lysichiton*, the West Coast relative of the East Coast skunk cabbage but more impressive—four to five feet high with showy

yellow spathes that can become two feet high—has not grown well in the Glen. A Japanese counterpart, which has white inflorescences and was obtained with great difficulty, has also been disappointing.

In spring, the ferns are upstaged by flowering perennials and serve mainly as background for their soft colors. At this time, pride of place is held for almost four months by primroses that are hardier and more vigorous than the polyanthus primroses sold by most nurseries. A sequence of bloom is provided by four species, beginning in early March with *Primula vulgaris*, followed by *P. veris* (another European species), the Asian species *P. denticulata*, and

Growing Ferns

Ferns, like some classic perennials (daylilies, for one), are masters of illusion, perfect for many landscape uses and for mixing with trees, shrubs and herbaceous plants. They will grow where flowers will not bloom. They can be planted along banks or roadways, or in narrow places along a path or fence. They will fill gaps, or can be featured in mass single-species plantings or in collections of many different kinds.

Discerning gardeners who think in terms of low-maintenance, ecologically stable plantings are beginning to place ferns, along with hostas, at the top of their list of shade-loving plants. (Shade, by the way, is not synonymous with "dark." Ferns and all plants need some light—either indirect light of a north-facing area, or dappled shade.) Robert Hebb, who is partially responsible for the design of the Fern Glen, places great importance on the fern's need for moisture-retentive soil: "Many ferns do not have to have ideal conditions. With an even supply of moisture, they will thrive. Most species can be exposed to a half-day of bright sun if the soil is moisture-retentive." Ferns do not need to be staked, divided, dead-headed or fertilized, although they do respond to compost-enriched soil or a mulch of decaying wood.

Ferns generally do not make good competitors with tree roots and nuisance plants such as Virginia creeper, so occasional spot weeding may be in order. Exceptions are hay-scented fern (*Dennstaedtia punctilobula*), sensitive fern (*Onoclea sensibilis*) and bracken fern (*Pteridium aquilinum*). The rhizomes of bracken fern are such notoriously aggressive spreaders that it has been

said that all the bracken in the world is really only one plant.

Once established, ferns often propagate vegetatively, and new growth can be broken off and transplanted. However, gardeners who want a wider or more unusual selection may want to try spore propagation.

Spore propagation can be a very tedious, complex and precise process. (See "Fern Propagation" by David Longland in the June 1982 issue of *American Horticulturist*.) For a few species, spore germination can take several years. For others, such as the popular *Osmunda* spp. (cinnamon, interrupted and royal ferns), only a few weeks are involved; however, it may still take several years before the ferns grow large enough to plant in the garden. More and more, fern fanciers are propagating from spores of hardy ferns that are not yet available commercially. Gardeners can obtain spores from an interesting fern by cutting off a small piece of frond with ripe spores and putting it in a plain paper envelope or, if there is no problem with dampness, in a cellophane wrapper. As the specimen withers, the spores will fall out, and the fine, dust-like spores can be sown. The best way to obtain spores of unusual ferns is to join a fern society that maintains a spore bank. (See "Sources" on page 38.)

Obviously, spore propagation is not the answer for anyone looking for a "quick fix" to a garden problem. As with other perennials, faster results can be obtained by buying and transplanting them, by rooting divisions of ferns already growing on one's property, or by trading "over the garden fence" with a friend.

in mid-June with Japanese primroses, *P. japonica*.

All plants and gardens are in a perpetual state of "becoming," and the Fern Glen is no exception. The cobble area will be expanded to include an acid cobble, featuring ferns that require acid soil to thrive, and more companion plantings will be introduced. There will also be more concentration on summer-blooming companion plants, including the likes of *Cimicifuga* and astilbes. Hostas, one of the finest foliage plants that can be used to complement ferns, will be missing. "Deer love hostas," Hebb lamented. "Can you imagine what a feast we would be giving them if we planted hostas in this setting?"

As one leaves the Glen, it is possible to take a circuitous route to the lilac collection on the fringe of the Gifford Garden, which emphasizes unusual plants and low-maintenance perennials. This garden is still under construction, as are the Rhododendron Dell and Tree Avenue. The Avenue will show large native and foreign species that are valuable for lawns and street plantings. There is a greenhouse and

nursery complex a few minutes' drive from the Plant Science Building, which houses the administrative offices, laboratories, and library and meeting facilities. Plant seedlings and cuttings from around the world are cultivated in the greenhouses and will eventually be planted on the Arboretum grounds. Cary Arboretum is the official host and organizer for the Soviet-American Botanical Exchange Program of the U.S. Department of the Interior, and many of the plants have been propagated from seed obtained on special plant-collecting expeditions to Russia.

Leading to the Plant Science Building entrance is a deck surrounded by woody native trees, shrubs—and ferns. Here, ferns have a lived-with look, planted against a building as part of a foundation planting. "Ferns are ideal ground covers under rhododendrons, azaleas or any ericaceous plant," said Hebb. "That's because they all like the same conditions—even moisture, somewhat acid soil and part shade." *Polystichum* spp. are found among understory plantings at the Fern Glen. These ferns are evergreen and make a big bold

display, even though the older leaves, with their Christmas stocking-shaped pinnae, become prostrate in winter. (Other evergreen ferns include marginal shield fern, wood fern and Braun's holly fern.) There are also large plantings of cinnamon and maidenhair ferns, Solomon's-seal, Christmas rose, *Heuchera americana* and *Iris* as understory plantings for rhododendrons, *Kalmia* and *Leucothoe*.

Around the corner from this display is a stunning sight: a sunken courtyard with a stairway of ferns—perhaps 30 wide, steep, concrete steps spilling over with ferns and perennials. From the bottom it looks as if it climbs into the sky, and as one ascends or descends, the garden can be appreciated from changing angles. Here, one thing becomes clear: Whether in the sylvan splendor of the Glen, or as architectural plantings, ferns provide beauty, stability—and a dollop of magic—to our environment. ♣

Margaret Parke is a free-lance writer and photographer whose articles have appeared in *Organic Gardening* and the *New York Times*, as well as in former issues of *American Horticulturist*.

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