

American Horticulturist



BEAUTIFUL & BOUNTIFUL

Horticulture's Legacy to the Future

San Francisco, "The Golden Gate City," provides a perfect setting for the 41st Annual Meeting of the American Horticultural Society as we focus on the influence of oriental gardens, plant conservation, and edible landscaping.

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Explore with us the joys and practical aspects of edible landscaping, which allows one to enjoy both the beauty and the bounty of horticulture.



San Francisco Convention & Visitors Bureau

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Through the centuries, gardeners have turned to Mother Nature when searching for design inspiration.

This lovely garden pool, which is sculptured in concrete, has a mountain counterpart that was carved out of solid granite by wind and water. Join Pamela Harper on page 22 for a look at a fascinating San Francisco garden and the mountain scenery that inspired its design. Photograph by Pamela Harper.

Through the centuries, gardeners have turned to Mother Nature when searching for design inspiration.

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On the Cover: Native American plants have long been popular in the nursery trade. Unlike these cacti, which were grown from seed, many of the native plants offered in mail-order catalogues and at nurseries are collected from the wild. Wild-collecting threatens the survival of many of our native species of cacti, orchids, lilies and ferns, to name a few. To learn more about this subject—and what you can do to help alleviate the problem—see “Native Plants and the Nursery Trade” on page 27. Photograph by Marv Poulson.

Editor's Note: It has come to our attention that several copies of the April issue of *American Horticulturist* were missing pages and/or had duplicate pages. Any member who received a defective copy of the April issue (or who receives a defective copy of *any* issue, for that matter) is requested to write to the Editor in care of the Society. Please return your defective copy, or list which pages were missing and/or duplicated. This information will help us to identify where the production problem occurred and will enable us to take the necessary steps to correct it. We will be happy to replace defective issues and refund your postage.

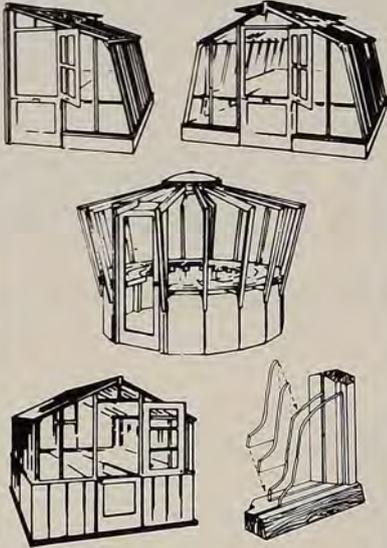
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By the time this appears in print, most of us will have begun a new season in our gardens. Because of the lead time required to publish each issue of *American Horticulturist*, however, I am writing this column at a time when my own garden is decidedly dormant. In fact, it is still buried under several inches of snow.

This is definitely a time of year for reflection, and although the traditional time for New Year's resolutions has passed, it is still not too late for new garden-year resolutions. Such resolutions are personal in nature; they are a pact between the individual who makes them and his or her own conscience. There are some resolutions, however, that I think have enough universal appeal for Society members to consider.

First on the list, I think, is to resolve to try something new in our gardens—by way of either plants or gardening techniques. Personally, I benefit enormously from publications like the one before you when I plant my garden each season. Advertisements and "how-to" articles are the chief catalysts that motivate me to action. Also, because my garden is now a clean slate, I can use my imagination to envision perfect results from my efforts. I am totally unencumbered by the realities of the labor involved in carrying out any of my plans, the problems posed by the vagaries of weather or the non-cooperation on the part of the plants themselves.

The second resolve that I would like to pass on is to take some opportunity during the new garden season to increase your knowledge of some aspect of gardening with which you are not very familiar. The opportunities are limitless. For instance, plan to spend a little time in other gardens—public or private—to observe their successes and failures. Or, spend some time with a plant society or garden club for the same reason. Needless to say, a resolution to read all of the *American Horticulturist* Society's publications, attend one of its meetings or join one of the Society-sponsored trips would also be valuable.

A third resolve worth passing on is to

make every attempt to treat ourselves and our environment more kindly by a practice I would call "reading leaves" instead of "reading labels," that is, by beginning to practice more careful and considerate use of chemicals when dealing with plant diseases and pests. Rather than searching the shelf for a quick cure to a perceived problem, we should try to look for a more natural way to effect a cure.

Although the traditional time for New Year's resolutions has passed, it is still not too late for new garden-year resolutions.

Finally, I would like to offer a resolve to share our gardening experiences with others. One of the most wonderful aspects of gardening is that it is not generally a competitive activity. In all of my travels with the Society and all of my talks with Society members, I have never found a gardener who wasn't willing to share his or her horticultural experiences with others. I can't think of any better way to fulfill this resolution than by introducing a friend to the *American Horticulturist* Society.

Perhaps you will benefit from these thoughts if for no other reason than because they may lead you to think of other good resolutions for yourself. This is our chance to treat ourselves to perfect gardens. As long as our landscapes are still only images in our own minds, is there any harm in believing that all of our efforts will be successful? All we know now is that our gardens this season will be the best that we will ever grow. Let's wait until later to talk about how it all works out. Now we only know success.

Edward N. Dane

—Edward N. Dane



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The Pink Family



Dianthus chinensis 'Queen's Court Mix'

**Sir, the year growing ancient,
Not yet on summer's death,
nor on the birth
Of trembling winter, the
fairest flowers o' the season
Are our carnations, and
streak'd gillyvors.**

—The Winter's Tale

By the time Shakespeare wrote *The Winter's Tale*, he had left the London theater for good and returned to his own home and garden at Stratford. Like any good gardener, he thought much about the seasons of the year. In the above quotation, Shakespeare speaks of midsummer and the flowers that bloomed in gardens during that season. The name gillyvor is a corruption of the French word for clove, *girofle*. In the Middle Ages, the old-fashioned, fragrant clove carnations were used in place of expensive cloves from the Orient to impart a pleasing flavor and bouquet

to wine. The word carnation is based on the Latin *corona*, meaning crown, in reference to the ancient custom of using this flower in crowns or wreaths.

The clove pink or carnation, *Dianthus caryophyllus*, is just one of many species in the pink family, Caryophyllaceae. Family members are called "pinks" not for their color—which may be white and yellow, or a shade of pink, rose or red—but for the crimped, or "pinked," edges of their petals.

Plants belonging to the Caryophyllaceae are found mainly in temperate and cool climates. The family includes 70 genera, and abounds in ornamental plants—annuals, biennials and perennials suited to rock gardens, wall gardens and herbaceous borders. The family includes several well-known genera, of which *Dianthus*, *Gypsophila* and *Lychnis* are the best known. Pink family members tend to prefer alkaline soils, are sun-loving, and are predominantly summer-flowering. Flowers are regular, and have four or five sepals that are separate or united, four or five petals, and 10 stamens. All secrete honey at the

base of the stamen. In some species, sepals are separate down to the base, and nectar is easy to obtain; in others (such as the carnation), nectar is held deep in the tubular calyx of joined sepals so that only insects with a long proboscis (for example, butterflies or moths) can reach it. Pollination results in the production of a cylindrical capsule, which usually contains many seeds. A few species produce a one-seeded nutlet.

There are approximately 300 species of *Dianthus*. The generic name derives from the Greek words *di* and *anthos*, meaning flower of the gods. Most species are native to Europe and Asia, although a few species can be found growing in the wild in such places as Alaska and South Africa. Horticulturists have divided the genus arbitrarily into five to eight main groups. One grouping that is helpful in making choices for the garden is presented by Roy Hay and Patrick M. Syngé in *The Color Dictionary of Flowers and Plants for Home and Garden* (Crown Publishers, Inc., 1969): descriptions and color photographs are given for (1) alpine and rock garden pinks;

(2) annual and biennial plants; (3) border pinks and carnations; (4) perpetual carnations for the greenhouse.

Some *Dianthus* species are mat-forming, while others are tufted or erect. Leaves are opposite, paired, and often united at the base, forming a sheath around the stem. Nodes are usually swollen. Flowers, which are solitary or grow in panicles or clusters, have five petals and 10 stamens. They are often showy and fragrant, and usually pink or rose in color.

In North America, the name carnation ordinarily refers to the florist's flower, *D. caryophyllus*, which is grown under glass for cut flowers. However, the name rightly belongs to all of the carnation species. The highly developed, large-flowered forms are of two general groups: the border or outdoor carnations, and the glasshouse or florist's carnations. Border carnations are rarely cultivated in North America; the florist's flower is grown on this continent as a commercial crop.

D. chinensis, rainbow pink, is a short-lived perennial from central and eastern China. The 'Heddewigii' strain of cultivars and a number of other hybrids comprise the annual pinks most commonly grown in gardens in the United States. Rainbow pinks sport green foliage on stems that are six to 30 inches tall. The plants produce few- to many-flowered clusters of flowers in a variety of colors.

D. deltooides, maiden pink, is a native of Europe. This vigorous species for the rock garden blooms in May or June. Its deep pink flowers are borne on six- to eight-inch stalks above the green or glaucous foliage, which grows in tufts or clumps. Several cultivars of *D. deltooides* bear white, pink or rose blossoms.

D. gratianopolitanus (formerly *D. caesioides*) is commonly called cheddar pink. It is also native to Europe. This species produces dense, little clumps of gray leaves, and blooms intermittently in early summer. Its fragrant, rosy-pink flowers have toothed and bearded petals. There are various cultivars that provide the gardener with a choice of flower color and habit.

D. plumarius, cottage pink or grass pink, was probably introduced to the United States from Europe in colonial days. This mat-forming perennial displays distinctive gray foliage, and blooms in May and June. Its extremely fragrant blossoms often sport fringed petals of rose, purple or white. There are a number of cultivars and varieties from which to choose.

The hardy hybrid species *D. × allwoodii* originated in England from a cross between *D. caryophyllus* and *D. plumarius*. Its flowers come in many colors and have variously fringed petals.

Montague Allwood, British hybridizer, spent his whole life raising different forms of *Dianthus*. He created the race of cultivars known as "Allwoodii" after nine

years of intensive work that involved crossing pinks with perpetual carnations. The last of Allwood's hybrid races, commonly referred to as the "Allwoodii alpinus" race, was bred by crossing 'Allwoodii' selections with various dwarf species. Plants in the race bear pink or purple flowers that bloom over a long period.



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STRANGE RELATIVES

Another species, *D. knappii*, is curiously reluctant to hybridize with other members of its genus. However, hybridizers have been able to use this native of western Yugoslavia to widen the color range of carnations. *D. knappii* forsakes family tradition by having unique clear-yellow flowers, which never fail to attract interest. The flowers are small and have no fragrance, but they are carried in profusion on tall, branching stems that grow to a foot or more in height. The plant's habit of growth is straggly and impermanent.

D. barbatus, sweet William, is a native of southern Europe. Although it has a long history of cultivation, the garden forms have changed comparatively little over the centuries. This short-lived perennial, usually grown as a biennial in the garden, is nearly two feet tall. The inflorescence is a many-flowered, flat-topped, sometimes double cluster of flowers. Many cultivars have been developed that offer white, pink, rose, red, purple or bi-colored blossoms. *D. barbatus* has escaped from gardens and is naturalized in North America.

Gypsophila, or baby's-breath, is another ornamental member of the pink family. Baby's-breath is distinguished from other genera of Caryophyllaceae by its large, branched sprays of tiny flowers. Members of this genus, which includes both annuals and perennials, are valued for the fine texture of their foliage and the frothy effect of their flowering habit. All gypsophilas love sun and prefer an alkaline soil.

G. paniculata is a delicate, but compact-growing hardy perennial. Small, white flowers (up to 1,000 on a single branched spray) appear in July; the plants will bloom again from August to October if they are cut back after the first flush of blooms. There are a number of white or pink cultivars; 'Bristol Fairy' is a common double-flowered form. *G. elegans*, an attractive annual, has larger flowers than does *G. paniculata*. Cultivars with white, purple and rose-pink flowers are available.

Florists cultivate both *G. elegans* and *G. paniculata* for bouquets. In addition, both species are valued in gardens for their heavily branched habit and for the feathery

texture of their small leaves and flowers.

G. repens, creeping baby's-breath, forms broad mats that are smothered in summer by tiny white or pink flowers. This species makes a good ground cover and is well suited for the rock garden.

The generic name *Lychnis* is derived from the Greek word for lamp, an allusion to the flame-colored flowers borne by some members of this genus. The common name, campion, comes from the Latin word for field, the plant's usual habitat. The 35 species of *Lychnis* are annuals or perennials that are native to north-temperate or arctic regions. Several species or forms bear bright, five-petaled flowers in shades of white, scarlet, pink or purple. The flowers are solitary or borne in clusters.

L. chalconica was once thought to have been brought to western Europe from Jerusalem at the time of the Crusades; hence the common names Jerusalem-cross and Maltese-cross. However, it is actually native to Russia and Siberia. Its dense terminal heads of inch-wide, scarlet flowers—which appear on leafy three-foot stems

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in June and July—make it a popular perennial border plant. This species has become naturalized in the United States.

L. coronaria, rose campion, has also been naturalized in this country. Although it is a biennial, it can be grown in the garden as an annual. It bears rosy blossoms on silvery stems. The leaves are covered with many fine, silvery hairs. This dense, white, woolly substance was once picked from the leaves and used for lamp wicks. The vivid cerise flowers provide a striking contrast to the rest of the plant.

A hardy perennial for the wild garden is *L. flos-cuculi*. The white, pink, blue or purple flowers have five petals, each of which is divided into four thread-like segments. This distinctive pattern accounts for the common name, ragged-robin. The flowers, which appear from May to August, are borne on one- to two-foot stems. The leaves are somewhat hairy and sticky. This species is a weed of European origin, and has become naturalized throughout eastern North America, from Quebec to Pennsylvania.

L. flos-jovis, flower-of-Jove, is an attractive three-foot perennial with white tomentose foliage and purplish-red flowers.

L. coeli-rosa, rose-of-heaven, is an annual whose blossoms are produced singly at the ends of stems that grow eight to 20 inches tall. There are rose-of-heaven selections that bear white, red or purple flowers.

L. viscaria, German catchfly, sports tufts of grass-like foliage and reddish-purple flowers borne in clusters of three to six per stem. A native of Europe and northern Asia, this species blooms in late May or June. The name catchfly alludes to the stems, which are hairy above and viscid just below the nodes.

Haages campion, (*L. × haageana*) is a hybrid between *L. fulgens* and *L. coronata*. It produces masses of scarlet-orange flowers in early summer on 10-inch-tall plants.

One large genus of the pink family whose members are distributed throughout the Northern Hemisphere is *Silene*. This diverse group includes annuals, biennials and perennials, both hardy and tender. A few

of the silenes are useful and ornamental in the garden, while some fall under the general category of wildflowers. The name *Silene* is based on the Greek word for saliva, in reference to the sticky substance found on stems or leaves. Among the names commonly associated with this genus are catchfly and campion.

As with other pinks, *Silene* species bear flowers that have five petals and 10 stamens. The calyx is tubular, and the united sepals enfold the flowers, whose separate petals are white, pink or red.

S. acaulis, cushion pink or moss campion, is a showy, mat-forming alpine species that bears deep pink or purplish flowers. This species, which is a native of arctic Eurasia and the mountains of western North America and central Europe, produces a small hummock of leafy stems and woody bases. It is suitable for the rock garden, but is generally not as free-flowering under cultivation as it is in its native habitat.

S. alba, white campion or evening campion, bears lightly scented, white blossoms that appear in the evening. It is native to

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STRANGE RELATIVES

North Africa, Europe and Asia, and has become naturalized in North America.

Another night-flowering species is *S. noctiflora*, a rather coarse annual that is noted for its fragrant aroma. This species comes from Europe and Asia, but is also naturalized in North America.

S. vulgaris, bladder campion or maiden's-tears, is a common roadside weed of Europe that bears nodding flowers at the upper joints of the stems. Small, clawed, white petals and stamens extend from a large, inflated green calyx.

Among the native-American species of *Silene* are *S. virginica*, *S. caroliniana*, *S. stellata* and *S. laciniata*. *S. virginica*, fire pink, is one of our most conspicuous wild-flowers. The flowers are an inch or more across, and sport brilliant red petals, each one of which is two-pronged at the tip. Greenish sepals are united into a sticky tubular calyx. The plant's sticky, hairy stem reaches a foot to two feet in height. Common in open woods and on rocky slopes, this species begins to bloom in the South in late March, and may continue to bloom into June or later.

S. caroliniana, Carolina wild pink, is a low, tufted plant with sticky, hairy stems. Its spreading, one-inch petals are bright pink. It is found in dry, sandy or rocky woods, and blooms between April and June.

S. stellata, starry campion or widow's-frill, bears a loose cluster of white flowers atop a stem that grows from two to three feet tall. Along the stem are whorls of four lance-shaped leaves, which are slightly hairy beneath. The flowers measure about three-quarters of an inch across, and have an inflated, bell-shaped, usually downy calyx. Petals are delicately fringed. *S. stellata* is common in open woods from July to September.

S. laciniata, Indian pink or Mexican campion, grows naturally in mountains from California to New Mexico and into Mexico. Three-foot pubescent stems bear clusters of showy crimson flowers.

The genus *Saponaria*, soapwort, is best known for the species *S. officinalis*, commonly called bouncing Bet. This stout, rhizomatous perennial forms colonies of sparingly branched, three-foot stems. Its pink-and-white flowers grow in a condensed terminal cluster. Although of European origin, bouncing Bet is naturalized throughout North America and is somewhat invasive. The flowers give off little scent in daylight but exude a delicious aroma at nightfall, and for this reason the

species is sometimes included in borders or wild gardens.

The name *Saponaria* is based on the Latin word for soap. The species name *officinalis* indicates that the weed was a stock-in-trade item of ancient herb shops. Soapwort has had many herbal, medicinal and domestic uses throughout the centuries. For example, it has been used to restore delicate materials; lather produced by crushing the leaves and roots is high in saponin, a chemical compound that foams like soap and works well to restore color and sheen to old and faded fabrics, including ancient tapestries, embroideries and brocades. Saponin produced from soapwort has also been used to return the original luster to delicate china and precious glass. Today, soapwort is used in museums and historic houses to restore treasures spoiled by ages of neglect. The plant is still cultivated in Syria and other eastern countries for its exceptional cleansing qualities in washing wools, linens and silks.

The name *Stellaria media* means "a starry plant of intermediate size." Anglo-Saxons called this plant chickweed, a name that attests to the fact that it is relished by birds and poultry. This modest cousin of the carnation is an annual weed that lasts through the winter and seldom lacks flowers and seeds. It grows throughout Europe as well as southern and central Asia, and is established as far north as the Arctic Circle. *S. media* is among the few plants that possess a rich copper content, and is a highly nutritious cress in the diet of man, beast and bird. Both *S. media* and *Cerastium arvense*—another pink family member that is also called chickweed—are garden and lawn weeds in North America.

Among the desirable garden species in the genus *Cerastium* is *C. tomentosum*, snow-in-summer. This perennial is valued for its grayish, woolly leaves, and grows in dense, creeping patches in rock gardens.

Certain plant families have universal appeal, and the Caryophyllaceae is one of them. Given their variations in color, size, character and habit of growth—for example, creeping or erect, annual or perennial, day-flowering or night-flowering, showy or diminutive—the pinks can help the gardener achieve a summer-blooming garden of great diversity. ♀

—Jane Steffey

Jane Steffey is an Editorial Advisor and a frequent contributor to *American Horticulturist*.

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From Wood & Meadow

All too often we seem to overlook the many useful parallels that exist between the goings-on in meadows and woodlands, where natural selection has chosen the resident plant life, and our own efforts to landscape our home grounds. Whether our goals include the development of low-maintenance plantings or obtaining more unusual plants for our gardens, we can learn a great deal about what plants can be used to best advantage under different growing conditions by studying natural plant communities in their native habitats.

Parks and other refuges from human encroachment where the natural terrain and vegetation have been preserved are an invaluable source of information and inspiration for gardeners. They offer a firsthand look at how different terrains are successfully populated by plants that have selected their own preferred habitats. These areas also display the rich variety of plant species that are amenable to different soil, light and moisture conditions.

Especially noteworthy are areas that have been singled out for protection because of their unique characteristics and the unusual plant communities that frequently dwell there. Limestone cobbles, acidic bogs or tracts of virgin prairie, for example, can all offer useful information to gardeners with unusual garden habitats in their back yards.

If a low-maintenance planting is high on your list of landscaping objectives, you can ask for no better guides in matching plants to habitat than the woods and meadows. By discovering and using plants that are readily adaptable to the climate and soil found within your garden, you should be able to establish a thriving and visually sumptuous planting that will require little coddling once the plants have established themselves.

Low-maintenance gardening is based on the premise that the gardener chooses the plants to fit the cultural conditions of the planting site, rather than tailoring (and periodically refurbishing) the site to meet the preferences of a select group of plants. Therefore, before venturing out to dis-



Alice Yeager

cover what the woods and meadows hold, you will need to discover what your own piece of land has to offer.

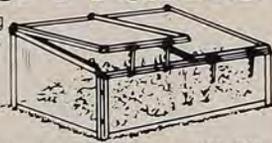
The available light will vary from spot to spot depending upon the garden's exposure, as well as the size and species of trees present. The soil will usually be anything but uniform throughout the entire garden. My own garden has far more clay than I would have liked, outcroppings of slate where little soil of any description exists, and one wonderful meadow of sandy loam. The water table is relatively high

except where the vegetables are grown, and the light varies from shady patches lying in the shadows of maples, pines and hemlocks, to a full, unobstructed southern exposure in the loamy meadow.

The availability of water, especially during the summer months, is a critical consideration. Since the necessity for frequent watering defeats the purpose of low-maintenance gardening, the plants' moisture requirements should be matched to the average rainfall. Of course, during prolonged dry spells, those plant species that are not

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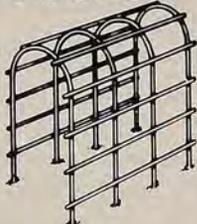
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GARDEN HINTS

adapted to desert survival may need a deep drink. The infrequent task of watering will be much easier if a faucet or hose is nearby.

No matter how homogeneous your garden site may appear to be, it undoubtedly contains a number of microclimates that favor one group of plants over another. Although the soil type, light and water availability can be easily ascertained, spots where cold air collects in late spring and early autumn are less obvious. If you can wait one full year before planting a new garden, your observations of where the frost hits first in autumn and where the first buds of spring break will help you decide where to plant what for the best performance. A year's observation will also reveal where storm run-off collects, along with other bits of information that take much of the trial (and, all too frequently, error) out of placing plants in the garden.

Once you are familiar with the many-faceted character of your planting site, you will probably be sorely tempted to reach for catalogues and garden reference manuals to look up plants listed under headings such as "Plants for Wet Soil" and "Plants for Rocky Ground." Although these materials are a valuable source of information and can be useful in selecting proper plants for your particular growing conditions, you should reach instead for a good field guide to native plants and set out for a walk in the woods or meadows.

The ever-growing list of plants offered for sale at garden centers and through mail-order catalogues is principally composed of hybrids and cultivars that have been painstakingly developed by plant breeders. These plants (with the exception of the escapee that finds the untended life in the wild to its liking) are not found growing in the wild. However, they originate from wild species, and these ancestors can often tell you quite a bit about a species' or genus's cultural preferences.

Many of our garden favorites, such as peonies and bearded iris, originated from species that are native to other lands and thus will not be found growing wild in our woods and meadows. However, depending on the time of year, a meadow walk can introduce you to wild fleabanes, rudbeckias, coreopsis, heleniums, a multitude of asters and a stunning variety of goldenrods. When you come across these plants or others that catch your fancy, take a moment to study the conditions under which they are growing. Is the meadow dry or moist? Which plants seem to pro-

liferate most freely under the prevailing conditions? Does your garden have a similar spot where a mass of meadow-dwellers could be successfully accommodated? These are the sorts of observations that can help you select plants that will feel right at home in your garden and will provide both visual beauty and a minimal demand upon your time.

Information gleaned from your walks can also help you capitalize on a site's traits to establish a more complete garden picture. For example, while walking in the woods during spring, you may come upon an area where the soil is a bit dry and rocky. In the Northeast, wild columbine, polypody ferns and Virginia saxifrage are common residents of such a site. A similar area in your garden, where light shade predominates, would be no less hospitable to these carefree, yet delicate-looking plants, which need only an occasional watering during summer to keep them happy.

Before leaving the rocky site in the woods with your plant information, notice that the beauty of the spot relies upon more than the plants themselves. On such a site, you will also frequently find seams of lichen-encrusted stone, with patches of moss and reindeer lichen clinging to the shallowest pockets of soil. Columbines and saxifrages often add color and a touch of delicacy, thereby providing a contrast to the harder character of stone and lichen. Together, these diverse elements create a very lovely, low-maintenance planting for dry, stony soil.

Moister woodlands with a deeper and richer soil harbor bloodroot, trilliums and an endless variety of woodland ferns. If conditions are right, gentians, dutchman's-breeches and *Hepatica* may be found as well, while areas where the sun peers through the trees may contain the crimson-red blooms of cardinal flower. Areas in the home garden that duplicate these conditions should be equally successful in hosting these well-loved wildflowers. On the other hand, efforts to create these conditions where they do not already exist often lead to disappointment.

Before leaving the woods, note that the natural setting in which these lovely plants grow also contributes to the overall beauty of the scene. Fallen branches and leaf litter cover the ground in a haphazard manner that complements both the appearance and the character of the wildflowers in a way that no litter-free, wood chip-mulched environment can. In addition, such a setting



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GARDEN HINTS

offers insight into the soil-nutrient-plant relationships that enable these plants to flourish. For example, the decaying layer of debris helps keep the soil cool and moist, and improves the soil's texture while slowly releasing a steady supply of plant nutrients. The plants prosper in this natural setting without supplemental feedings of 5-10-5—something to keep in mind should you choose to grow them at home.

When brought into our gardens, native plants often lose their vigor because of our good intentions. Over-fed and over-watered, these plants quickly become targets for insects and diseases. Keep in mind that their value as low-maintenance plants

lies in their adaptability to specific growing conditions—for example, cardinal flower to a moist, sunny spot; butterfly weed to a dry, sunny spot; and wild columbine to a rocky, shady spot. Native plants that are provided with conditions in the garden that mirror those of their native habitats will display their stamina and natural low-maintenance characteristics, and can be enjoyed for years to come.

Of course, there is no reason not to experiment with these plants in order to see how far you can stretch their adaptability. Cardinal flower, for example, does very well in a herbaceous border of well-worked soil with moderate fertility. Wild colum-

bine is less comfortable in this setting, and butterfly weed can become lank and a haven for aphids.

If you desire greater variety in the plants you will be using, your excursions through woods and meadows can open your eyes to plant species you may never before have considered to be ornamentally useful. Heading the list of the often-neglected ornamentals are the goldenrods (*Solidago* spp.), whose undeserved reputation as noxious weeds has limited their use in American gardens. Overseas, however, our native goldenrods have been welcomed and hybridized into a collection of outstanding ornamentals. An autumn border of asters, chrysanthemums and masses of golden-yellow goldenrods would complement any sunny, well-drained piece of ground.

Another group of plants whose attractive flowers and adaptability to difficult growing situations have only recently begun to attract the attention of gardeners are the milkweeds. In particular, the vivid orange flowers of the sun- and dry soil-loving butterfly weed are becoming more frequent residents of our gardens. Where moist soils abound, I recommend the rosy-pink and sweet-scented swamp milkweed. Blooming in mid- to late summer, it is the perfect companion to the vibrant red, summer-flowering cardinal flower. Butterfly lovers should note that our common milkweed, *Asclepias syriaca*, is the favored food of the monarch butterfly's larvae. However, milkweeds are poisonous to many farm animals and should be kept out of pastures used for grazing.

Yet another neglected group of native plants are the mulleins. Their preference for a sunny, well-drained site makes them very useful in gardens where water is at a premium. The flowers of the common mullein are inconspicuous, but the plant's fuzzy gray foliage, which closely resembles that of lamb's-ears (*Stachys byzantina*), is very attractive. The showy yellow flowers, on spikes up to three feet tall, make the moth mullein a very desirable mid- to late-summer bloomer.

A walk in the open woods and abandoned meadows of the Northeast during midsummer will often provide you with the opportunity to collect handfuls of tangy-sweet blueberries from the ground-hugging lowbush blueberry, *Vaccinium angustifolium*. This versatile plant can be found in moist depressions or clinging to rocky ground where soil is sparse. An attractive, deciduous ground cover, it re-

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grettably loses its ripening berries in drier terrain if summer rain is scarce. An acid soil, preferably rich in organic material, and a full day of sun will keep the lowbush blueberry happy. If acid soil with a reasonably generous amount of organic matter is available, other native ericaceous ground covers are also worth a try, including the moisture-loving bog rosemary (*Andromeda polifolia*) and bog laurel (*Kalmia polifolia*). If the soil is well drained, try bearberry (*Arctostaphylos uva-ursi*). And if your walks take you through a moist woods with acid soil in spring, keep your eyes open for the soft pink, fragrant flowers of trailing arbutus (*Epigaea repens*) and the small but familiar flowers of the dogwood family's diminutive member, bunchberry (*Cornus canadensis*).

If you have been taking notes as you walk, you will have collected the sort of information that will enable you to recognize which plants will be most likely to thrive in the various corners of your own garden. You can now match native plants that you know firsthand with their preferred spots in your yard, and enjoy those almost carefree qualities that few non-native plants can offer. Or, you may want to investigate the cultivated varieties of those now-familiar native species more fully. In either case, you will have a much better appreciation for how different plants will be likely to respond to the cultural conditions found within your garden.

When planting time comes around, keep in mind that *where* you get your plants is just as important as correctly matching the plants to their new home. Given that native stands of many wildflowers are dwindling away because of over-collecting and habitat destruction, it is both thoughtless and destructive for gardeners to uproot these plants from their natural surroundings (unless, of course, the plants are growing on a site soon to fall under the bulldozer and can be collected with the landowner's permission). Preserving these plants in their native habitats should be a priority for all gardeners. Gardeners can work toward this goal by (among other things) supporting the growing number of nurserymen who propagate rather than collect native plants for sale to home gardeners. Such responsible buying will help to ensure that wild colonies of native plants will be around to educate the gardeners of the future. ☼

—Michael B. Trimble

Michael B. Trimble is a gardener and writer living in Rhinebeck, New York.

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People and Plants



Charles A. Lewis

The following is a condensed version of Mr. Lewis' Keynote Address, presented at the American Horticultural Society's 40th Annual Meeting (September 11-15, 1985) in Chicago, Illinois.

Hundreds of millions of years ago, forces were set in motion that ultimately led to the appearance of life on this planet. Somehow in that primal atmosphere, molecules joined together to form the most primitive of life forms. Green plants appeared first, inhabiting this planet long before our predecessors appeared. Plants were able to thrive in the primal atmosphere, which was rich in carbon dioxide. It is believed that through their growth and expansion, plants helped to increase the amount of oxygen in the atmosphere, thereby permitting the evolu-

tion of the first oxygen-breathing forms of life. Thus, plants became the background for the unfolding drama of evolution and the emergence of higher forms of life.

The development of new life forms proceeded slowly. If new types appeared that were well adapted to the particular environment of that time, they survived. Millions of combinations were tested, and only a minute number were successful. Life on earth today represents the residuum of all those trials.

Interactions between humans and plants have occurred at both physical and mental levels throughout the centuries. From the very beginning, man had to learn how to use plants to survive in his physical surroundings. First, he was a hunter-gatherer, seeking out the fruits of the environment wherever they could be found. Slowly, he

discovered that it was more efficient to remain in one place to cultivate his food, and agriculture was born. Agriculture, which assured an adequate food supply, in turn allowed for the development of industry.

Nature not only provided for man's physical well-being, but also helped shape and nurture his mental abilities. The primary task of our primitive ancestors was to survive, and thus to continue the species. They learned their lessons through trial and error from the green environment that surrounded them. They learned how to solve problems and make sound judgments in life-threatening situations—what plants could be safely eaten, for example. Those who were astute learners survived; the others, like the near-sighted monkey who missed the branch, disappeared. Modern

Blessings and Curses

BY CHARLES A. LEWIS

man is living proof of the success of the species in learning to cope with its changing environment.

Today, however, the green plants that have nurtured man are themselves in need of protection. Increasingly, man has viewed the earth's natural vegetation as an obstacle to an expanding economy. He has leveled and cleared entire forests, and the monocultural practices of modern agriculture have replaced ecological diversity. Industries and urban sprawl have carved their designs in the green earth. As a result, the plants that have been man's partners in the evolutionary journey are now threatened and in danger of extinction. There are 200,000 known species of flowering plants (angiosperms) and untold more that have not yet been discovered. Fully 10 percent—nearly 20,000 species—are in need of protection. Only a small fraction of the many plant species native to the tropical rain forests of the Amazon have been discovered, yet each day 5,000 acres of that precious ecological area are destroyed.

Many national and international groups have been formed to determine the extent to which plants are threatened. Some of these groups have published systematic listings of endangered species. Ironically, the very listing of a plant as endangered can pose a threat to the plant itself. If a plant is considered rare, there will always be someone who is willing to pay a high price to obtain it. Today, there is a steady and lively illicit trade in endangered species of plants. Rare cacti are ripped from the desert, while sundews, Venus's-flytraps and pitcher plants are purloined to satisfy the wants of gardeners. (For more information on this subject, see "Native Plants and the Nursery Trade" on page 27.)

Overwhelmed by challenges of survival, contemporary man has failed to see the value of plants in the technological world—especially the subtle ways in which plants can help us endure the polluted and overcrowded world we have created. Unfortunately, we have come to view plants not as an integral part of our lives, but as objects separate from people.

One way to learn to see plants within the context of human experience is to look



Allen Rokach

LEFT: Inner-city residents, such as these enthusiastic gardeners in Bronx, New York, benefit in many ways from their experiences with growing plants. City gardening programs have led to reduced vandalism and cleaner streets. ABOVE: Urban parks, such as Bryant Park in New York City, provide settings where city-dwellers can be close to nature. Psychologists believe that there is a close link between plants and the well-being of humans. City dwellers may be refreshed, both physically and psychologically, after pausing to enjoy the trees and other vegetation in a park.

at horticulture from a people-plant perspective. Plants are sought, discovered, propagated, bred, bought and sold not for the benefit of plants, but rather to satisfy the interests of people. (Remember, plants do not need people; people need plants.) Horticulture, therefore, is a human activity, an umbrella to bring together people who have an interest in plants.

Plants enter into human experience in two ways. First, we observe plants as they appear in parks, in gardens, along streets or in vacant lots. Thus, our first impression is visual; we see the plants with our eyes. Then, the image is transmitted to our brain, decoded and recognized. Finally, we experience feelings about the vegetation and landscape we see—pleasure, displeasure, awe, fear, fascination, to name a few. Our accumulated interpretations correspond to the personal meaning we might find in a given tree or landscape. However, in this mode of experience, person and plant are still separated, and any feelings involved are the result of visual contact.

People who are intimately involved with a plant's growth experience plants in an entirely different way. In this case, the person is no longer simply an observer, but is directly responsible for the well-being of the plant. If the plant wilts, the person waters; if it lacks vigor, he adds fertilizer or provides additional light, and so on through the many nurturing activities. By close observation, a gardener learns to understand each plant's responses as a kind of language by which the plant signals its needs. The long, intimate encounter between person and plant often leads to subjective personal feelings. When the plant grows, the gardener feels successful and proud. If it does not grow, he feels sad or perhaps even angry.

Horticulture may therefore be seen as a kind of process. It includes all the thoughts, actions and responses that take place from the time the gardening activity is first contemplated, through planting and the growth of the seed, to the mature plant. At each stage, the process presents the gardener

Plants possess life-enhancing qualities that encourage people to respond to them. . . . They are living entities that respond directly to the care that is given them, not to the intellectual or physical capacities of the gardener.



Barbara W. Ellis

with opportunities for personal involvement. Thus, a part of the human spirit is invested in the gardening process. Deciding to grow a plant, design a garden or sow a seed creates mental expectations of what the garden will look like. Because of the time required for plants to grow, the gardener must wait for his reward until the seed germinates and the plant grows and finally blooms. The quality of the person-plant experience is dependent on the gardener's degree of personal involvement and on the success of the horticultural project.

In 1972, the American Horticultural Society, with the support of a grant from Mrs. Enid A. Haupt, launched the People-Plant Program to investigate and call attention to the kinds of benefits that are derived from gardening. Three years later, under the leadership of Dr. Rachel Kaplan, Environmental Psychologist at the University of Michigan, the program initiated a survey to study the kinds of satisfaction and benefits that people find in gardening. Over 4,000 Society members completed survey forms, and many also sent letters noting the details of their personal gardening experiences. The survey asked the respondents what kinds of satisfaction they

derived from gardening, and provided them with two categories of choices: horticultural (for example, "I enjoy growing new plants") and personal (for example, "the feeling of peacefulness in the garden"). Over 60 percent of the respondents chose "feeling of peacefulness" and "source of tranquility" as the most important reasons for gardening. For them, human rewards were more important than horticultural benefits.

Urban Gardening

Gardening projects in low-income areas are a good example of how the horticultural process enhances the quality of life. Participation in such programs regularly results in the gardeners' enhanced self-esteem and new neighborliness, as well as improved yards, buildings and neighborhoods. Gardeners in city programs across the country have reported sharing their flowers, vegetables and themselves. Reports indicate that the presence of the gardens has led to reduced vandalism and cleaner streets.

In Philadelphia's inner city, a successful window box garden contest—begun in 1953 by Louise Bush-Brown—led to the formation of the Neighborhood Garden Association (NGA). For any block in which 85 percent of the residents agreed to plant and maintain window boxes for two years, NGA provided contact with a garden club, which, in turn, provided plants to help start the window boxes. Soon, colorful flowers appeared on the inner-city blocks, and neighbors banded together to clean up streets and whitewash curbs, front steps and windowsills. At the same time, vacant, debris-laden lots were converted into playgrounds and gardens. These activities were not part of the program, but were spontaneous and somehow inspired by the presence of the window boxes. The program, now supported by the Pennsylvania Horticultural Society, continues in over 100 Philadelphia blocks.

The presence of gardens in poor urban areas, then, can have a positive effect on the residents and their self-esteem. Dr. Edward Stainbrook, former Chairman of the Department of Human Behavior at the University of Southern California's School

of Medicine, notes in his article "Man's Psychic Needs for Nature" that "an environment of ugliness, dilapidation, dirtiness, over-built space, and lack of natural surroundings confirms the negative self-appraisal a person may have developed through other contacts with society. Self-esteem is the keystone to emotional well-being; a poor self-appraisal, among other factors, determines how one treats his surroundings and how destructive he will be toward himself and others. These factors set up a vicious circle that is difficult to break."

How does gardening enhance self-esteem? The gardener takes on a responsibility when he grows a plant, because the plant's future is dependent on the gardener's ability to provide the right conditions for growth. Each day as the gardener tends his garden, he observes the plant growing in response to his care. After awhile he identifies with his garden and builds a personal relationship with it. The garden becomes an extension of himself, a highly visible representation of his individuality. When a plant blooms, he has brilliant evidence of his success. He also soon becomes aware that perhaps hundreds of people he does not know pass by each day and enjoy his garden. All of these factors enhance his self-image and help to create self-esteem. The gardener, feeling better about himself, also feels better about where he lives.

Plants possess life-enhancing qualities that encourage people to respond to them. In a judgmental world, plants are non-threatening and non-discriminating. They are living entities that respond directly to the care that is given them, not to the intellectual or physical capacities of the gardener. In short, they provide a benevolent setting in which a person can take the first steps toward confidence.

In addition, plants communicate messages to those who tend them. Their growth is steady and progressive, not erratic. The gardener observes a continuous, predictable process of change from seedling to mature plant, and sees that change need not be disruptive. These patterns are different from those of our technological society, in which the flow of life is constricted by schedule and regulation, and



Charles A. Lewis

LEFT: Plants and people clog a city street in New York City's flower district. ABOVE: A rooftop garden in New York City provides a spot of color in an otherwise barren environment.

must change rapidly to accommodate distractions.

Finally, plants take away some of the anxiety and tension we experience by showing us that there are long, enduring patterns in life. It takes time for a cutting to grow roots, for a seed to germinate or for a leaf to unfold. Plants respond visibly to the sun in its daily course, and signal the change of seasons. These rhythms in plants were biologically set by the same forces that set human biological clocks. An oak tree has looked like an oak tree for thousands of years. There is a secure feeling in knowing that a rose is a rose—at all times and in all places.

Horticultural Therapy

One horticultural specialty that is based on people-plant interactions is horticultural therapy, in which the goal is to help re-train and repair damaged bodies and

minds through the use of plants. In hospitals, geriatric centers, schools for the mentally disadvantaged, drug rehabilitation centers and prisons, the process of horticulture helps to heal physical, mental and social disabilities.

Many aspects of horticulture have proven beneficial to mentally or physically distressed patients. According to Andrew Barber, former horticultural therapist at the Menninger Clinic in Topeka, Kansas, "Germination of seeds, vegetative growth, flowering and maturation have close parallels in the basic concepts of human development. Common gardening tasks such as watering, fertilizing and protecting plants from bad weather have human connotations. The physical structure of a greenhouse has been likened to a mother's womb and provides an atmosphere of security." He observes that activities centering around the greenhouse have helped some patients

regain touch with reality.

Success in growing plants can also provide the patient with hope in dealing with other areas in his life. Howard Brooks, former therapist at the Institute of Rehabilitation Medicine in New York City, also sees great value in horticultural therapy: "There will be some patients who will be difficult to reach and motivate. Working with plants may provide an impetus and initiate a response. Something as simple as the growth of roots of a cutting suspended in a glass of water or a bud preparing to open may provide the key. One of the great advantages of gardening is that it is not a static activity; there is always something happening—a new sprout, a shoot or leaf is forming, a flower is opening or fading and has to be removed. Then the cycle begins all over again." According to Brooks, for many severely incapacitated patients who are totally dependent on others for

Nature matters to people. Big trees, small trees, glistening water, chirping birds, budding bushes and colorful flowers—these are important ingredients in a good life.



Courtesy of the John Deere Corporation

ABOVE: The Administrative Center of the John Deere Corporation has an indoor garden that extends through the center of the building, providing a clear view of vegetation to workers in inner offices. LEFT: Freeway Park in Seattle, Washington, combines water, trees and tranquility in an urban setting.

assistance, having a living thing depend on them for care and sustenance can give them the will to go on and an interest in the future.

Plants and City Dwellers

In addition to helping patients, plants can play an important role in helping city dwellers cope with their environment. At great effort and expense, we bring nature into the city not only in the form of parks and gardens, but also as an integral part of buildings.

The integration of plants and buildings is not a new idea. Babylon had its hanging gardens, and Victorian England found expression in schemes for landscaped rooftops and interiors. Today's buildings attest to our increasingly strong desire to bring plants more intimately into our lives. Examples abound, ranging from potted plants in offices to more ambitious endeavors. Within the Ford Foundation Building in New York, for instance, is a garden enclosed with glass walls 11 stories high, so that office workers can look out on the garden from all sides. At Fermilab in Illinois, the 15-story Administration Building focuses inward on its atrium court, a garden of trees and fountains.

One of the best examples of integration of plants and structures is in Moline, Illinois, at the Administrative Center of the John Deere Corporation. The building, which is located in a wooded area, was designed with an indoor garden extending through the center. Bridges cross the garden to connect office floors. The setting is open, without office partitions, and each worker has a clear view of either indoor or outdoor vegetation.

Research Results

In recent years, several groups of scientists have begun to look closely at the relationship between man and plants. The researchers are primarily from two disciplines: psychology and geography.

Roger Ulrich, a geographer at the University of Delaware, has been particularly interested in learning how settings that include vegetation relieve stress. In one study, Ulrich measured the emotional state of two groups of students who had just completed



M. Black

an exam and were expressing some anxiety. Both groups viewed slides that had been carefully selected and evaluated for their content. One group was shown nature scenes, while the other viewed urban scenes. Psychological tests repeated after the slides were shown indicated that the emotional state of the students who viewed slides showing vegetation was significantly improved; those students shown urban scenes felt somewhat worse. The results suggest that the sight of vegetation enhances the viewer's psychological well-being.

One of the most striking of Ulrich's studies was carried out in a hospital. The geographer selected two rooms that were the same except for the windows. In one room, the window looked out on trees, while in the other, the window looked out on a brick wall. Ulrich compared the recovery rates of patients who had undergone the same surgical procedure and were staying in the selected rooms. He found that those patients in the room with a view of trees required less medication to relieve pain, were released from the hospital earlier, and had a more positive attitude than those in the room with a view of the brick wall. Furthermore, patients with a view of trees had slightly fewer post-surgical complications as compared with patients whose room viewed the wall. Such studies are important because the results produced by this kind of research can be translated into economic terms. Health and health care have a dollar value, and city councils can more readily understand dollar values than aesthetic ones. This kind of research begins

to provide needed economic substantiation for planting and maintaining vegetation in human environments.

In a related study, Professor Rachel Kaplan examined the feelings of residents of clustered, multifamily housing about where they lived. She asked residents how they liked the building and its surroundings, and what they thought about the other residents. Occupants who had a view of trees or had vegetation nearby rated the building and the neighbors much higher than those whose occupants' windows looked out on busy streets and power lines.

Kaplan and other psychologists have consistently found that people prefer scenes that include vegetation. Given a choice of an urban setting without any vegetation and one with a few trees, people selected the setting with trees. Some researchers believe that these present-day landscape preferences are rooted in primitive man's preference for those settings that helped him to survive. For example, when people are given a choice of landscapes, they select a setting with open trees and an opening beyond—a safe place for primitive man. They also prefer the path that curves out of sight. Such a path not only has potential for providing new information, but it also invites us to be involved in the landscape and to explore what lies beyond.

Today, although many of us live in cities, there is a part of us that still responds as though we lived a primitive life in the forest. In fact, people now travel great distances to be in close contact with nature. Backpackers, hikers and campers often find the experience of matching wits with the

wilderness to be restorative. A day in the woods can be both physically and psychologically refreshing.

If vegetation is restorative and rehabilitative, then how much of it is needed to be effective in the city? Psychologist Stephen Kaplan has speculated about "micro-restorative" environments—that is, smaller settings from which we can gain restorative benefits. Such settings might include city parks or city gardens, for example. These public and private places can serve as small settings in which one can pause and feel refreshed. Specific examples of successful restorative environments include Paley Park in New York, and Freeway Park in Seattle, both of which combine water, trees and tranquility. Such settings provide a rest for the overworked mental faculty that must screen out the extraneous sights and sounds of the city, and thus help us to better function in the demanding urban setting.

The above examples lead to the inescapable conclusion that there is a close link between plants and the well-being of humans. Trees, flowers, shrubs, vines and lawns all have very subtle effects on our lives that can be measured and studied. We have discovered that the very presence of vegetation—whether along city streets, in parks or in wilderness settings—can be restorative.

According to Rachel Kaplan, "Nature matters to people. Big trees, small trees, glistening water, chirping birds, budding bushes and colorful flowers—these are important ingredients in a good life. To have these available only rarely, when and if one can afford to leave the city, deprives people of tranquility and spiritual sustenance." We have been blessed by the presence of living plants. Yet we have been a curse, depleting the green diversity of this planet. It is time we acknowledge the role of plants in our lives. Indeed, following the green path may very well be the key to peace and tranquility in the world. ☪

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Sierran Inspiration

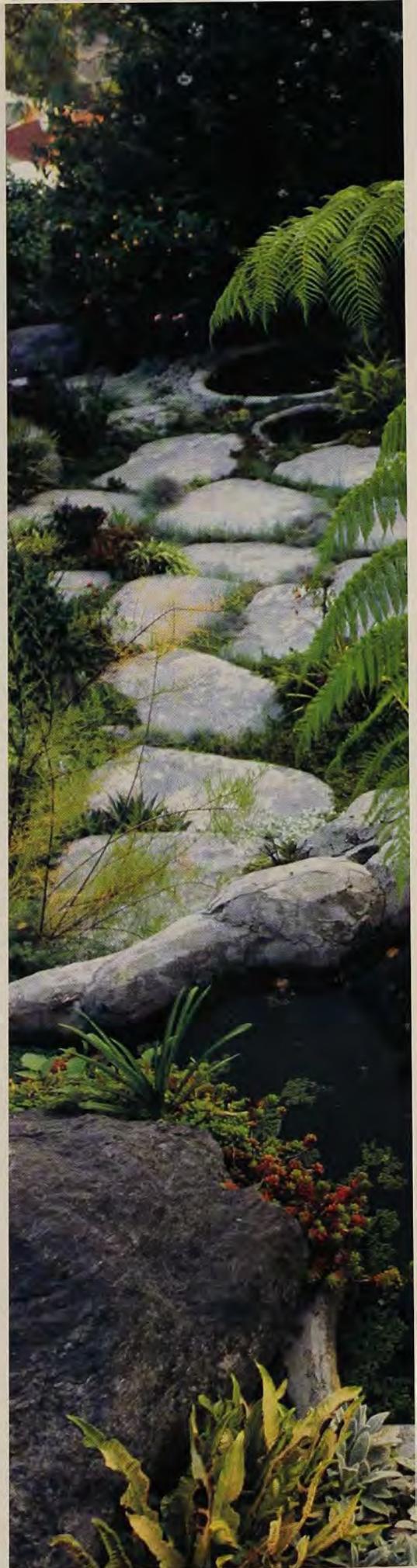
TEXT AND PHOTOGRAPHY
BY PAMELA HARPER

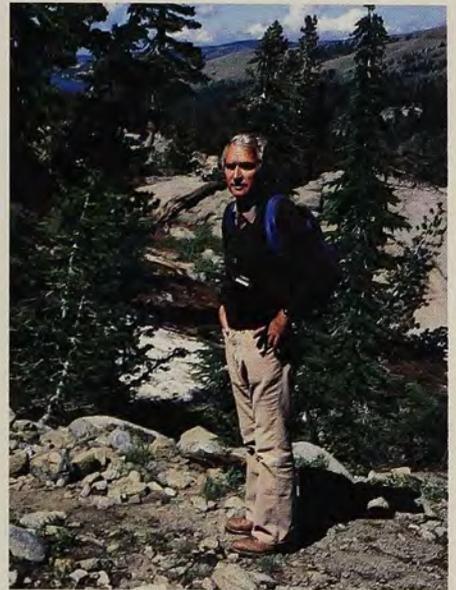
I have written before about Harland Hand's California garden, with its 60-foot-wide planter-faced cliff, 12 paved "rooms," 15 seats and ledges, 19 pools and over 200 boulder-like steps, all fitted—without crowding—into a half-acre hillside site, with the city of El Cerrito immediately below, and beyond it, a panoramic view of San Francisco Bay. (See "A Garden Work of Art" in the April 1983 issue of *American Horticulturist*.) Fitting so much into half an acre requires a sound knowledge of design principles. The shortest distance between two points is a straight line, but a garden is not a superhighway. In this garden, winding paths greatly stretch the apparent space.

Harland Hand's garden was inspired by the flowing lines and strongly contrasting colors characteristic of the region—for instance, by the dark domes of valley oaks, which seem black in contrast to Califor-

nia's sinuous, light green or wheat-gold hills. But the main source of inspiration was the Silver Lake area of the Sierras, where pale gray granite and dark vegetation intermingle in a scene of two-tone grandeur. What Harland finds so exciting about the Silver Lake region is the strength of the lines of the rocks found there: "So powerful, yet their surface smooth and delicately tooled." His garden was designed as a similar mosaic of dark and light, embellished with color and a wealth of plants. It is structured in concrete, which is the only available, affordable and manipulable material capable of being sculpted to resemble the granite formations in the Sierras.

In creating the garden, Harland sought to capture not only what is *seen* in nature, but also what is *felt*. He doesn't speak of paths, walls, terraces and vistas, but rather of trails, shelters and overlooks, which he





considers expressive of instinctive human needs. The shelter offers safety and solitude. The overlook is a vantage point, a place with a view. The trail satisfies our need to explore, and is far more satisfying when it winds sufficiently to conceal what is just around the bend, and permits the visitor to return by a different route.

The garden's "room" theme is not new; it can be seen in many English gardens, notably Hidcote and Sissinghurst. In those gardens, however, rooms are structured like those of a house, surrounded by walls or wall-like hedges, and entered through doors or archways. Harland's approach is different, and takes its lead from nature. Islands of trees and shrubs are used to define the spaces, and all lines—following nature's example—are curved and flowing. This beautiful spot resembles a Japanese garden (inspired by similar mountain scenery), but with far more color and plant variety.

This is a plantsman's garden. Harland refutes the suggestion that a gardener can have either a good design or a large collection of plants, but not both. His garden proves that such a marriage can be made to work. In this case, the design came first, but was always created with the intention of providing a setting for plants. Hundreds of specimens now grow on Harland's

ABOVE: Harland Hand in the Sierras. His garden was inspired by the contrast between dark and light and the breathtaking scenery of the Silver Lake region in the Sierras. FAR LEFT: A granite mountain pool in the Sierras that was sculptured by the elements. LEFT: Tree fern fronds are mirrored in the water of a pool in Harland Hand's garden. The pool, which was sculptured in concrete, is poised like its mountain counterpart on the edge of a cliff. Garden rooms and distant pools can be seen in the "valley" below.



ABOVE: Dark water creates a pattern against gray granite in the Silver Lake region of the Sierras. TOP: In the garden, patches of creeping thyme (*Thymus serpyllum*) contrast with gray concrete to create a similar light-and-dark theme. BOTTOM RIGHT: A Sierran mountain "room" carpeted with golden grass. TOP RIGHT: A garden room in Harland Hand's garden, planted with *Aurinia saxatilis*, *Thymus serpyllum* and *Aloe striata* hybrids.

property: trees, shrubs, vines, perennials, annuals, bulbs, ferns and grasses. Harland has taken full advantage of the benign climate by including such exotics as orchids, kangaroo-paws (*Anigozanthos flavidus*), Spanish-shawl (*Heterocentron elegans*), and bird-of-paradise tree (*Strelitzia nicolai*). Plants are not allowed to obscure the design. Over-exuberant growth is controlled by pruning and, when necessary, by removal. Some part of the garden is always being reworked, a continual process that is viewed not as a chore but as an opportunity to try out new ideas and introduce new plants.

When I wrote about the garden before, I had not seen Harland's wellspring of inspiration, the Sierras. In the late summer of 1983, we planned a trip together to the Winnemucca Trail—"the most exciting, uniquely beautiful place I've seen," says Harland. It wasn't an easy trip to plan. At that high elevation—9,000 feet—snow lies deep and remains on the ground late into summer; in mid-August, it was still too deep to make the excursion feasible. We took a chance and made reservations at a mountain lodge for early September. I awoke the first day to pouring rain, a howling wind and no electricity—not an auspicious beginning.

Luck was with us, however; the next day was perfect for a mountain hike. It was nearly windless, the temperature was a comfortable 65° F, and the sky was blue but with enough puffs of cottony cloud to be photogenic and, given patience, to obscure the sun briefly when shadowless pictures were wanted. We had to pick our way through occasional patches of snow, but most of it had melted up to 9,000 feet. We didn't know then just how lucky we were; a few days after our visit, winter set in and the snow began to fall again.

As we climbed, I was struck immediately by scenes that were reminiscent of Harland's garden. Tufts of brilliant yellow buckwheat (*Eriogonum umbellatum*) growing between smooth-surfaced gray granite slabs seemed to be nature's version of the yellow alyssum (*Aurinia saxatilis*) in the garden's concrete paving, and tussocks of brown grass at the base of boulders brought to mind brown sedges (*Carex* spp.) alongside concrete garden seats. Fern-frond shadows, black against pale gray rock, had the same etched effect as the fronds of tree ferns in the garden seen against gray sky at dusk. The hardier mountain counterpart of the ruby-tinted jellybean sedum (*Sedum* × *rubrotinctum*) found in Harland's garden could be seen emerging from moist niches at the leeward base of a granite ledge.

In the garden, dark green thyme (*Thymus serpyllum*) and flowerless chamomile (*Chamaemelum nobile* "Treneague") form nearly black, free-form patterns on the concrete paving. In the Sierras, I saw similar patterning—where water seeped over pale gray granite, and again, where dark-leaved manzanita (*Arctostaphylos*) was spread-eagled over smooth, pale rock, and yet again, where conifer needles had caught and rotted to a dark brown duff in hollows between rocks. Which of these features was mimicked in the garden? All, and none. The garden developed from multiple impressions that were absorbed and reinterpreted. For example, dwarf chaparral broom (*Baccharis pilularis*) trailing over a rock in the mountain might, in the garden, become a pink-bobbled shawl of *Polygonum capitatum* flung over a concrete bench.

On our hike, we came to a plateau where all was gray, except for the odd blue lupine. The silvery, incised leaves of artemisia flowing over and around the rock provided textural contrast. The serenity of this gray-on-gray theme is echoed in Harland's garden by the tiny leaves of snow-in-summer (*Cerastium tomentosum*) and the larger, velvety leaves of lamb's-ears (*Stachys byzantina*), which fill and soften the joints between paving and vertical structures.

After experiencing the calm of the gray plateau, we came upon brilliant, exciting color, where Indian paintbrush (*Castilleja*) turned an entire slope to scarlet. I felt certain that one particular large, smooth boulder with a clump of *Castilleja* at its base must have been the model for a look-alike concrete bench in the garden, with orange *Aloe striata* planted nearby. But we were to see many more of nature's benches that might just as easily have been the model.

A raised concrete pool in Harland's garden clings precipitously to the edge of a cliff. It was exciting to find its mountain counterpart. How long had it taken the wind and rain and frost and snow to fashion this age-old sculpture? The rim bore a dark, wet stain, bringing to mind the dark stain of wire vine (*Muehlenbeckia axillaris*) flowing over the rim of one of the garden's raised pools. Seat and pool were combined in another mountain sculpture, where one end of a large, flat rock had somehow been hollowed out.

Despite the bitter winter cold, these mountains are brilliant with flowers in summer. For low-growing, winter-dormant plants, deep snow acts as a kind of life preserver. But not for the conifers. Skeletons of dead trees are one of the beauties of the mountains. As we walked, we noticed the bleached trunks, which gleamed



in the bright sunshine and looked as if they had been sculpted in silver. Each was unique: twisted, contorted and huddled low; antler-like; slender and bowed by snow into an arch that framed a view. Some were denuded of branches and remained stiffly upright, like accusing fingers pointing at the sky. In the garden, driftwood posts are used for similar effect, some as bare vertical accents, others softened with vines. On one such garden post, the star-like, white-flowered *Clematis* 'Henryi' is intertwined with white wisteria. The effect is ethereal at dusk.

I backpacked my cameras, while Harland carried lunch. We sat down on boulder seats to eat, and tried to identify the flowers that surrounded us. Far below, a lake—shrunk to pool size by distance—reflected the blue of the sky. Five lakes could be seen from the trail: Caples Lake, Red Lake, Silver Lake, Frog Lake and Lake Winnemucca. The garden tops this number, with 19 pools.

Of all we saw that day, perhaps the most exciting was a complete "room" furnished by nature, complete with couch, shelves, table and hassocks. The "room" was backed

by a wall of smooth rock and carpeted with a shag rug of golden grass. What a magical place this would be for a child to play! I thought. The structures bore an amazing resemblance to those made of concrete in the garden.

The trail wound on. A snow-capped mountain lay ahead, and down it tumbled a mountain stream; the splash of water was audible from where we stood. Often I have stood by the "stream" of *Echeveria* rosettes flowing across a slope in Harland's garden, imagining it to be a gentle brook purling over pebbles. Now imagination's eye and ear could also envision it as rushing white water.

By mid-afternoon, it was time to turn back. So much still lured us on, but the trail had not always been easy to find, and we had to be off the mountain before dark. Going back, we were both absorbed in our own thoughts. Dinner was similarly silent, but eaten with good appetite and with much food for thought. ☪

American Horticultural Society members will tour Harland Hand's remarkable garden on a special optional tour to be held August 18, following the Society's August 13-16 Annual Meeting in San Francisco, California. For more information, write to Annual Meeting, American Horticultural Society, P.O. Box 0105, Mount Vernon, VA 22121.

Pamela Harper is the owner of the Harper Horticultural Slide Library, and is a frequent contributor to *American Horticulturist*.



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NATIVE PLANTS AND THE NURSERY TRADE

BY JANE SCOTT

The horror stories abound. A man in North Carolina peddles wild pink lady's-slippers, *Cypripedium acaule*, from the back of a pickup truck. A Texas nursery pays Mexican workers a nickel a plant to collect wild cacti from the Chihuahuan Desert. An exhibitor at a large flower show mentions in passing that he is sending a truck out to collect *Helonias bullata*. *H. bullata*, commonly called swamp pink, is a bog-loving member of the lily family, and is listed on the Federal Register as a candidate for Threatened or Endangered status. At a commercial booth at the same flower show, a botanist finds a rare species of peyote, *Lophophora williamsii*. It is mislabeled, perhaps because it is illegal. (Peyote contains a hallucinogen that is included on the Food and Drug Administration's schedule of controlled substances.) This particular specimen is well over 100 years old, yet forms a cushion that measures only 3½ inches across.

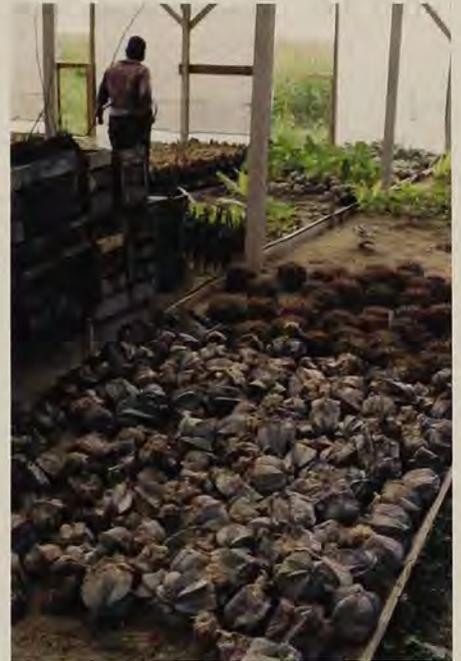
Of course, not all nurseries are guilty of such blatant plant rustling. Yet the fact remains that a sizeable portion of the native North American species offered for sale through nurseries have been collected from the wild. Native plant nurseries acquire plants in three ways: they propagate them from seeds and stock plants obtained from a variety of sources; they dig plants from the wild and sell them "as is"; or they buy plants from wholesalers, who may or may not have collected them from the wild. Thus, even a nurseryman who does not "wild collect" himself may buy from suppliers who do.

What impact does all this digging actually have on wild plant populations? In the case of woodland plants, many nurserymen claim that removing a few plants here and there does no permanent harm, because they are not taking endangered species, but rather plants that are abundant in the wild.

If the collector owns the land where the plants are growing, or has an agreement with the landowner, it is true that the digging can be regulated so as not to deplete the wild population. This is especially true if some of the plants that are taken are used as breeding stock (unless, of course, the demand far exceeds the supply). However, few suppliers of native plants have such control over their sources. Many "suppliers" turn out to be local residents in choice areas who are paid so much per plant by wholesalers. All too often, the plants are simply stolen from public or private land as the opportunity arises. Choice sites are dug over repeatedly, and the populations of popular species in these areas soon disappear, forcing the collectors to move farther and farther afield. Yet, according to William Brumback of the New England Wild Flower Society, each population of a species is important to the survival of the entire species, especially because so much of our native flora is threatened by the continued destruction of habitat by man and his activities.

The germ plasm represented by each population of a species contributes to the genetic wealth of the entire species. The genetic diversity found in naturally occurring populations of a species provides evolutionary potential, thereby making it possible for the species to survive unexpected changes in the environment. When the number and the range of individual populations decrease, the loss of genetic diversity limits the potential for variation and may eventually threaten the continued existence of the entire species. Often, when the number of individuals within a population falls below a critical number (called the genetic minimum) further decline is inevitable.

Cultivated varieties, both by design and by default, often have a different genetic constitution than do their wild parents.



ABOVE: Cactus rustlers in the western states have driven many of our native species of cacti to the brink of extinction. Despite tighter trade restrictions, collection is still a serious problem in both this country and Mexico. Here, piles of wild-collected *Astrophytum myriostigma* and *Ferocactus latispinus* await sale in a south-Texas nursery. LEFT: Legislation has reduced collecting pressures to some degree, and an increasing number of nurseries are propagating their own plants. Young nursery-grown plants—such as these *Echinocereus*, *Neolloydia* and *Coryphantha* seedlings—are frequently offered for sale in supermarkets and specialty shops.

They may no longer be able to survive in their original habitat, or they may harbor hidden genetic weaknesses that make them vulnerable to environmental stress, such as insect attacks or disease. Because of their genetic uniformity, cultivars have less evolutionary potential. (The original wild species is the only source of new genes that can improve or restore both wild populations and garden ones.)

Taking “a few plants here and there” not only has long-term genetic consequences, but also reaches alarming proportions in some sections of the country. It has been estimated that well over 100,000 herbaceous plants are removed from the mountains of North Carolina and Tennessee every year. Harry Phillips, the propagator at the North Carolina Botanical Garden, believes this number has remained constant, even though many younger nurserymen are now propagating their stock, because the older nurseries continue to dig as they always have. Over the years, this digging has exacted a significant toll. In many parts of North Carolina, the pickings of choice species are now so slim that collectors have moved into Tennessee.

In Arizona and New Mexico, the notorious cactus rustling that drove as much as 29 percent of our native-American cacti species to the brink of extinction has been slowed to some extent by legislation. However, in Texas, collectors are still digging cacti such as *Echinocereus*, *Mammillaria*, *Epithelantha*, *Echinocactus* and *Ariocarpus* by the thousands. Sometimes the excess plants are simply left to rot after being uprooted. Wild Mexican cacti also come through Texas, according to Douglas Fuller of the World Wildlife Fund. Growers on both sides of the border are involved in the Mexican bribery system known as “La Mordida” (“The Bite”), despite the existence of an international treaty that is supposed to regulate trade.

Sad to say, it is horticulturists who are partially to blame for this pressure to collect. The number of species plants collected from the wild rises—and falls—according to the demand we gardeners place on nurseries. (By species plants, I mean plants that are not cultivars or hybrids that have been specifically developed for garden use. Such “man-made” hybrids and cultivars must be horticulturally propagated.) Obviously, much of the demand is created by the nurseries themselves, through catalogue advertisements and flower show exhibits. However, this demand is abetted by enthusiastic articles in horticultural publications detailing gardeners’ success with this native species or that. Clearly, it is our urgent responsibility as gardeners to seek



Francis R. Thibodeau

ABOVE: Botanical gardens are an excellent source of propagated native plants. Here, a greenhouse worker at the North Carolina Botanical Garden propagates sundews. Sundews are carnivorous plants, and many are threatened by collection. RIGHT: Horticulturists at the North Carolina Botanical Garden propagate a wide variety of native species.

out reputable nurseries who do their own propagating or purchase from nurseries who do so. We must also learn to make intelligent decisions based on a knowledge of the plants themselves so that we can avoid purchasing plants that were probably collected in the wild.

In the case of woodland plants, keep in

mind that monocots (those flowering plants that generally have flower parts in multiples of three, strap-like leaves and parallel veins) are harder for nurseries to propagate than are dicots. The woodland species most vulnerable to digging for commercial sale are members of two monocot families: the orchids, *Orchidaceae*,

and the lilies, Liliaceae. Members of both the iris family, or Iridaceae, and the gentians, or Gentianaceae (a dicot family), follow close behind, according to Paul Wiegman, Director of the Natural Areas Program for the Western Pennsylvania Conservancy.

Native terrestrial orchids are especially threatened by wild collecting, and most botanists seem to agree that inexperienced gardeners should not attempt to grow these plants. The reason is simple: terrestrial orchids have never been propagated successfully in the quantities necessary for commercial trade, so plants offered for sale have probably been dug from the wild. Nevertheless, orchids such as the lady's-slippers, *Cypripedium* spp., continue to be advertised widely. To buy one is to contribute to the species' unnecessary destruction in the wild. Furthermore, collected plants usually do not survive in the garden for more than a few seasons, if at all. Lady's-slippers, like most terrestrial orchids, depend on the presence of a group of fungi found in acid soils, called *mycorrhizae*, which live symbiotically with the plants' roots. For the orchid to survive, both its needs and those of the fungi must be met, a very difficult assignment. Research is being done on propagating terrestrials by aseptic seed culture (a method used for tropical orchids), but so far, supplies of plants propagated in this way are almost nonexistent.

Lilies are also threatened by collectors. The lily family includes such popular woodland plants as *Trillium*, trout lilies or dog-tooth violets (*Erythronium* spp.), Solomon's-seal (*Polygonatum biflorum*), bellworts (*Uvularia* spp.) and wild hyacinth (*Camassia scilloides*). Many are dug in great quantities, principally because they are extremely slow to propagate from seed. For example, the seed of white trillium, *Trillium grandiflorum*, takes at least two years to germinate, and up to 10 years may pass before the plant reaches blooming size. It is no wonder, then, that these plants have been over-collected for generations; it simply makes no economic sense for nurseries to propagate them from seed. Sometimes mature plants can be divided, but division is too slow a process when one needs a supply of thousands.

Tissue culture (the technique of reproducing plants in quantity from a small piece of meristem tissue) may relieve the commercial pressure on such plants in the future, but it still requires highly specialized skills and facilities. It is important to remember that tissue culture, although useful for producing plants for the gardening public, is like any kind of vegetative prop-

agation; that is, it reproduces the parent plant's exact genetic make-up. Thus, although it can be used to produce plants that will help satisfy gardeners' demand for plant species, it is of little value in preserving the full genetic diversity necessary for survival in the wild. This technique can be helpful in rescuing a species in imminent danger of extinction.

Carnivorous plants and cacti also continue to be seriously threatened by commercial trade. Carnivorous plants grow in the wet, acidic soil of bogs and are generally of more interest to plant collectors than to gardeners. Ironically, when a plant such as *Trillium grandiflorum* is sold for less than a dollar, it has probably been collected in the wild. In the case of carnivorous plants, this "price clue" works the opposite way. According to Rob Sutter of the Plant Conservation Program of the North Carolina Department of Agriculture, collectors may pay \$25 to \$50 for an endangered species of pitcher plant that has been illegally dug, even though the same plant can be propagated and sold for about three dollars. In addition, the propagated plant is already adapted to cultivation and is far more likely to survive.

The wild populations of Venus's-flytrap, *Dionaea muscipula*, are protected by law, but they, too, continue to fall prey to unscrupulous collecting—in spite of the fact that they also can be easily grown from seed. (It is worth noting that Venus's-flytrap is a native of temperate climates and does not usually thrive in heated houses.)

Recently, a Delaware botanist had a guest from Texas who, quite unknowingly, brought him a wild specimen of an endangered species of cactus, *Coryphanta minima*, as a house present. Fortunately,

the World Wildlife Fund reports tighter trade restrictions are beginning to relieve the pressures on cacti by stimulating growers to select and propagate desirable species. These growers are permitted to collect breeding stock from the wild, and many of the young cacti now for sale in supermarkets and specialty shops have been grown from seed or offsets. However, buyers should view mature cactus plants, such as those used for landscaping, with suspicion. In Arizona, it has been illegal to remove such plants from the desert without a permit since 1976, but enforcement is difficult, and other states are not so careful. Mexican cacti continue to be dug in alarming quantities, and many of these plants come through Texas, despite the efforts of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), as well as a Mexican decree banning export of cacti for commercial purposes.

In general, native woody plants are less likely to be dug from the wild than herbaceous plants, because they are usually propagated from cuttings. Plants of the Ericaceae, or heath family, are the exception. Ericaceous plants include (among others) native azaleas, mountain laurel and trailing arbutus (*Epigaea repens*), a species that has been virtually eradicated in many of its former sites because of over-collecting. Mountain laurel, *Kalmia latifolia*, is dug out of the southern Appalachians by the truckload because it roots so poorly from cuttings. Nurserymen take seedling plants and grow them in containers, or they cut down a mature plant and let it come back from the roots. Fortunately, tissue culture propagation has proven to be an effective technique for mountain lau-



Courtesy of the North Carolina Botanical Garden

Where to Write for Plant Conservation Information

Many different organizations are involved in the fight to save this country's rare and endangered native plants. The following is a partial list of some of the national organizations. For more information on their programs, please write to them at the addresses listed below.

- The American Horticultural Society, P.O. Box 0105, Mount Vernon, VA 22121. Through publication of the *Endangered Wildflowers Calendar*, the American Horticultural Society is working to increase public awareness of the plight of America's native plants. Calendar sales support the Society's Wildflower Rediscovery Project, a program that provides awards to individuals who rediscover populations of species thought to be extinct in the wild.
- The Center For Plant Conservation, The Arnold Arboretum, Harvard University, The Arborway, Jamaica Plain, MA 02130. The Center is a non-profit organization devoted to building a living collection of America's most endangered plants in member botanic gardens across the country. The collection will be used for basic research to determine cultural requirements of individual species and how to care for those plants in the wild, as well as for education and display.
- Environmental Defense Fund, 1616 P Street, NW, Washington, D.C. 20036. This organization works at both state and federal levels to secure enactment of plant protection laws and ensure their effective implementation.
- Federal Wildlife Permit Office, U.S. Fish and Wildlife Service, 1000 North Glebe Road, Room 611, Arlington, VA 22201. This office issues permits under the Endangered Species Act, as well as other laws, for "removing and reducing to possession" listed plants from lands under federal jurisdiction. It also administers CITES by issuing import and export permits, and issues interstate commerce permits.
- Garden Club of America, 598 Madison Avenue, New York, NY 10022. The GCA strives to educate both its members and the general public about endangered native plants through a variety of programs. It

has recently co-produced two educational programs on native plant issues: "Roots of Life," in conjunction with the World Wildlife Fund; and "Garland of Generations," produced with the Center for Plant Conservation.

- National Wildflower Research Center, 2600 FM 973 North, Austin, TX 78725. The Center conducts basic research on native and naturalized plants and their cultivation. It also provides information on wildflower projects, programs and research efforts across the country.

- National Council of State Garden Clubs, Operation Wildflower, 4401 Magnolia Avenue, St. Louis, MO 63110. Operation Wildflower is a National Council of State Garden Clubs program dedicated to the beautification of roadsides and other approved sites and to public education about the application, preservation and propagation of our native wildflowers and grasses.

- The Nature Conservancy, 1800 North Kent Street, Arlington, VA 22209. TNC uses a variety of strategies to protect native plants, including acquisition of land by purchase or donation, protection through easements, management agreements and participation in public lands protection.

- Office of Endangered Species, U.S. Fish and Wildlife Service, Washington, D.C. 20240. The Office of Endangered Species evaluates taxa of both plants and animals to decide which ones should be included on the federal list of Endangered and Threatened Species. After a taxon has been listed, the Office consults with federal agencies regarding the taxon, carries out recovery actions, and works with states, private groups and individuals.

In addition to general brochures on endangered species, the Office of Endangered Species publishes *Endangered and Threatened Wildlife and Plants* (the current edition was published January 1, 1986; 50 CFR17.11 and 17.12) and *Endangered and Threatened Wildlife and Plants; Review of Plant Taxa for Listing as Endangered or Threatened Species; Notice of Review* (50 CFR part 17). Both publications are available free of charge. To order, write the Publications Unit, 148 Matomic, U.S. Fish and Wildlife Service, Washington, D.C. 20240.

- Plant Conservation Project, Natural Resources Defense Council, 1350 New York Avenue, NW, Washington, D.C. 20005. NRDC monitors horticultural trade in wild plants, and works to improve legal protection for rare species in the trade. The

Council also actively supports the enactment of plant-related legislation and oversees their effective implementation.

- TRAFFIC (U.S.A.), World Wildlife Fund-US, 1601 Connecticut Avenue, NW, Washington, D.C. 20009. TRAFFIC (U.S.A.) monitors trade in endangered species and CITES-listed species. This organization has publications on a variety of trade-related topics and also publishes a newsletter, *TRAFFIC (U.S.A.)*.

Native Plant Societies

Gardeners who would like to join a native plant society in their state will want to write for the New England Wild Flower Society's list of native plant societies and botanical organizations. The list, which is under constant revision, is available for \$1.00, including postage and handling. To order, write the New England Wild Flower Society, Inc., Garden in the Woods, Hemenway Road, Framingham, MA 01701.

Nursery Sources for Native Plants

For a list of nurseries that propagate their own plants, readers can request "Nursery Sources for Native Plants" from the American Horticultural Society, P.O. Box 0105, Mount Vernon, VA 22121.

The New England Wild Flower Society's publication, *Nursery Sources: Native Plants and Wild Flowers*, is a summary of the Society's 1984 survey of 430 nurseries that deal in native plants. The booklet lists each nursery's answers to questions about stock source (percentage of stock that is propagated, wild-collected and purchased from unknown sources), wild orchid source, stock type (seed, herbaceous, trees or shrubs and grasses), and nursery type (retail, wholesale or mail order). *Nursery Sources* is available for \$3.50, including postage and handling, from the New England Wild Flower Society, Inc., Garden in the Woods, Hemenway Road, Framingham, MA 01701.

Native Plants Book List

The American Horticultural Society has prepared an annotated list of books on native plant topics. The list includes field guides as well as books on both gardening with native plants and environmental issues. All of these publications are available to Society members at AHS member prices. To order the free "Native Plants Book List" write to the American Horticultural Society, P.O. Box 0105, Mount Vernon, VA 22121.



The North Carolina Botanical Garden, like many other gardens across the country, sells propagated native plants to the general public.

rel, and selected cultivars are now beginning to appear in the trade. (For more information on the new mountain laurel cultivars, see “A New Look at Mountain Laurel,” by Ruby Weinberg, in the June 1984 issue of *American Horticulturist*.)

Native ferns of all species are also dug for commercial sale, since their propagation is slow. Fern spores must first develop into a tiny plant called a prothallus before fertilization can take place and the true fern can grow. Some fern species are not only widespread and persistent in the wild, but easily propagated by division. Others, however, are more vulnerable. Fern fanciers should learn the differences between the various species before buying plants for their collections.

The Mount Cuba Center for the Study of Piedmont Flora is concerned with selecting attractive cultivars of native flora that can eventually be introduced into the nursery trade. (Ease of propagation is one important factor in the selection process.) The Director of Mount Cuba, Dr. Richard Lighty, offers several suggestions for gardeners who want to grow native plants without harming wild populations.

First, he warns that nurseries often dig even those woodland species that are easy to propagate, because so many of these plants produce relatively few seeds. Also, the seeds of these species usually require complex treatment before they will germinate, a process that is not always economically feasible. Therefore, Dr. Lighty (as well as both Hal Bruce of Winterthur Gardens and Harry Phillips of the North Carolina Botanical Garden) suggests that we gardeners move out of the woods and into the meadows when selecting native

plants for our gardens. For instance, many species in the aster family (Compositae) are easy to grow from seed, and cultivars have been selected and propagated specifically for garden use. In fact, cultivars of Joe-pye weed (*Eupatorium*), black-eyed Susans and goldenrod (*Solidago*) can all be found in English and German gardens, where they add a touch of elegance and sophistication. The pea family (Leguminosae), the snapdragon family (Scrophulariaceae) and the evening primrose family (Onagraceae) also include many species that are appropriate for garden use. When grown under ideal conditions, many of these field flowers develop into handsome specimen plants.

In addition, Dr. Lighty suggests that gardeners leave rare plants alone, unless they are certain that the plant they are buying has been propagated by a nursery and that wild plants are not necessary to maintain the supply. Gardeners should select only those species that are suited to their growing area, and should choose named cultivars whenever possible. (Named cultivars of wild plants usually must be propagated vegetatively.) If cultivars do not exist, Dr. Lighty suggests buying a maximum of one to three plants and dividing them. This technique is often successful if the gardener replants the divisions immediately in a permanent location. Propagation by division is preferable to buying large orders of plants that were obviously dug and that may arrive so dried out and under stress that few will survive.

In garden centers, the discriminating gardener can often spot a collected plant. Any plant that appears to have been recently potted—with leaves askew and not

oriented as they would be in nature—is suspect. Ordering through the mail presents a more difficult problem. Botanists and others have suggested setting up a national referral system that would list commercially propagated plants in nursery catalogues and on plant labels. Until then, gardeners should use price-charged as a key, avoid plants that are known to be difficult to propagate, and, if in doubt, ask the nurseryman where the plants originated. In 1984, the New England Wild Flower Society asked 430 North American nurseries to list the percentage of their stock that was collected from the wild (as opposed to stock that was propagated on the premises or bought from wholesalers). The responses of 193 nurseries have been published in a booklet available to the public. (See the sidebar on page 30 for information on how to order a copy.)

Since 1980, North Carolina has had a law making it illegal to trade in those species that have been officially deemed most in need of protection. Any nursery selling one or more of these species must certify that the plants have been horticulturally propagated and that the nursery's supply is not dependent on wild plants. Eventually, there may be an entire network of certified nurseries that would have to meet certain propagation requirements before dealing in any native species. The public would then be urged to buy native plants only from those nurseries.

Inevitably, the question of “plant rescue” or “salvage” comes up whenever gardeners talk about growing native plants. First, gardeners must understand that “salvage” does *not* mean rushing to a site about to be destroyed by a bulldozer and digging up plants to take home to private gardens. This form of rescue may be permissible for the more common species, but the sad fact is that no private garden in a country with as mobile a population as ours can be considered a safe haven for rare plants. In addition, too often gardeners take such action at the wrong time of year or without a full understanding of the facts. Consider the case of the yellow lady's-slippers, *Cypripedium calceolus*, that were “rescued” from a piece of property about to be developed near Pittsburgh. Actually, there was no plan to build on the exact spot where the lady's-slippers grew, but by the time this fact became clear, the lady's-slippers were lost.

Nevertheless, plant salvage is appropriate in certain situations. Horticulturists can take credit for the survival of plants such as franklinia (*Franklinia alatamaha*) that would otherwise be extinct. Plants that have been legitimately salvaged can often be used

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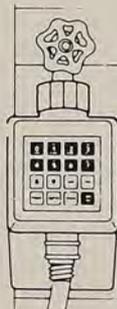
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NATIVE PLANTS AND THE NURSERY TRADE



Propagator Bill Brumback at the New England Wild Flower Society's Garden in the Woods raises over 150 types of wildflowers to sell to visitors each year. John A. Lynch

for breeding stock, and the more common species can be incorporated into nature trails. However, only experts who are trying to help the species survive in the wild should attempt to salvage rare and endangered plants. Sometimes this kind of action involves moving the plants to a botanical garden for study, but saving plant populations by growing them in botanical gardens is, in the end, no more satisfactory than trying to save wild animals by keeping them in zoos. Botanists agree that a wild species usually disappears because its habitat has been destroyed, although indiscriminate collecting can also push a vulnerable species over the edge. Therefore, the best way to save rare plants is to preserve their natural habitats in sufficient quantity and diversity so that native populations can continue to reproduce without being disturbed. A good source of horticulturally propagated plants can help diminish collecting pressures.

The Endangered Species Act of 1973 is a landmark piece of legislation that reflects the public's interest in preserving America's wildlife, plants as well as animals. However, complex requirements must be met and detailed studies made before a plant can be listed as officially Threatened or Endangered. As a result, only a small fraction of the number of species that need attention have been listed. In the meantime, many states have already taken steps to protect these species.

In addition, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) has com-

plied a list of species that are already seriously threatened by trade (CITES Appendix I), as well as of species that might become threatened if trade is not monitored and controlled (CITES Appendix II). All members of the orchid family are listed in Appendix I, and all North and South American cacti are currently included in Appendix II. Also included in Appendix II are such horticultural favorites as *Shortia galacifolia* and *Cyclamen* species. Various cycads and species of *Aloe* are listed in both Appendix I and II. Obviously, all horticulturists would benefit by becoming familiar with both the Endangered Species and CITES lists.

Thanks to the botanists working with The Nature Conservancy, state agencies, federal agencies such as the U.S. Fish and Wildlife Service, and universities and botanical gardens throughout the country, our national store of botanical knowledge has increased dramatically since the passage of the Endangered Species Act in 1973. Even so, much more needs to be done. One particularly encouraging development has been the formation of native plant societies in several states. Many members of these societies have become expert advocates on behalf of their local flora. Joining or starting one of these societies—or working with a local garden club conservation committee—is a good way for gardeners to become involved in the preservation of native plants.

The American Horticultural Society has joined the movement to educate gardeners about native plants and the threats they face. In 1984, AHS took over the Wildflower Rediscovery Project and publication of the *Endangered Wildflowers Calendar* from the Rare and Endangered Native Plant Exchange. Both the Calendar and the Wildflower Rediscovery Project focus on stimulating public knowledge of and concern for rare plants.

Although many of the wild-collected species sold in the nursery trade today are not yet on the list of Endangered and Threatened species, it is inevitable that they will one day be added if collecting pressures continue unabated. As gardeners, we have a responsibility to see that such action is never necessary. ☉

Jane Scott is the author and illustrator of *Botany in the Field, An Introduction to Plant Communities for the Amateur Naturalist*, published by Prentice-Hall, and co-author of *Grow Native Shrubs in Your Garden*, published by the Brandywine Conservancy in Chadds Ford, Pennsylvania.

Sources

THE PINK FAMILY

Garden centers and nurseries across the country offer an excellent selection of pink-family members for gardeners to choose from. The following nurseries and seed companies offer outstanding selections of these plants.

Plants:

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

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

André Viette Farm and Nursery, Dept. AH, Route 1, Box 16, Fishersville, VA 22939, catalogue \$1.50.

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

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

Seed:

W. Atlee Burpee Company, Dept. AH, 300 Park Avenue, Warminster, PA 18974, catalogue free.

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

The Fragrant Path, Dept. AH, P.O. Box 328, Fort Calhoun, NE 68023, catalogue \$1.00.

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

Maver Rare Perennials, Dept. AH, P.O. Box 18754, Seattle, WA 98118, catalogue free.

Park Seed Company, Dept. AH, P.O. Box 31, Greenwood, SC 29647, catalogue free.

Thompson and Morgan, P.O. Box 1308-AM, Jackson, NJ 08527, catalogue free.

SIERRAN INSPIRATION

Readers who would like to learn more about Harland Hand's remarkable garden will want to read "A Garden Work of Art," which appeared in the April 1983 issue of *American Horticulturist*. A limited number of copies of that issue are still available. To order a copy, send \$2.50 to Assistant-to-the-Editor in care of the Society. To request a black-and-white reprint of the

article, send \$1.00 to cover postage and handling to Assistant-to-the-Editor in care of the Society.

PEOPLE AND PLANTS

To learn more about the city-wide gardening contest sponsored by the Pennsylvania Horticultural Society, write to Coordinator, City Gardens Contest, Philadelphia Green, Pennsylvania Horticultural Society, 325 Walnut Street, Philadelphia, PA 19106. The Society has a packet of information about the contest that will help gardeners start similar contests in their own cities.

Anyone who is interested in the subject of horticultural therapy should belong to the National Council for Therapy and Rehabilitation through Horticulture (NCTRH). This fine organization produces a monthly newsletter (as well as other publications), conducts an annual national conference, keeps members apprised of training programs being offered in the field, and has a national registration program for horticultural therapists. For more information on memberships, write NCTRH, 9220 Wightman Road, Suite 300, Gaithersburg, MD 20879, or call (301) 948-3010.

For more information on community gardens, write to the American Community Gardening Association, P.O. Box 93147, Milwaukee, WI 53202. The National Gardening Association (180 Flynn Avenue, Burlington, VT 05401) also has publications pertaining to community gardening.

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Botanist Laura C. Martin is Coordinator of Native Plant Research at Atlanta Botanical Gardens and the author of *Wildflower Folklore*.

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Book Reviews

THE WILDFLOWER MEADOW BOOK.

Laura C. Martin. *The East Woods Press.* Charlotte, North Carolina. 1986. 360 pages; hardcover, \$18.95; softcover, \$12.95. AHS member price, \$17.05 (hardcover), \$11.65 (softcover).

As most gardeners know, there has been a renewed interest in native American plants among both gardeners and publishers, and wildflower meadows and prairie restorations are popping up all



across the country. Despite this renewed enthusiasm, however, the subject of meadow gardening has been neglected in the literature thus far. Fortunately, Laura Martin's new book, which is endorsed by the American Horticultural Society, fills this very important gap.

The author begins with a look at the history of meadow gardening, and provides detailed directions for planning and planting a meadow garden (for cut flowers, nature crafts such as dyeing or pressed flowers, and nature studies, for example) meadows as community gardens, and organizations working with cultivating wildflowers complete the introductory section of the book.

The majority of *The Wildflower Meadow Book* is devoted to chapters on meadow gardening in various regions of the country, such as the Midwest, the Pacific Northwest and the Southeast. In each of these chapters, the author discusses the naturally occurring plant communities, noxious weeds and region-specific cultural recommendations. She also provides extensive plant lists for each region, including a general list of plants that grow in the region, a recommended "top ten" list, appropriate grasses, plants for cutting, plants for seasonal bloom, and plants that attract birds and butterflies. Perhaps most importantly, Martin includes several "case studies" for each region that provide specific examples of meadows that have been

planted. Finally, each regional chapter concludes with a list of institutions and organizations, nurseries and seed companies as well as recommended reading.

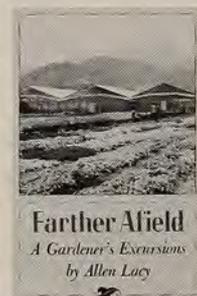
The final section of *The Wildflower Meadow Book* is devoted to an encyclopedic treatment of more than 150 species of wildflowers appropriate for the meadow garden. Each species is illustrated with a black-and-white line drawing, and each entry includes a wealth of information on the species, including the botanical name (complete with pronunciation) the common name, approximate bloom time, a description, the species' environmental preference, and propagation recommendations.

In short, this new Society-endorsed book is a must for any individual interested in wildflowers or meadow gardening.

FARTHER AFIELD: A GARDENER'S EXCURSIONS.

Allen Lacy. *Farrar, Straus & Giroux.* New York, New York. 1986. 258 pages; hardcover, \$16.95. AHS member price, \$13.55.

Gardeners who sampled Allen Lacy's delightful prose in *Home Ground*, his first book about gardening, or who have enjoyed his regular columns on the subject in *The Wall Street Journal*,



have been looking forward to his second book with great anticipation. *Farther Afield*, another collection of essays on a variety of garden-related topics, is certainly worth the wait. The essays range from very short pieces that can be read in less than 15 minutes (for example, "A Craze for Hostas," "The Sedum Family Reunion" and "Closely Watched Quinces") to longer pieces on Thompson and Morgan Seed Company and Linda Vista, Claude Hope's seed farm in Costa Rica. An entire section of the book is devoted to essays of varying lengths on specific gardens—The Preston B. Bird and Mary Heinlein Fruit and Spice Park, André Viette's Nursery, and Sissinghurst, for example. The essays grouped



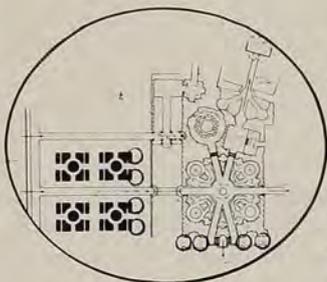
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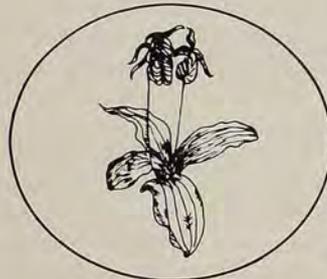
Scotland is unquestionably romantic in legend and history and the landscape beautiful and unspoiled. We will visit private homes and gardens in the Western Highlands of Argyll, renowned for its rhododendrons and flowering shrubs. Traveling through remote and breathtaking scenery, we will tour the Isle of Gigha, Crarae Woodland Gardens, Inverewe and Inverness. We will be entertained in private homes and castle gardens. In Edinburgh we have the opportunity to explore the city at our own pace and to be entertained by some of Scotland's most enthusiastic and privileged horticulturalists. We are again fortunate to have Everitt Miller, former director of Longwood Gardens, as our leader.



In Search of Gertrude Jekyll

July 24-August 7, 1986

Our search for the gardens of Gertrude Jekyll will take us to the English countryside to visit the many homes and gardens that speak to the genius of this outstanding gardener and her remarkable partnership with Sir Edwin Lutyens. Throughout our tour we will meet with English authors, landscape architects and horticulturalists who will share with us their knowledge and affection for the work of Gertrude Jekyll. Our tour leader, Mac Griswold, is a garden writer and historian presently working on a book for New York's Metropolitan Museum of Art about the garden images in their own collection.



Nantucket and Martha's Vineyard

September 14-21, 1986

This fall the island gardens of Nantucket and Martha's Vineyard will be the focus of a special trip co-sponsored by the New England Wild Flower Society and the AHS. Our visit will concentrate on the natural flora of the islands and the unique qualities resulting from their isolation and unusual climatic conditions. We will be guided by well-known New England botanists, and our tour leader will be Polly Pierce, President of the New England Wild Flower Society.



Fall Foliage Cruise on the Chesapeake

October 8-18, 1986

The Foliage Season, nature's last hurrah before winter, invites us to cruise the Chesapeake Bay in early October. With thousands of miles of tidal shoreline, the Chesapeake provides a brilliant backdrop for our 7 day cruise. We sail on the M/V *America*, a lovely small ship boasting spacious outside cabins and the best of southern hospitality. We begin in Baltimore, sail along the unspoiled landscape of Maryland's Eastern shore and visit such historic and exquisite landmarks as Williamsburg and Portsmouth, VA. Join us during these golden days of October as we cruise this spectacular estuary and plan to extend your trip for a few days in Washington to enjoy specially sponsored activities by the AHS.

These trips are sponsored by the American Horticultural Society.

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BOOK REVIEWS

under "Tidbits and Observations, Dreams and Practicalities" include a piece about Steven Davis's experiences with the wild-flower meadow at the American Horticultural Society's River Farm headquarters, as well as Lacy's observations about cats and plants. *Farther Afield* concludes with a series of essays focusing on conservation. Readers will no doubt recognize "The Wild Cyclamen of Montrose" (see the October 1985 issue of *American Horticulturist*) and will also enjoy reading about Elwood Fisher's heirloom apples and "The Disappearing World of Peter Raven."

MANUAL OF CULTIVATED BROAD-LEAVED TREES AND SHRUBS, VOLUME II.

Gerd Krüssmann. (Translator, Michael Epp; Technical Editor, Gilbert Daniels.) Timber Press. Portland, Oregon. 1985. 445 pages; hardcover, \$65.00. AHS member price, \$58.50.

This is the second volume (E through PRO-) of the first English translation of Gerd Krüssmann's invaluable encyclopedic survey of trees and shrubs. (Volume I, published in 1984, covers A through D.) A major reference work first published in 1960 in German, *Manual of Cultivated Broad-Leaved Trees and Shrubs* lists plants in alphabetical order by genus and species. Technical descriptions are given for each genus and species, and extensive line drawings and black-and-white photographs are provided. (For more information on this series, see the book review of Volume I, which appeared in the April 1985 issue of *American Horticulturist*. To obtain a copy of the review, write to Assistant-to-the-Editor in care of the Society.)

—Barbara W. Ellis

AN INTRODUCTION TO THE PROTEACEAE OF WESTERN AUSTRALIA.

Alex S. George. Kangaroo Press. Australia. 1984. 112 pages; hardcover, \$19.95. AHS member price, \$16.98.

THE BANKSIA BOOK.

Alex S. George. Kangaroo Press. Australia. 240 pages; hardcover, \$24.95. AHS member price, \$21.25.

The Proteaceae is a showy group of woody plants native primarily to southern Africa and Australia. Of the 1,400 species (which are distributed among 60 genera) that are found throughout the world, more than 800 are native to Australia. About 550



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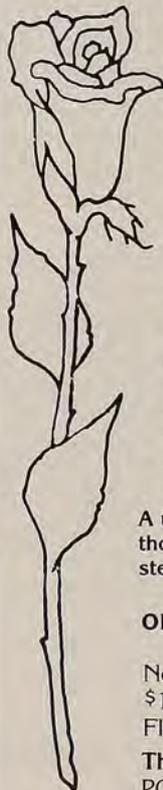
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species (of which 500 are endemic) grow in the state of Western Australia. Alex George's *An Introduction to the Proteaceae of Western Australia* covers 16 genera found in Western Australia. This is essentially a picture book, and the 162 beautiful color plates illustrate many of the species that are included, but the text accompanying each species also gives interesting details of habit and habitat. Surprisingly, fire is an important element affecting the life cycle of many of these plants.

The Banksia Book describes and illustrates the 73 species of *Banksia*, all of which are native to Australia. Ranging from prostrate shrubs to tall trees, *Banksia* species all have showy "bottle brush" flower heads and evergreen foliage. The entry for each species includes a complete botanical description and details of the origin of the name, geographical distribution, habitat, flowering period and response to fire, as well as specific cultural instructions and other information. Black-and-white line drawings illustrate fruit, seeds and leaves, and a distribution map is also included. The 103 superb color plates show details of flower and fruit, as well as the overall

appearance of the mature plant.

Anyone interested in this highly decorative plant family will find these authoritative and beautifully produced presentations of the Australian members of the Proteaceae and the entire genus *Banksia* to be valuable additions to the library. Whether you are simply an armchair traveller to Australia, a customer of your local florist (where blooms of many of these species are available as cut flowers), or one of the fortunate few who can grow these plants in their own gardens, these books are highly recommended.

HARDY GERANIUMS.

Peter F. Yeo. *Timber Press, Portland, Oregon. 1985. 192 pages; hardcover, \$39.95. AHS member price, \$33.98.*

As many gardeners know, the hardy geraniums or cranesbills (*Geranium* spp., as opposed to the tender florist's geraniums, *Pelargonium* spp.) are valuable additions to the garden. Although occasionally found in gardens in this country, hardy geraniums deserve to be used more frequently in cultivated perennial borders or even as ground covers. To date, there has been

little information about these plants in the literature either of botany or of horticulture. Fortunately, this oversight has now been corrected; Peter Yeo's excellent treatment of the cultivated species of *Geranium* includes descriptions and cultural information for 110 species and botanical varieties as well as for an even greater number of cultivars and hybrids. Although the 43 beautiful color photographs illustrate only a small portion of the taxa included, they provide evidence of the decorative value of the many species.

Since identification of individual species within this genus is unusually difficult, the author has provided two well-designed keys, one of which depends primarily on leaf and flower details; the other also uses fruit characteristics.

Hardy Geraniums is a long-awaited and much-needed scholarly work that should be equally valuable to the gardener and the botanist. —Gilbert S. Daniels

Barbara W. Ellis is Editor of *American Horticulturist* and Publications Director for the American Horticultural Society. Gilbert S. Daniels is the immediate Past President of the American Horticultural Society.

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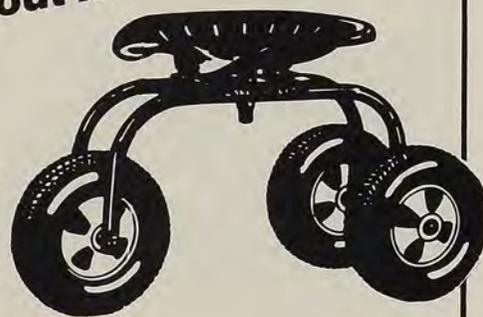
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Pronunciation Guide

Achillea ah-KILL-ee-ah
Alchemilla vulgaris
 al-keh-MILL-ah vul-GAIR-iss
Aloe striata
 AL-oh-ee/AL-oh stry-AY-tah
Alyssum saxatile
 ah-LISS-um sacks-ah-TILL-ee
Andromeda polifolia
 an-DRAW-meh-dah poe-lih-FOE-lee-ah
Anemone × hybrida
 ah-NEM-oh-nee HIGH-brid-ah
A. japonica a. jah-PON-ih-kah
Anigozanthos flavidus
 an-ih-go-ZAN-thuss FLAY-vih-dus
Arctostaphylos uva-ursi
 ark-toe-STAFF-ill-ose OO-vah-UR-sigh
Ariocarpus air-ee-oh-CAR-pus
A. ludoviciana var. *albula*
 a. lood-oh-viss-ee-AY-nah al-BEW-lah
Asclepias syriaca
 ass-KLEE-pee-us seer-ee-AY-kah
Astrophytum myriostigma
 ah-strow-FIE-tum me-ree-oh-STIG-mah
Aurnia saxatilis
 aw-RIN-ee-ah sacks-ah-TILL-iss
Baccharis pilularis
 BACK-ah-riss pie-lew-LAIR-iss
Bergenia cordifolia
 ber-GIN-ee-ah core-dih-FOE-lee-ah
Camassia scilloides
 kah-MASS-ee-ah sill-OY-deez
Campanula persicifolia
 kam-PAN-yew-lah per-sis-ih-FOE-lee-ah
Carex CARE-ecks
Castilleja kas-TILL-EE-jah
Cerastium arvense
 ser-ASS-tee-um ar-VEN-see
C. tomentosum c. toe-men-TOE-sum
Chamaemelum nobile
 kam-ee-MELL-um no-BILL-ee
Clematis KLEM-ah-tiss/klem-AT-iss
Coryphantha minima
 core-ee-FAN-thah MIN-ih-mah
Cyclamen SYKE-lah-men/SICK-lah-men
Cypripedium acaule
 sip-rih-PEE-dee-um aw-CALL-ee
C. calceolus c. kal-see-OH-lus
Delphinium del-FIN-ee-um
Dianthus × allwoodii
 die-AN-thuss all-WOOD-ee-eye
D. barbatus d. bar-BAY-tus
D. caesius d. SEE-see-us
D. caryophyllus d. care-ee-oh-FILL-us
D. chinensis d. chih-NEN-sis
D. deltoides d. del-TOY-deez



D. gratianopolitanus
 d. grah-tee-AH-no-pol-ee-TAY-nus
D. knappii d. NAP-ee-eye
D. plumarius d. plew-MARE-ee-us
Dictamnus albus dick-TAM-nus AL-bus
Dionaea muscipula
 die-OWN-ee-ah mus-SIP-yew-lah
Echeveria eck-eh-VAIR-ee-ah
Echinocactus ee-kine-oh-KAK-tus
Echinocereus ee-kine-oh-SEAR-ee-us
Epigaea repens ep-ih-JEE-ah REE-penz
Eriogonum umbellatum
 air-ee-OG-oh-um um-bell-AY-tum
Eryngium alpinum
 air-RIN-jee-um al-PINE-um
Erythronium air-ih-THROW-nee-um
Eupatorium yew-pah-TORE-ee-um
Ferocactus latispinus
 fair-oh-CAC-tuss lat-ih-SPY-nuss
Franklinia alatamaha
 frank-LIN-ee-ah ah-lah-tab-MAH-hah
Geranium endressii
 jer-AY-nee-um en-DRESS-ee-eye
Gypsophila elegans
 gip-SOF-ih-lah EL-eh-ganz
G. paniculata g. pan-ick-yew-LAY-tah
G. repens g. REE-penz

Helonias bullata
hel-OWN-ee-us bull-AY-tah
Hepatica heb-PAT-ih-kah
Heterocentron elegans
het-er-oh-SEN-tron EL-eh-ganz
Iris EYE-riss
Kalmia latifolia
KAL-mee-ah lat-ih-FOE-lee-ah
K. polifolia k. pol-ee-eye-FOE-lee-ah
Lophophora williamsii
low-foe-FORE-ah WILLIAMS-ee-eye
Lychnis chalcedonica LICK-niss
kal-see-DON-ih-kah
L. coeli-rosa l. SEE-lee-ROW-sah
L. coronaria l. core-oh-NAIR-ee-ah
L. coronata l. core-oh-NAY-tah
L. flos-cuculi l. FLOSS-KEW-kew-lie
L. flos-jovis l. FLOSS-JOE-vis
L. fulgens l. FUL-jenz
L. × haageana l. hag-ee-AY-nah
L. viscaria l. vis-CARE-ee-ah
Mammillaria epithelantha
mam-ill-AIR-ee-ah ep-ih-thel-AN-thah
Meconopsis meck-on-OP-sis
Muehlenbeckia axillaris
mew-len-BECK-ee-ah ax-ill-AIR-iss
Neolloydia knee-oh-LOID-ee-ah
Nepeta mussinii
ne-PEE-tah moose-IN-ee-eye
Polygonatum biflorum
poe-lig-oh-NAY-tum by-FLOOR-um
Polygonum capitatum
poe-LIG-oh-num cap-ih-TAY-tum
Rosa rugosa ROW-sah rew-GO-sah
Rudbeckia rude-BECK-ee-ah
Saponaria officinalis
sap-oh-NAIR-ee-ah oh-fis-ih-NAL-iss
Sedum × rubrotinctum
SEE-dum rew-broe-TINK-tum
Shortia galacifolia
SHORT-ee-ah gah-lass-ih-FOE-lee-ah
Silene acaulis sigh-LEE-nee ah-CALL-iss
S. alba s. AL-bah
S. caroliniana s. care-oh-lin-ee-AY-nah
S. laciniata s. lah-sin-ee-AY-tah
S. noctiflora s. knock-tih-FLOOR-ah
S. stellata s. stell-AY-tah
S. virginica s. vir-JIN-ih-kah
S. vulgaris s. vul-GAIR-iss
Solidago sol-ih-DAY-go
Stachys byzantina
STACK-iss biz-an-TIE-nah
Stellaria media
stel-AIR-ee-ah MEE-dee-ah
Strelitzia nicolai
streh-LITZ-ee-ah NICK-oh-lie
Thymus serpyllum
THY-mus/TY-mus sir-PIE-lum
Trillium grandiflorum
TRILL-ee-um grand-ih-FLOOR-um
Uvularia yew-view-LAIR-ee-ah
Vaccinium angustifolium
vack-SIN-ee-um an-gus-tih-FOE-lee-um
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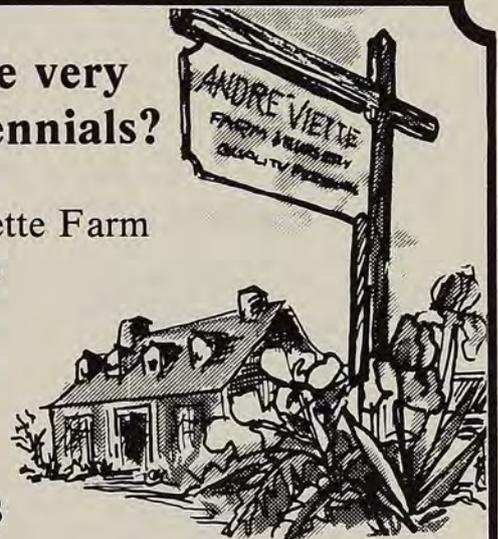
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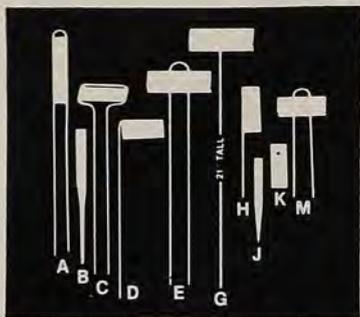
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Border Textures

When most gardeners plan a herbaceous border, their first concern is color, whether it is a riot of red, yellow and purple, or a subtle sea of shifting lavender and pink. However, in their quest for as much color for as long as possible, they often choose plants that turn out looking like lovely but disembodied heads suspended on invisible stems.

But what about the rest of the plant, or the rest of the year? What does phlox look like in May and June, or *Anemone* × *hybrida* in June and July? How does a peony appear as it breaks through the soil, even before its leaves unfurl? And what does it look like by the end of a hot, dry summer? A gardener should know what each plant's foliage looks like in every season—for example, in the luminescent gray light of a spring shower and in the glare of summer at noontime.

If a border is designed for bloom from May to August, probably only about one-third to one-half of the plants will be in bloom at any one time. During the rest of the growing season, it is foliage that gives a border the underlying strength and subtlety needed to carry it through slack periods. Foliage also adds richness and depth during peak blooming time.

When designing a border, I'm as susceptible to the delights of color as the next gardener, so I sometimes try to visualize the proposed plan in my mind as if it were a black-and-white photograph. That way, blobs of color no longer compete for my attention; I can imagine the sunlight catching the ragged edge of *Delphinium* leaves, or the contrast between a dark, heavy mass of *Bergenia cordifolia* and a froth of *Gypsophila paniculata*. In black and white, the shape, pattern and texture of leaves—the placement of leaves on the stems, how light settles on the leaves' rough or smooth surfaces, and the foliage of each plant interacting with that of surrounding plants—are all important.

As part of a recent project, I was called upon to redesign several existing borders. Originally designed to delight the eye with a mass of color during the former owner's weekend visits, the beds were solid with



A gardener should know what each plant's foliage looks like in every season. In this border, the foliages of *Nepeta mussinii*, *Alchemilla vulgaris*, *Iris* and *Geranium endressii* provide an interesting series of contrasts.

either daylilies or bearded iris. These borders were well positioned around a series of terraces opening from various rooms of the house, and were certainly colorful, but once the iris season was over, they were downright dull. Although the daylily borders were planned for a longer season of bloom, they, too, lacked enough interest to sustain them for more than a weekend.

Daylily and iris foliage are fine, but when they are used in such quantity, they look like so much cabbage. To make these borders more interesting, I realized that their period of bloom would have to be extended. In addition I planned to add textural variety, using only easily grown plants in order to keep maintenance to a minimum.

The first thing we did was to yank out one-third to two-thirds of the plants. We then added 'Sea Shell' peonies to the borders dominated by iris. These striking plants offer strong foliage, as well as single pink blooms in June. Other major additions in-

cluded blue-and-white *Campanula persicifolia*; clumps of hardy *Geranium endressii* 'Wargrave's Pink', which sports finely divided leaves; and *Dictamnus albus*, which bears glossy pinnate leaves. We added *Alchemilla vulgaris* (commonly called lady's mantle) for its light touch of form and the color it provides through midsummer, and *Anemone* × *hybrida* (often sold as *A. japonica*), which contributes grape-like foliage and late bloom.

Horticulturally speaking, these additions were not terribly adventuresome. However, the idea was simply to select plants whose foliage and form would complement the flowers throughout the season. While the iris and peonies are in bloom, the campanulas are still willowy, green stalks—vertical accents that gently contrast with (but do not compete with) the border's major show. Then, as the campanulas appear, the geraniums serve as a mildly interesting ground cover, with their scattering of pink flowers. By then, the

spiky iris leaves have faded into the background, and the peonies look rather like regal, dark green shrubs.

By midsummer, the anemone leaves have come on nicely, and the lady's-mantle becomes a chartreuse froth, interrupted by a few clumps of daylilies with sprawling, slender, arching leaves. Late in the season, the lady's-mantle is cut back to its downy, lace-edged leaves, and the rest of the border's foliage serves as a varied background for the flowers of *Anemone × hybrida*.

As for the daylily border, we wanted to give it a character that would change when viewed from different parts of the garden. We also wanted to establish plant combinations that would highlight each plant's individual qualities. For contrast, we planted *Bergenian cordifolia* in front of the border, near *Eryngium alpinum*. *E. alpinum*, with its deeply jagged lower leaves and spiky, silver-blue upper leaves and bracts, seems to bring out the roundness of its cabbage-like companion.

Toward the rear of the border, the feathery, silver fingers of *Artemisia abrotanum* (southernwood) and *A. ludoviciana* var. *albula* 'Silver Queen' serve to highlight the strong details of the bracts of *Eryngium alpinum*. At the same time, *E. alpinum* makes the finely divided foliage of *Artemisia* appear more distinctive. The silver-powdered foliage of *Achillea* 'Coronation Gold', planted near *E. alpinum* makes the latter's foliage look softer and the plant's intrinsic thorniness even more apparent. *Eryngium*, in turn, emphasizes the details of the finely toothed foliage of *Achillea*. Amid the remaining daylilies, evergreen *Yucca filamentosa* helps to anchor the borders and to provide dramatic tension.

It was our thinking that the texture of the borders should appear distinctly different from different vantage points. Viewed from inside the house or from the terrace, the individual textures of the plants in the borders contrast with and complement one another nicely. But when seen from the drive or from deep in the woods, these borders look like a haze of silver-blue and yellow. When viewed from a closer distance, the clumps of *Yucca filamentosa* and large, dark green shrubs of *Rosa rugosa* 'Frau Dagmar Hartopp' stand out as strong focal points. As one moves between the borders, the subtle shift of textures keeps the garden vibrant right up to the first hard frost. ☉

—Margaret Hensel

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

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