

# American Horticulturist

June 1994

A Publication of the American Horticultural Society

\$2.95



HOT PHLOX, COOL HYDRANGEAS  
RICHARD JAYNES' MOUNTAIN LAURELS  
A CLIMBER PRIMER



# DOROTHY HAMILL

Gardener, Olympic Gold Medalist



I remember helping my mother in her garden when I was little. I was so proud.

Now, when my daughter, Alexandra, helps me in our garden,  
I get that same wonderful feeling, like remembering a dream.

My mother let me feed her plants with Miracle-Gro, a cupful at a time.

Today, I wouldn't use anything else. Like mother used to say,

*"There's nothing like Miracle-Gro."*

*Dorothy Hamill*



MIRACLE-GRO

# American Horticulturist

Volume 73, Number 6

June 1994

## ARTICLES

- The Man Who Moves Mountain Laurels**  
*by Sydney Eddison* ..... 18  
Richard Jaynes' controlled crosses and the advent of tissue culture are bringing new colors, shapes, and sizes to these native shrubs.
- Hydrangeas—So Passé, So Today**  
*by Kathleen Cullen* ..... 25  
They're as fusty as high-buttoned shoes—and the perfect accoutrement for today's natural landscapes.
- Of Twiners, Tendrils, Hooks, and Blebs**  
*by Robert Geneve* ..... 30  
Darwin and his contemporaries appreciated a fine vine.
- Play It Again, Sambucus**  
*by Martin Waterman* ..... 35  
As time goes by, gardeners may rediscover the multipurpose elderberry.
- On Fire for Phlox**  
*by James H. Locklear* ..... 38  
Will Americans warm up to these useful natives, or let Europeans keep claiming the hottest introductions?

## DEPARTMENTS

- Commentary ..... 4
- Offshoots ..... 5
- Members' Forum ..... 8
- Natural Connections ..... 10
- Natives at Risk ..... 11
- Gardeners' Information Service ..... 12
- The Urban Gardener ..... 13
- Planting the Future ..... 15
- Book Reviews ..... 16
- Classifieds ..... 44
- Pronunciations ..... 46



## JUNE'S COVER

Photographed by Joanne Pavia

*Hydrangea macrophylla*—known by a spate of common names including hortensia, mophead, snowball, and French hydrangea—is an Asian immigrant that fairly rings with summer memories for many Americans. Called a “changeable” by the British, its flower colors evolve slowly in spring, become mottled as they recede in fall, and at peak bloom, can be bright pink or blue depending on soil acidity. Beginning on page 25, Long Island landscape designer Kathleen Cullen considers the uses of a shrub that has transcended the vagaries of fashion.

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# COMMENTARY

The letter from a lifetime member was short and to the point. She liked what she was hearing about the American Horticultural Society and the programs and plans that were underway. "The new programs are challenging and ambitious," she wrote. "They reflect a new breadth of activities as well as a new emphasis on education."

The major educational vehicle of AHS has always been *American Horticulturist*, our monthly publication. We have recently added several new departments while continuing to keep members informed about sources, new books, upcoming events, and the latest research. We couldn't do all this without the contributions of authors, photographers, editorial advisory board members, and unheralded sources of information for our staff.

This month two of those helpful people will be officially joining our magazine's editorial advisory board. They are Richard Lighty of the Mount Cuba Center for the Study of Piedmont Flora in Greenville, Delaware, and Elvin McDonald, whose hundreds of garden photography and writing credentials include serving as U.S. editor for the award-winning *The American Horticultural Society Encyclopedia of Gardening*.

In the months ahead our leadership and educational efforts will continue to evolve, not only through our publications but also through sponsorship of many public events, my weekly national "Growise Gardener" radio show, and member services such as our Gardeners' Information Service and our Free Seed Program. We want our members to know what we are working to do for you, your community, and the nation.

As part of that strategy we will be publishing some special issues on important topics. The first of these will be the proceedings of our two national symposia on children and gardening—our successful 1993 event and keynote topics from the one we are co-sponsoring this August with the Montessori Foundation. In coming months, we will develop another special publication based on our National Home Composting Park.

These publications will be presented so that the programs they describe can be easily duplicated in your communities. We hope by doing this to show that AHS is not just a magazine subscription, but also a voice for bringing all Americans, from amateur gardeners to representatives of the green industries, together in pursuit of the "green ethic."

Those for whom the green ethic means greater use of native plants should enjoy this issue. You'll get an in-depth look at phlox, a perennial much loved in England but underappreciated by Americans, and visit with Richard Jaynes, "Mr. Mountain Laurel." We'll also hear about hydrangeas—both natives and the "old-fashioned" Asian varieties—and learn how early scientists studied the climbing mechanisms of plants.

My letter from the long-time member ended by saying that educating everyone to be successful and more environmentally responsible gardeners will take many bold acts. We at AHS are taking those steps. Watch us in the months ahead!

*H. Marc Cathey, AHS President*





# OFFSHOOTS



BILL FIRESTONE

## Remembrance of Flowers Past

By Mary Yee

When I was a little girl in Hong Kong, my family lived in a house without a refrigerator. I didn't feel deprived in the least. Not having a refrigerator meant that my grandmother, head cook and major-domo of the household, visited the food market nearly every day. On Saturday mornings I was allowed to accompany her.

At the market, we would go from the open-air butcher shops with their hanging carcasses to the Jungle gym of the poultry cages, where chickens and ducks fretted next to opalescent guinea fowl. Fishmongers refreshed their glassy-eyed hostages with buckets of cold water, carelessly thrown. Fruits, vegetables, nuts, herbs, and spices gleamed from baskets and enamel basins. If a holiday was approaching there might be delicacies or trinkets for the occasion. I especially coveted the brightly colored tissue paper lanterns for the autumn moon festival.

We sometimes ended our excursions at a particular corner of the market where an elderly lady sat on a low stool and cradled a shallow reed tray of flowers. Not tired roses swaddled in white paper or gay bunches of robust country flowers—the old lady held a lapful of snipped buds, each the soft color of old ivory, the long outer petals faintly edged in sepia. Their fragrance was intoxicatingly sweet.

My grandmother would buy only one bud—for me. On the walk home I would peel the outer petals to feel the cool satin of the inner folds. Every few steps I waded the bud in front of my face and sniffed rapturously.

Once at home, the bud might have been abandoned on a windowsill. My little sister might have seized it in her eager baby hands. Bruising touches would cause the sepia of the petal edges to gradually stain the entire bud.

By late afternoon the flower lay crumpled and sere, but the fragrance lingered.

When I was eight years old, my family moved to America. Along with a new country and a new language we acquired a large refrigerator. In America one did not



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shop for food every morning. And a well-lit grocery store took the place of the open-air market. Now our excursions ended with taking a week's worth of groceries out of crisp brown paper bags.

Over the years I forgot about the market, forgot the small, gray-haired lady with the shallow tray, forgot even the scent of the flower. Then one day, I opened a bulb catalog and saw a photograph of a double tuberose. The sounds of the market, the bent figure of the flower seller, the memory of a glorious perfume all came back to me. Sadly, I had no plot of ground or even a sunny window for a pot of tuberose. And the florists I knew didn't carry so exotic a flower.

Months later, I sniffed a tuberose in a Mexican flower market. The fragrance was rich and lovely, but not the one enshrined in memory. I examined the florets and found no faint sepia tracery. My market-day treat had not been a tuberose.

In a desultory way I continued to search for my mystery blossom. In front of Nepalese temples I bought little leaf bowls of blossoms, searching for satin ivory petals edged with brown. In department stores I allowed myself to be dampened with a mist of the latest perfume in the half-hearted hope that an astute "nose" had discovered my cherished scent. Then the name of the flower might have been revealed in a glossy advertising leaflet.

I acquired more nursery catalogs, discovering how many species answered the description of a cream-colored, perfumed tropical flower. Having become more sophisticated in matters botanical, I focused on jasmines. Yet photographs of species after perfumed species failed to match the flower of my recollection.

In my years of hunting, I never asked my grandmother about the flower. Perhaps I was afraid she might have turned a puzzled face to me and denied that a tray of slender ivory buds ever beckoned from an old lady's lap. Perhaps I didn't really want to find the flower, fearing it could never really have smelled so sweet. I should have trusted more and asked sooner.

On a visit with my grandmother to a great-aunt's house, I casually inquired about a large house plant that was summing out on the patio. My aunt's response was electrifying: white jade orchid. She said it in Chinese and the soft words fell into an empty place in my memory, next to the mind's image of tapered buds. It was as though I had always remembered the name. I turned to my grandmother and asked about the old lady with the reed tray. She remembered her and remembered how much I had enjoyed picking out one perfect bloom.

My great-aunt's plant had come from a Chinese-run nursery in California. She had carried it home to the East Coast herself and did not believe that the nursery offered mail orders. I inspected the plant and brooded. It had a single, rather woody stem; obviously one could not ask for a division. The plant was somewhat scraggly and looked far from robust. Given that my previous attempts at rooting woody-stemmed cuttings mostly ended in failure, it did not seem fair to this plant to take one of its few branches. Reluctantly I decided I had to acquire my own plant.

I knew, of course, that the name "white jade orchid" would be of little help. The Chinese called many flowers "orchids" the way other people call many flowers lilies or daisies. I was not quite sure that hunting in orchid books or collections would bring me the plant I wanted. But since the plant was obviously tropical, I turned again to books and catalogs of exotic plants.

In the catalog from Logee's Greenhouses of Danielson, Connecticut, I came across *Michelia figo*, a Chinese member of the magnolia family described as bearing creamy yellow and purple flowers and having a delightfully sweet fragrance. This sounded most promising; although I would not have made the connection on my own, now that it had been suggested, the heavy substance of the "white jade orchid" seemed very like that of magnolias. In a book on Hawaiian flora, the authors described *M. alba* as a flower brought by Chinese immigrants to Hawaii and called "white orchid" in Chinese.

An order went out to Logee's immediately. I wish I could say that the plant proved astoundingly robust and bloomed within months. No, it quietly expired on a sunny windowsill after putting out a few leaves. A larger plant, acquired from another source, also departed for a better place without producing a flower. In her book *A Southern Garden*, Elizabeth Lawrence described *Michelia* as "one of the evergreens difficult to transplant." I cannot, however, take the gentle hint that perhaps this is not the plant for me; a tantalizing scent from long-ago spurs me on. So more orders are going out. Soil mixtures will be adjusted, watering routines changed. I may even try replacing Mozart's late quartets with daily recitals of Chinese folk music. My unreasonable hope is to find a nursery that will sell me a plant already laden with tapered, ivory buds edged in sepia and fragrant with the beckoning memories of childhood.

Mary Yee is a free-lance writer living in Silver Spring, Maryland.

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## MEMBERS' FORUM

### Top Gesneriad

As an old friend of Darrell Trout and a fellow board member of the Greater New York Chapter of the American Gloxinia and Gesneriad Society, I was pleased to see his article on gesneriads in the February issue. However, as vice president of the New York City African Violet Society, I must take exception to one sentence in the informative and beautifully illustrated piece, viz, "The best-known gesneriad is the florist gloxinia, *Sinningia speciosa*."

The best-known gesneriads are the *Saintpaulia* hybrids, the African violets that grace windowsills and plant stands around the world.

George R. F. Baker  
New York, New York

### Torrid 'Cleopatra'

Contrary to what the picture caption on page 21 of the February issue claims, the "torrid licks of red" on the leaves of *Epiciscia* 'Cleopatra' do not show how the genus earned its common name of flame violet. That name was earned by its flowers' usual color (orange-red) and shape, like that of a violet.

Incidentally, most *E. cupreata* have no red at all in their leaves. 'Cleopatra' is the relatively rare exception.

Larry Miles  
Independence, Missouri

### Peat Alternatives

I enjoyed reading Chris Bright's article about peat bogs in your December issue. In a side bar to that article, several alternative and experimental substitutes for peat were mentioned. I would like to learn more about these products and where they are available. Please print the names of companies offering these products so that we here at Yerba Buena Nursery can try them. We are always interested in methods less damaging to the environment.

Cathy Simms  
Woodside, California

*Chris Bright responds: Despite the interest in peat alternatives, they can be difficult to find on the garden center shelf. Many that*

*we mentioned are still in the experimental stages. Wholesale buyers like your nursery stand a better chance of locating an acceptable substitute than do individual consumers buying on a retail level. Bulk purchasers might consider the following possibilities:*

*Scotts Hyponex, a marketer of lawn and garden products, sells various growing media, including peat. But Scotts also markets a mixture of compost and peat. Scotts can be reached at (800) 221-6220.*

*If you live in the Southeast, another possibility is rice hull compost. It's used as a peat substitute on golf courses, athletic fields, and in potting media—usually in combination with peat. Phone McMaster's Rice Hull Compost, (800) 622-4855.*

*Top moss, the living layer of sphagnum moss, is being harvested on a sustainable level from bogs in Wisconsin. Much of this moss is brokered through Northwoods Organics in Minnesota. Tom Lebar, manager of Northwoods, cautions that top moss should be substituted for ordinary peat only in certain specialized applications, such as packing, topiary work, and layering and germination media. Top moss is more expensive than peat and breaks down more rapidly. On the plus side for nurseries, it can be milled to specifications and doesn't need sterilizing when used for seed germination. Northwoods can be reached at (218) 727-8479.*

*Of course, another alternative is municipal compost if it is available in your area, although its quality can vary widely.*

### Defending English Gardens

In the February book review of Allen Lacy's *Gardening With Groundcovers and Vines*, Paul Capiello writes that Mr. Lacy urges American gardeners to develop their own style instead of trying to recreate the English garden. I contend that the reviewer completely misses Mr. Lacy's point.

In addressing the question as to how to create English gardens, Mr. Lacy says that we Americans cannot create the English climate, and that only a handful of us can



grow towering delphiniums or blue Himalayan poppies. But, what we really want when we ask how to make our gardens "more English, somehow" is the style of planting that characterizes such a garden. . . "a style that is as possible to achieve in New Jersey or North Carolina as in Kent," Mr. Lacy writes. He believes that an attitude toward plants is also involved—"the willingness to let plants be plants," to let them weave through each other as they grow. He summed up the English style of planting as he has observed it at Sissinghurst, Hidcote, Great Dixter, and other gardens in Britain in three words—density, depth, and diversity. He then elaborates on each of these aspects, showing clearly how we American gardeners—even those of us who live in Kansas!—can create our very own English gardens.

*Gardening With Groundcovers and Vines* is a good read for many reasons. It is worth buying if *only* for the section entitled "I Want an English Garden." Paul Capiello should apologize to Allen Lacy and his fans.

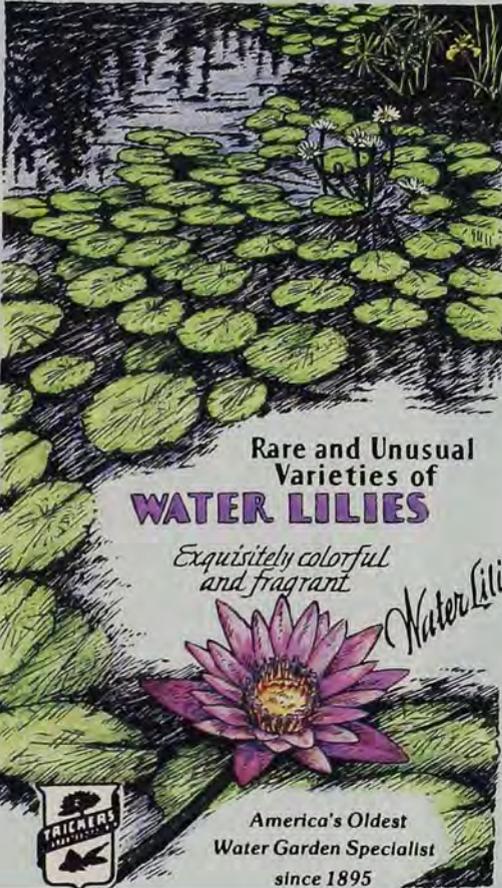
Lyn Holiday  
Overland Park, Kansas

Paul Capiello responds: Mrs. Holiday is correct in pointing out that Lacy emphasizes using the English style with plants adapted to the American climate. I agree with Lacy entirely on this point. It is inappropriate to try to cultivate "English" plants here simply because they are commonly used in England.

My criticism of English gardens lies not with the choice of plant material but rather with the prevalent feeling of many American gardeners that the so-called English style of garden design is the only type worth having. The British did not invent garden design, nor have they perfected the art. They have simply developed a highly recognizable style. And while I have no personal bias against the style (I even have a portion of my own garden that could be compared, somewhat, to an English cottage garden) there are other styles out there. The French, the Italians, the Japanese, and yes, even some Americans have, over time, developed their own styles. I like to feel that garden design is one of the great forms of personal expression, and to stymie that expression with preconceived ideas of correctness of style seems, to me, counterproductive.

### Correction

In our April issue, credits for two photographs on page 19 were transposed. Dick Keen photographed the southern magnolia and Michael S. Thompson photographed the 'Pinkspear' summer-sweet.



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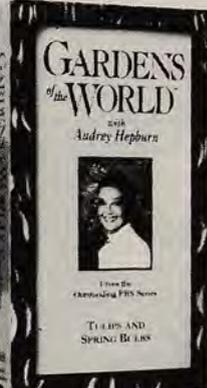
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A2

## Wild Roses

Most people think of roses as the quintessential garden plant, but few realize how great their possibilities are for wildlife gardening.

The rose most commonly planted for wildlife is *Rosa multiflora*, a spiny, fast-growing Japanese species that can grow 10 feet high and 15 wide. Birds and small mammals shelter in it and consume its hips and shoots. But it's extremely invasive.

You may want to choose a native rose instead. North America is blessed with over 100 native roses, and with their white or pink single flowers, often large hips, and mounding habit, many are handsome shrubs.

It's true that wild roses are home to a vast complement of insects, but many of these insects are worthy of attention in their own right, and few do the plants any serious harm. For starters, native roses are usually pollinated by our native bumblebees, rather than by exotic honeybees. Leaf-cutter bees slice out circles of leaf tissue to line the nests they build inside the stems of various plants. About 50 gall wasps lay their eggs in the stems and the results can be quite beautiful: some of the galls look like eggs or tiny sea urchins. A full appreciation of native roses may require an insect field guide.

While you probably shouldn't hedge your carefully tended collection of Austin roses with a thicket of natives, many of these insects confine themselves to the genus. So while you may find the bright red, long-snouted rose curculios munching the buds of your wild rose, they'll do your prize daphne no harm. Similarly, many of the aphids, sawflies, and leafhoppers that have evolved with the wild roses cannot feed outside the genus *Rosa*.

And all those bugs invite more appealing visitors. They're a big draw for insectivorous birds, like warblers, which sometimes nest in wild roses. So do mockingbirds, thrashers, cardinals, sparrows, and catbirds. Many of

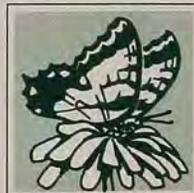
the seed-eating birds are after the vitamin-rich rose hips, which during the lean months of the year are a valuable food. Some native roses are known to attract as many as 38 species of birds.

You may also find rabbits, voles, and mice amid the roses. In winter, the rabbits and voles may gnaw the stems, but the mice usually focus on the hips. Often the mice move into abandoned birds' nests; they "winterize" the nests by filling them with dried grass, then burrow inside. That's where they feast on the hips.

What wild roses should you plant? Here are some of the more rewarding possibilities. *R. nutkana* is native to the West Coast, from California to Alaska. It grows to six feet and produces pink flowers. *R. gymnocarpa* grows in the Pacific Northwest and as far inland as Montana. It can reach eight feet and flowers in pink as well. *R. woodsii* ranges from the Southwest to the upper Midwest. It endures very arid conditions, reaches six feet, and flowers in pink or white. Also in the Midwest you'll find *R. setigera*, which can grow as far south as Texas and as far east as Florida. It reaches 15 feet and blooms in either pink or white. *R. carolina*, at three feet, and *R. palustris*, at six, occur over the entire eastern half of the continent. The latter is especially useful in very wet areas. Both flower in pink. The Northeast is home to *R. nitida* and *R. virginiana*. *R. nitida* reaches only two feet, while *R. virginiana* reaches six. Both are pink-flowering. Where their ranges overlap, wild roses hybridize readily. Their refusal to conform to our categories helps to keep our native roses interesting.

The prospect of birds' nests, chewed leaves, and imperfect blooms may not conform to everyone's idea of a rose garden. But if you have a place for a native that's tough as nails—and one that will bring a good share of the wild along with it—consider planting a native rose.

—Chris Bright  
Assistant Editor





# NATIVES AT RISK

## BEAUTY FROM BULBS



ALFRED SCHOTZ

### Texas Trailing Phlox

Eula Whitehouse discovered the first population of Texas trailing phlox (*Phlox nivalis* subsp. *texensis*) in 1931. The subspecies, known only in Texas, was common in the Big Thicket—an open, grassy, frequently burned, long-leaf pine (*Pinus palustris*) sandhill in southeastern Texas with a midstory of bluejack oak (*Quercus incana*), post oak (*Q. stellata*), and yaupon (*Ilex vomitoria*). The area includes a wide diversity of forbs and grasses, including bluestem (*Schizachyrium* sp.) and beardgrass (*Bothriochloa* spp.).

Texas trailing phlox is usually found growing with bird-foot violet (*Viola pedata*). The phlox's deep rose, lavender, purple, rose pink, or white flowers make a spectacular show when the plants bloom in March and April.

This phlox is fairly short—flowering clumps may only reach six inches tall—and has two kinds of stems, each with a different leaf. Flower stems are upright and have deciduous lance-shaped leaves. Nonflowering stems trail on the ground and are covered with dense, needlelike, evergreen leaves. These sterile stems support many shorter stems



that give the plant a matted appearance.

Most perennial phloxes are pollinated by moths or butterflies, but botanists aren't really sure if the same is true for Texas trailing phlox. "We've never seen moths or butterflies around the plant," says Mike Warnock, a researcher who has been studying the rare phlox for two years. "But then we've never seen anything else pollinating it either." The Texas trailing phlox rarely produces seeds, but spreads vegetatively.

*Phlox nivalis* subsp. *texensis* once thrived in 17 locations in Hardin, Polk, and Tyler counties. Housing developments have sprouted in places where the plant used to spread its evergreen shoots. In the past 30 years, land clearing for urban developments, pine plantations, and highway and pipeline construction have reduced populations to two locations, one within the Roy E. Larsen Sandyland Sanctuary managed by the Nature Conservancy of Texas, and another on private property near Woodville. The U.S. Fish and Wildlife Service listed the Texas trailing phlox as endangered in September 1991.

Fire suppression is the plant's biggest threat. The sandhill plant community needs fire to maintain its diversity and structure—left unchecked, hardwoods "would shade out these plants and create deep duff and litter," says Wendy Ledbetter, a restoration biologist with the East Texas office of the Nature Conservancy. "Use of prescribed fire is the most important tool that can be used to maintain healthy populations." There were 23 phlox plants growing at Sandyland in 1985. After several burns, the population has grown to about 400 specimens.

The plant's potential as an ornamental makes it interesting to botanists, plant breeders, and rare plant enthusiasts. But gardeners can re-create a patch of Texas without endangering one of our rare natives. Many beautiful phloxes are commercially available. Creeping phlox (*P. subulata*) is a good substitute that will bring a bit of the Big Thicket into the garden.

—Mary Beth Wiesner  
Managing Editor

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A2

# GARDENERS' INFORMATION SERVICE

**Q:** Can you give me information on *Hepatica americana*, including a source for purchasing it?

—N. M., Camden, South Carolina

**A:** *Hepatica americana*, an herbaceous perennial, is commonly known as liverleaf. According to the Doctrine of Signatures, plants could be used to treat the body part they resembled, and the rounded lobes of an *H. americana* leaf give it a shape resembling that of a liver.

Its flowers, which consist of six rounded lobes, can be lavender blue, white, or pink. It grows four to six inches tall and occurs naturally in woodlands from Nova Scotia east to Minnesota and into our Southeast.

*Hepatica* is an excellent plant for naturalizing woodlands and other shady sites, including any shaded area of a rock garden. It needs well-aerated acidic soil rich in organic matter and benefits from a light mulch of leaf mold. Easy to start from seed or divisions, *Hepatica* needs little care once established and will self-sow if the soil is evenly moist.

Nursery propagated sources for *Hepatica* include Roslyn Nursery, 211 Burrs Lane, Dix Hills, NY 11746, (516) 643-9347, catalog \$2; Shady Oaks Nursery, 700-19th Avenue N.E., Waseca, MN 56093, (507) 835-5033, catalog free; and Siskiyou Rare Plant Nursery, 2825 Cummings Road, Medford, OR 97501, (503) 772-6846, catalog \$2.

**Q:** I'd like to plant catnip for my cats this year, but have heard that it can be invasive. Is this true? Is there one that would be less invasive than others?

—F. R., Vancouver, British Columbia

**A:** Because catnip, *Nepeta cataria*, is in the mint family, it might be assumed that it has the invasive tendencies of many of its relatives. But while catnip does have a sprawling

habit, it is not considered invasive.

Hardy to USDA Zone 4, catnip grows 18 inches to two feet tall, has small, grayish green leaves and four-to-five-inch spikes of lavender blue flowers.

*Nepeta* species are excellent in borders, herb gardens, or for edgings and walkways. They need sun and well-aerated soil. Once established, they are drought and heat tolerant, but don't like heat coupled with extended humidity.

Some gardeners feel that for formal beds, catnip is too unrefined compared to its relatives. Shearing it back four inches or so after it flowers will extend bloom time and give it a better shape. Shear it back again several inches from the ground in the fall.

Cats do love the smell of the foliage and you will probably find them rolling around or sleeping on the plant.

Other recommended species and cultivars of *Nepeta* include *N. × faassenii*, which grows to 18 inches tall with a more upright habit than *N. cataria*, and *N. gigantea* 'Six Hills Giant,' the tallest of the catmints at three feet in height. It tolerates humidity better than the other species.

For more on *Nepeta*, see "The Catmint Muddle," *American Horticulturist*, August 1993.

**Q:** My butterfly bush and honeysuckle vine are growing too well! How and when I can prune them?—M. W., Chicago, Illinois



**A:** The most commonly grown butterfly bush is *Buddleia davidii*, which blooms on the current season's growth. Therefore the best time to prune it back is in early spring before it has begun to grow again. Not only can the shrub be pruned back this hard, but it should be, every spring. Otherwise, it will become woody and leggy and have fewer flowers. If you have a butterfly bush species that flowers on the previous season's growth, like the fountain buddleia (*B. al-*

*ternifolia*), you should prune it back by about one-third after it has finished flowering in midsummer.

If your honeysuckle vine produces paired flowers on the current season's growth, it is *Lonicera japonica*, which should be pruned back when the plant is still dormant in winter or early spring. It can be cut back a little or a lot, depending upon how much it needs to be contained.

If your vine produces many long, narrow whorls of flowers it is probably *L. × brownii*, *L. periclymenum*, or our native *L. sempervirens*. These honeysuckles should be pruned immediately after they have finished flowering. Cut back as much as you'd like, but make sure to cut right above a nonflowering shoot.

If your honeysuckle is hopelessly overgrown and tangled, you need to take more drastic measures, cutting the stems off to within about six inches of the ground. Let the foliage die and dry out and it will be much easier to remove. If you do this now to a vine that flowers on the previous year's growth, you will have to wait one year until it flowers again.

—Maureen Heffernan  
Education Director

## BLACK WALNUT BLUES

One of the most frequently asked questions received by our Gardeners' Information Service hotline is what plants will grow under a black walnut tree. For a list of plants that will grow under these toxic trees, send \$1 and a SASE to: Gardeners' Information Service, 7931 East Boulevard Drive, Alexandria, VA 22308. The hotline, (800) 777-7931, is staffed from 11 a.m. to 3 p.m. eastern time Monday through Friday.



# THE URBAN GARDENER

## Starting Trees Right

If the city gardener has a friend, it would have to be Nina Bassuk, program leader of the Urban Horticulture Institute at Cornell University.

The institute, which has two fulltime faculty members and five to six graduate students, was formed 14 years ago to research problems of urban vegetation. "We focus on trees because we believe that is where our efforts will be most rewarded," Bassuk says. The institute works primarily with city foresters, landscape contractors, botanical gardens, and others who plant public landscapes. But their research can benefit anyone who believes that planting a healthy tree is about the best thing we can do for the overpaved, overheated, and often overly hostile places where too many of us must live.

"City trees don't get a lot of after-care," Bassuk continues in explaining the institute's focus. "There's usually no money for it. We can have the most impact during the period of the trees' establishment." That means carefully matching the site to the tree, moderating the soil conditions, and transplanting the tree properly.

Transplanting trees is so physiologically stressful to them it's a wonder that any survive. Studies have shown that some 95 percent of a tree's root system can be left behind at the nursery when it is dug from a field to be shipped and sold. If a tree is growing in a relatively undisturbed site, its roots will spread to three times the diameter of its crown. Clearly, it's going to be impossible for even the most careful grower to ship many of these roots with the tree.



But root tips are the tree's water-absorbing organs. They're also sites of hormone synthesis, and their loss disrupts the chemical signals to the developing shoots. The smallest roots are the most efficient at absorbing water, and also the first to become desiccated.

The loss of so many roots is especially hard on trees once they have leafed out and are transpiring more rapidly. Like marathon runners, they face serious consequences if they don't take in fluids.

In this respect, container-grown trees have an advantage over those purchased balled-and-burlapped ("B-and-B"), since they bring their entire root system with them. But container trees can become pot-bound, with tangled roots that won't regenerate. "When that happens, you need to tease the roots out," says Bassuk. You may need to cut into the ball a bit to do this, but be gentle. "Some people split the root ball and spread it like a butterfly. That's pretty drastic and we don't recommend it."

Container-grown trees have other drawbacks. They need to be protected in the winter, for instance. The hardiness zones given for plants, notes Bassuk, "assume that their roots will be in the ground." She compared the ground to a large body of water, whose temperature doesn't fluctuate much compared to a small one. Container trees also need more irrigation when they're transplanted. Water drains rapidly from the medium they've been growing in—usually a lightweight soilless mixture—and having all those roots intact means the trees are transpiring faster. And if you want a big tree, you probably won't be able to buy it in a container, because growing them that way is more expensive.

Another option—sometimes the only choice when buying through mail-order—is a bareroot tree. "Bareroot trees can potentially retain more of the original root system," notes Bassuk, and if there is any damage to the roots, it can be spotted easily. But these trees, of course, have to be moved while they're dormant.

Another possibility not yet widely used is fabric containers. The container, which is put in the ground, lets in water and air. It also allows roots to penetrate for a short

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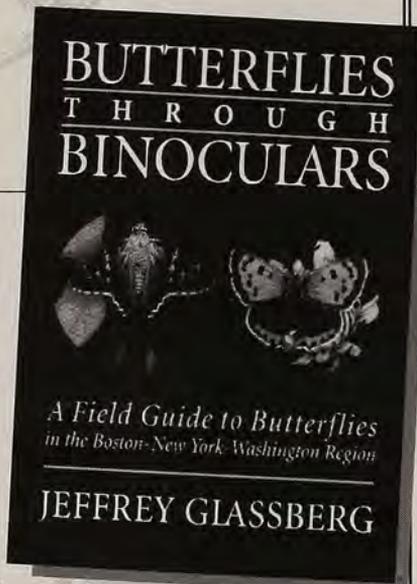
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distance. The result is a root ball with more of the important fibrous roots. “This has not necessarily been a tremendous advantage,” says Bassuk. “The fabric can rip off root growth, and you need to water much more initially. You can grow big plants, but the root ball stays small, and this can cause problems when you put them in the landscape.”

The upshot of all this is that there is no shock-proof system for transplanting trees. But the glamour of buying a big balled-and-burlapped tree is possibly over-rated, especially given how much heavier they are. “A two-inch caliper tree produced in a container can be lifted by two people,” says Bassuk. “A two-inch caliper B-and-B tree would require a tractor.”

The best news for those of us on limited budgets is that in many ways, small is better anyway. One study has found that a four-inch diameter tree and a 10-inch diameter tree will be the same size 13 years after transplanting. “Large diameter trees give you an instant effect for landscaping,” says Bassuk, “but physiological stresses increase exponentially with tree size.”

Trees generally maintain a root-shoot ratio, so their branches won't grow much until their roots have regrown. The four- and 10-inch trees have lost the same ratio of roots, but the four-inch tree has lost a smaller amount and its above-ground growth will resume in five years, compared to 13 years for the 10-inch tree.

Other tree-planting tips from Bassuk:

The planting hole should be no deeper than the root ball and at least three times as wide. In a deep hole, the root ball can settle and suffocate. Water well and gently tamp down the soil to eliminate air pockets, which can hamper water movement and decrease the soil available for root regeneration.

Don't lift trees by the trunk. Their cambial walls are thin in the spring and their bark is easily “slipped.”

After a B-and-B tree is in its hole remove artificial burlap and wire baskets. Pull natural burlap down from the top.

Refill the planting hole with the soil you took out of it unless you can amend the entire bed to accommodate the spread of several years' root growth.

Don't wrap your tree to protect it from sunscald. Current research indicates that this does more harm than good.

Trees generally don't need staking unless they are on open, windy, and wet sites. Guy wires can disfigure and girdle trees and prolonged staking can give them a bent shape, says Bassuk. “A tree needs to have some movement for good root establishment and better flare at its base.” —Kathleen Fisher

Editor



# PLANTING THE FUTURE

## Indelible Impressions

By H. Kibbe Turner

*Editor's note: The Children's Discovery Pond, one of the children's gardens installed last summer at the American Horticultural Society's River Farm headquarters, was one of 10 projects recognized in a national environmental challenge contest sponsored by the Amway Corporation and Newsweek magazine. We asked its designer, H. Kibbe Turner of Wildlife Habitats in Gaithersburg, Maryland, to reflect on what makes a successful children's garden.*

To children, the aspects of gardening are limitless, far exceeding what our maturity might allow us to perceive as gardening. To the young—and in some cases the young at heart—a garden is pure experience—as fresh as the seasons that trigger renewal.

A garden is the sensation of wet, the rustle of leaves and grass, the perfume of fruit and flower—or well-rotted manure. It is the feel of dirt—dry and granular, or wet and heavy and cool on arms, legs, and face until it dries and cakes and peels off. The textures of plants, their colors, tastes, shapes, structures, and fragrances, imprint themselves on young minds incidentally but indelibly. As adults, what appeals to us as garden aesthetics is often really a stirring of these earlier basic emotions, and becomes our communion with nature. No wonder that a garden has such power, from youth through old age, to heal and renew us.

The Children's Discovery Pond at River Farm is an outdoor classroom and a wildlife habitat meant to be experienced. In a time when many of our young people have known plants only as seeds growing in a paper cup, it is difficult for them to be in touch with the wonders of our natural world. Lying on your stomach in the cool, wet grass and watching a plant break through the soil is a multisensory experience that creates wonder, runny noses, and lifetime memo-



ries. A viewing station with an ant farm behind hinged doors lets you imagine yourself as a tiny creature scurrying through a tunnel—or powerful enough to move huge boulders on your back. Sitting on a wooden bench, you can touch a smooth, wiggling earthworm or grub, and get to know these small workers in the garden.

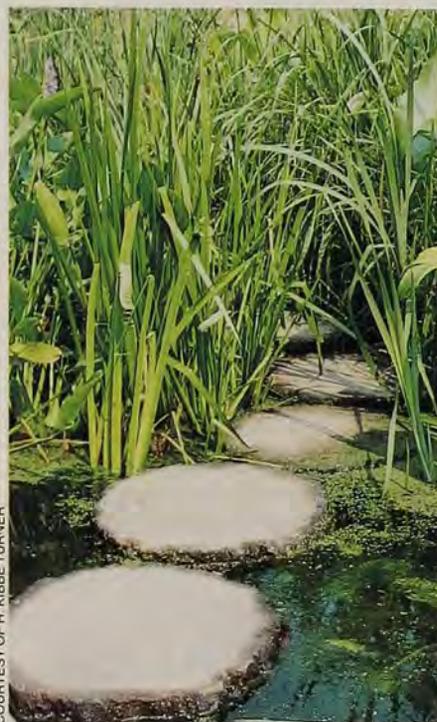
But the Discovery Pond is only one garden. The techniques that can be used to attract children to gardens are both simple and endless. First, gardens should be designed from where they will be viewed—from kneecap level to just a bit higher. Next, they should interact with as many of the senses as possible—even skunk cabbage is a part of our world and an experience to be remembered.

Even more for children than adults, a garden has three dimensions. It is not just a place to look at, but a space to move through. A simple spiral maze of bricks laid end to end will wind children to its center and unwind them out again. A path is a road to follow, a ditch is a whole valley with two sides and a bottom to explore.

Weeping trees and overgrown fountain-shaped shrubs like forsythia beckon children to crawl into a private world where imaginations soar and reveries become vivid. A simple structure overgrown with pole beans or morning-glories is at once a place of magical escape and a stage on which children can act out their vision of the real world.

Nodding sunflowers splash the sky with color and lure birds, squirrels, and chipmunks. Zinnias and purple coneflowers bring butterflies, which one little visitor to River Farm last year called “the flowers with wings.”

Give your children an open space where they can lie on their backs to watch the grotesque outline of a branch or tree against the sky or storm clouds swirling in a kaleidoscope of fantastic shapes, colors, and moods. Let them reflect on the world more literally with a gazing ball that will show them a fisheye view of the sky and trees and their own funny faces.



COURTESY OF H. KIBBE TURNER

*Stepping stones take children into the magical, marshy interior of the Children's Discovery Pond at River Farm.*

Teach them to nurture. Make a pattern garden of herbs or annuals that an older child can form and a younger child can plant. Or have no pattern at all, but a “splotch” of flower seeds thrown by a little hand, to be cared for attentively until they bloom. Or surround them with edible plants to pick and taste, so they learn how the soil nurtures them.

Introducing our youth to the miracles of nature should begin with plants, the sustenance of the animal kingdom. Activities in and around gardens and natural settings help them to understand the interrelationships of soil, air, water, and the interdependence of humans on their surroundings.

All of these elements, and all of these experiences, are represented in the gardens for children at River Farm. These are a few of their favorite things.

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# BOOK REVIEWS

## Seeds of Change: The Living Treasure

Kenny Ausubel. Harper, San Francisco, 1994. 232 pages. 7 $\frac{3}{8}$ " x 9 $\frac{1}{8}$ ". Color photographs and black-and-white drawings. Publisher's price: softcover, \$18. AHS member price: \$16.25.

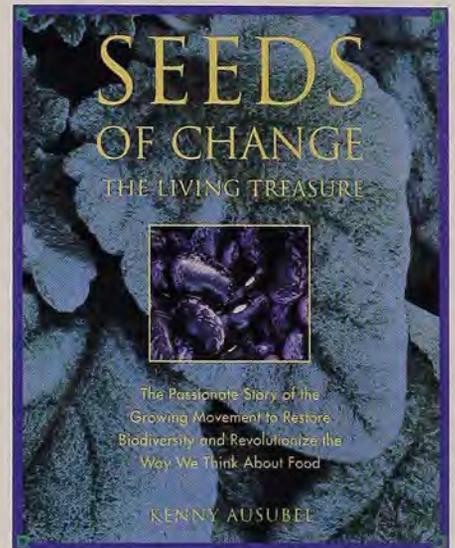
In the course of producing a documentary film in 1985, Kenny Ausubel discovered a cause. He was photographing plants in a New Mexico garden when he learned that genetically diverse varieties planted for thousands of years are endangered by uniform hybrids. In 1989 he founded Seeds of Change, a company that preserves and sells organically grown native seeds—"a botanical ark, a genetic shelterbelt against an eroding future."

This is the third book entitled *Seeds of Change* to appear in the last decade. But Ausubel's approach to his subject is clear from the clause that ends the subtitle: "The Passionate Story of the Growing Movement to Restore Biodiversity and Revolutionize the Way We Think About Food." He tells of people with a mission, and his account is personalized and emotional.

The first of three sections offers vivid sketches of the people involved in *Seeds of Change*. It also discusses biological diversity, genetic erosion, the power of multinational seed companies, the displacement of native varieties by modern hybrids, and the environmental damage caused by pesticides and fertilizers. Ausubel labels the multinational seed industry "a stealthy thief in the dark night of the biodiversity crisis."

In "Nutrition and the New Cuisine," Ausubel insists that nutritional values, not appearance or yield, must be the primary criterion for seed selection. He points out the risks of "technoveggies"—genetically altered foods—and describes four innovative restaurants, giving generous samples of their nutritionally correct recipes.

In the final section Ausubel describes the development of *Seeds of Change*. The firm now includes 80 growers in 27 states and



sells its seeds in 1,000 stores. Each section ends with references and the book concludes with a five-page list of sources of plants, seeds, and information.

Ausubel's original contribution is his story of one of many nongovernmental organizations dedicated to the survival of a diversity of plants. Combining this appealing story with extended discussions of genetic erosion, multinational seed companies, and nutrition diffuses its impact. These vital issues have been debated at length and in depth from a broader perspective by many leaders of the plant genetic resources movement.

Ausubel's breezy style and vivid word pictures convey his story effectively, but in my opinion his viewpoint is not broad enough to analyze biodiversity fully. For example, he discusses amaranth and other crops of the Incas without mentioning Noel Vietmeyer, the author of *Lost Crops of the Incas* and an authority on amaranth. That's like explaining the theory of evolution without referring to Darwin.

But it's Ausubel's enthusiasm that saves the book. He writes, "I love working with a global array of gardeners in direct action on behalf of life and its magnificent diversity." If



you share his passion, you will enjoy *Seeds of Change*. —Isabel Shipley Cunningham

*Isabel Shipley Cunningham is a contributing editor of Diversity, a news journal covering plant genetic resource issues.*

## Complete Garden Guide to the Native Shrubs of California

Glenn Keator. Chronicle Books, San Francisco, 1994. 314 pages. 7" × 10". Black-and-white drawings. Publisher's price: softcover, \$16.95. AHS member price: \$15.25.

Interest in landscaping with regional native plants has blossomed in recent years. It's now a full-blown movement that ranges from incidental use of a few natives to restoration of entire native plant communities. The movement seems to have begun in the tallgrass prairie region of the American Midwest several decades ago, but it now spans the globe.

The ocean, the mountains, and a wide range of latitude have given California a varied climate, and the state has an imposing richness of native shrubs to match. Over 500 of them are included in Glenn Keator's treatise, which covers their ecology, aesthetics, sources, and propagation. It's a virtually complete reference from the gardener/landscaper's perspective.

This book will be an important addition to the library of any California native plant enthusiast, whether currently resident in the "Golden State" or not. Within California, it should be required reading for horticulturists—as should Keator's earlier work, *Complete Garden Guide to the Native Perennials of California*, published in 1990.

In the wild, much of the state's flora is in poor shape and Californians are growing increasingly aware of the need for restoration. Keator's book has a role to play here too, as a reference on the shrub component of plant communities in repair.

I have two minor reservations about the book. The style is somewhat textbookish, and thus may fail to capture the interest of those not already converted to botanical nativism. This problem is worst when Keator is dealing with ecology and propagation; in the accounts of individual species, Keator's enthusiasm for his subjects is more obvious. The abundance of useful information and the elegant drawings should also help overcome Keator's stylistic failings.

My second reservation is that Keator used a botanical nomenclature "familiar to the gardening public and the horticultural trade" rather than that of the most recent revision of *The Jepson Manual*, the state's

authoritative flora. I would have preferred to see the updated binomials, which reflect years of important scientific research and discovery—and which would have increased the book's useful life. The recent name changes could have been summarized by expanding the book's already lengthy cross reference section.

This said, I recommend Keator's new book and look forward to his next one. Grasses, perhaps? —James Trager

*Dr. James Trager is the naturalist at the Missouri Botanical Garden's Shaw Arboretum in Gray Summit, Missouri.*

## The Natural Habitat Garden

Ken Druse with Margaret Roach. Clarkson N. Potter, New York, 1994. 248 pages. 8½" × 11¼". Color photographs. Publisher's price: hardcover, \$40. AHS member price: \$36.

What on earth is Ken Druse doing writing about deserts and prairies, bogs and woodlands? Isn't his garden just a tiny little patch of Brooklyn?

Druse's two previous books—*The Natural Garden* and *The Natural Shade Garden*—were based to some extent on his own experiences gardening on a small city lot. In this book, he and Margaret Roach become reporters, gathering and distilling the experiences of others. Clark Kent and Lois Lane never got an assignment this juicy: traveling from coast to coast and interviewing the most influential people in the New American Garden movement while touring the private and public gardens they have created.

Druse calls the experience a religious one, and compares the growing enchantment with natural gardens to the women's movement of the '70s: there is not one single leader, but many who have taken up the cause because it strikes a moral and emotional chord.

The book is divided into four sections based on divergent habitats: grasslands, drylands, wetlands, and woodlands. Each is introduced with a combination of philosophy, basic ecology, a plant list, and examples and tips for gardeners. Then Druse and Roach, an environmental writer for *Newsday*, take us with them for more extensive visits to exemplary habitat gardens. These may be well-known public institutions, like the National Wildflower Research Center in Austin, Texas; the homes of gardening celebrities like author Sara Stein; or properties described circumspectly as a "private residence." It's rare that you get much practical guidance from a coffee-table book such as this, but Druse and Roach have done a good

job of weaving in advice from their hosts so that we can learn from their successes and failures.

In the back of the book is a "propagation primer"—to help discourage collection of plants from the wild; Integrated Pest Management basics; and state-by-state lists of native plant nurseries and plant societies.

For anyone familiar with Druse's work, it goes without saying that the photographs are stunning: beautifully composed, sensitively lighted, and generously proportioned. That's true generally, although there are some I wouldn't have chosen to use, and a number that seem redundant. Nevertheless, thumbing casually through this book should silence for good those who contend that a natural garden is somehow uncivilized.

My biggest quibble with the book is the captions, italicized in light type and often only one to a two-page spread, so that one struggles with instructions to read them "clockwise from bottom left."

The natural gardening philosophy has been around for quite some time now, and some of its proponents may cavil that Druse is not saying anything new here. They should instead rejoice that their beliefs have been wrapped up in a gorgeous Drusian package, which just might be opened and read by their chemically dependent neighbors. —Kathleen Fisher

*Kathleen Fisher is editor of American Horticulturist.*

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# The Man Who Moves Mountain Laurels

*Richard Jaynes' faith in these evergreen beauties has given him 35 years of challenge and reward.*

B Y S Y D N E Y E D D I S O N

**T**he flowers of mountain laurel are as exquisite as any in nature. The pink-tinged buds, arranged in domed clusters, open into star-shaped cups within which 10 stamens radiate like a sunburst. These intricate filaments end in anther sacs imbedded in the wall of the blossom. Maroon dots decorate the sockets. As the corolla opens the filaments become taut, and at the first incursion of a bumblebee, they release one or more of the spring-loaded anthers. Pollen is thus disbursed, dusted on the bee's abdomen.

The charms of the mountain laurel don't end with its fascinating pollen-discharging mechanism and the beauty of its flowers. It is also tough. Hardy to USDA Zone 4, *Kalmia latifolia* thrives as far south as Florida. It is more drought-tolerant than a rhododendron, which it resembles, but its shiny, elliptical, dark green leaves don't

curl up in winter. It is also imposing, reaching 12 feet or more at maturity.

Richard Jaynes believes that for naturalizing, our mountain laurel is about as ideal as a plant can get. But naturalizing is only one way to use plants. Gardeners want more options, and Jaynes has made it his life work to expand the possibilities of this eastern native shrub.

After 25 years as a plant breeder with the Connecticut Agricultural Experiment Station, Jaynes retired in 1984 to devote himself fulltime to his laurel breeding program and nursery. Not only has Jaynes introduced about half of the approximately 50 mountain laurel cultivars in commercial propagation today, but he is the international registration authority for the genus. This means that the International Horticultural Congress has made it his responsibility to keep records of all named cultivars past, present, and future, and to periodi-

*Opposite: Richard Jaynes does his indoor work in a Broken Arrow Nursery outbuilding where he keeps tools from textbooks to tractors.*



TWO EMS, INC. / PAUL D. SPRAGUE

cally publish a checklist in a recognized botanical journal. “People are supposed to send the necessary information to the registrar, but what usually happens is that I see an unfamiliar name in a nursery catalog and have to chase it down,” he says. Jaynes hasn’t been content to merely publish articles, but has woven this cultivar checklist into a book describing all members of the genus and its history in cultivation.

When Jaynes was 11 years old, his parents bought eight acres of land in Hamden, Connecticut—land that would become part of the business Jaynes now calls Broken Arrow Nursery. His mother was “very much a gardener” of both vegetables and flowers. His father, an entomologist, renovated the small apple orchard he found in Hamden. “So we were, in a small way, in the apple business. We harvested 200 or 300 bushels of mostly McIntoshes each fall and sold them roadside,” says Jaynes.

Active in the 4-H Club, Jaynes grew vegetables to show at the local county fair, and was so successful one year that he won a prize of 250 fledgling Christmas trees. “I can remember my mother, my aunt, my dad, and myself grubbing out sod around the edges of the apple orchard to plant those trees,” he recalls with a smile. “I also remember big groans going up a year later when the 4-H County Agent decided we had done so well with the Christmas trees that I won another 250 trees.”

Jaynes never consciously thought of himself as following in his scientist father’s footsteps, but the twig was quickly bent. Looking back, it probably should have been clear that he was going to be a scientist, but as a student at Wesleyan University in Middletown, Connecticut, he felt confusion about his future.

Through the auspices of his father, he was able to spend two summers working

for the U.S. Forest Service, helping entomologists in Minnesota collect samples and count egg masses of the spruce bud worm, a serious pest in northern conifer forests. His boss noticed that young Jaynes, who would finally settle on a biology major, was far more interested in the plants than in the insects.

A subsequent and even more fateful summer job took him to the genetics department at the Connecticut Agricultural Experiment Station, where he helped with the breeding work of Donald F. Jones, a pioneer in the hybridization of corn and the American chestnut tree. Jones took a shine to his young assistant and made him an irresistible offer.

“He said, ‘If you go to Yale for your graduate work, we will give you a fellowship here to do research on anything you want.’” With that inducement, Jaynes abandoned the idea of leaving his home



state to further his scientific education and entered Yale. "I was split three ways as a graduate student," he recalls, earning a degree in genetics while his thesis advisor was in the School of Forestry and his other advisers were at the experiment station.

It was the experiment station that hired him full-time after graduation, and he began casting about for a field of specialization. Jones urged him to work with hollies, and he developed a small collection. Another mentor suggested that there were advances to be made in the rhododendron genus. "But too much had already been done," Jaynes felt. "So many of the nice plants in gardens were already complex hybrids that it wasn't a good place for a beginning scientist."

Then Jaynes remembered that a fellow graduate student had done an ecological study on mountain laurel. "That more than anything else turned my head to thinking, 'What about *Kalmia*?' It's the state flower. The nursery industry was the most rapidly growing segment of agriculture in Connecticut. Interest in ornamentals was increasing by leaps and bounds. *Kalmia* is a small genus—only seven species. And the literature didn't indicate that anybody had ever made a controlled cross of *Kalmia*."

Jaynes had found his vocation. Now in his 50s, lean, and deliberate as befits a scientist, he recalls his first efforts. "I started collecting the species, and whatever variants we could find mentioned in the literature, from gardens, arboreta, and botanic gardens, and began making interspecific crosses. The initial thrust was to take all the genetic variation that was available among the species and use it to develop new horticultural plants."

The possibilities were intriguing. The individual flowers of the different species are similar in shape, but they vary dramatically in size, color, number, and position on the stem. The flowers of mountain laurel are usually light pink, relatively large at about an inch in diameter, and borne in terminal clusters. Sheep laurel (*K. angustifolia* var. *angustifolia*), on the other hand, has diminutive blossoms—less than half an inch across, and emerging from the leaf axils of the previous year's leaves. The corolla is deep purplish to bright pink.

The species also vary considerably in stature. Western laurel (*K. microphylla*) would be at home in a rock garden, seldom exceeding six inches tall in its native Rocky Mountains. *K. microphylla* var. *micro-*

*phylla*, from Oregon's Cascade Mountains, forms a ground-hugging mat of minute leaves barely two inches off the ground.

The notion of mixing and matching such diverse traits appealed to Jaynes. In *The Laurel Book II*, his 1988 update of his original 1975 volume on the genus, he muses: "It would be wonderful if a mountain laurel hybrid could be developed possessing the general mountain laurel traits plus the solid, deep wine-colored flowers of sheep laurel and the easy rooting characteristics of eastern bog laurel." But pollinations between species usually failed, or were sterile and useless for further refinement, or at best were unappealing. He was

Most striking of all the variants is the banded mountain laurel, *K. latifolia* var. *fuscata*, with its bold circle of burgundy or cinnamon brown inside the corolla. Thanks to Jaynes, many permutations of this pattern have appeared in gardens in the last decade. Some variations have been found in the wild. 'Goodrich', with a band so broad its cup is almost filled with wine, was selected from a Connecticut population. But most banded introductions are the result of controlled crosses. There is the 1982 introduction 'Carousel', which sports a cartwheel of bright burgundy against its white corolla. The 1987 'Pinwheel' has flowers that resemble sweet



OPPOSITE: COURTESY OF RICHARD JAYNES; RIGHT: ROB SIMPSON

disappointed but not surprised, since genetic barriers are common between species.

But Jaynes found a lode of genetic diversity in mountain laurel rich enough to keep him busy for a quarter century. Besides differences normally found in wild populations, the species boasts five distinct genetic variations.

Because of its narrow, straplike leaves, *K. latifolia* var. *angustata* is commonly called the willow-leaved mountain laurel. Dwarf mountain laurel, *K. latifolia* var. *myrtifolia*, is less than three feet tall with proportionately dainty foliage and flower clusters. *K. latifolia* var. *obtusata*, a compact form found near Pomfret, Connecticut, in 1903, is distinguished by its oval leaves. The flowers of *K. latifolia* var. *polypetala* resemble orange blossoms, with starry corollas cut into five narrow pointed segments, while *K. latifolia* var. *apetala* lacks petals entirely.

*A favorite with Jaynes for its deep pink coloring is 'Sarah', opposite, named after his wife. The stamens of a mountain laurel flower, above, form a taut spring that loads pollen onto visiting bumblebees.*



JESSIE M. HARRIS



COURTESY OF RICHARD JAYNES

The flower of sheep laurel, top, is smaller and more purple than mountain laurel, but its foliage is unattractive in winter. The pollen parent of 'Sarah' was 'Pink Charm', above, which Jaynes selected in 1974. He was the first breeder to consistently record the "papa" of his introductions. The broad band of color inside 'Pinwheel', opposite, is typical of Jaynes' *Kalmia latifolia* var. *fuscata* selections and hybrids.

Williams. In 'Freckles', commercially introduced in 1983, the band is broken into ten pronounced cinnamon purple spots just above the anther pockets, enlivening the inside of a pale pink corolla.

Even before Jaynes took up their cause, banded and red-budded mountain laurels were prized by a few discerning nurserymen. In the 1940s John Eichelser of Melrose Nursery in Olympia, Washington, was one of the first people to commercially propagate mountain laurels from cuttings. One of the selections he worked with, which came from the garden of a Mr. Ostbo, was the first red-budded form to receive a cultivar name, 'Ostbo Red'. Jaynes believes Ostbo got the first of these plants from C. O. Dexter, a rhododendron hybridizer in Sandwich, Massachusetts. Dexter started with good pink laurels collected in the wild, grew several generations of seedlings, and selected those with the deepest flower color. But neither he nor Eichelser were known to have made crosses.

Edmund V. Mezitt of Weston Nurseries in Hopkinton, Massachusetts, was another pioneer, although he probably made few if any controlled crosses. In the 1960s "Weston already had many beautiful selections comparable to some of the named selections we have today," Jaynes says. Mezitt's excellent pink, banded, and red-budded laurels probably resulted from planting his choicest selections close together where they were cross-pollinated by bees. "He grew half an acre of seedlings, but he didn't know who their papa was," says Jaynes. "Knowing both parents gives you much more influence over the result."

So it remained for Jaynes to establish the first systematic breeding program for mountain laurels. He knew from experience that woody plants mean a long-term commitment—growing mountain laurels from seed to flower takes five to seven years. But the patient gardener, he says, learns to enjoy the excitement and discovery that the waiting itself brings. "Every day and every season the plants change, and watching them grow, develop, and mature is its own reward."

Breeding one stunning new mountain laurel is only the beginning. The next step is producing thousands to be enjoyed by gardeners, and in Jaynes' words, "mountain laurel is most intransigent." The plant has been notorious for being difficult to propagate ever since British naturalist Mark Catesby brought seeds and plants home from the Carolinas in the 18th cen-

tury and had no success with either.

Vegetative propagation is slow at best. A mother plant can provide only 10 to 20 shoots in a given year. The following year, the plant may have recovered sufficiently to furnish yet another 10 or so. At this rate, building up a supply large enough to sell clearly takes many years.

In 1975, two landmark events changed all this. W. C. Anderson published a paper on propagating the closely related rhododendron by tissue culture, and Briggs Nursery opened a facility for commercial tissue culture in Olympia, Washington.

Using tissue culture, or micropropagation, it is possible to take a minute portion of a single dormant bud, grow it in a sterile medium under controlled conditions, and wind up eight weeks later with a copse of 30 green shoots, ready to be rooted in a potting mix. In the spring of 1981, Jaynes mailed four promising mountain laurel selections to a tissue culture laboratory. By fall, the selections had been isolated in culture and shoots were emerging. Within two years, thousands of small clones of these new introductions were ready for distribution to nurseries.

Once quantity was no longer a problem in *Kalmia* breeding, Jaynes could concentrate on quality. He is especially pleased with the increasingly rich pinks, and he considers 'Sarah', named for his wife, one of his finest. The buds are vivid red and the open flowers a deep red pink. Stems and new foliage are reddish bronze.

He also likes 'Little Linda', named for his daughter. "This is one I have a great deal of hope for," he says. "At this stage, I think it is a neat little plant. There are also some new ones that are a little different in flower. They don't have the universal appeal of the spectacular red buds, but they're interesting." In 1972 Marjorie and Hollis Rogers sent him photographs of a plant they had spotted near Danbury, North Carolina. Introduced by Briggs a decade later, 'Shooting Star' has five distinct reflexed lobes. Now a banded version with the same flower form has caught Jaynes' fancy. "You would hardly recognize it as a mountain laurel," he exclaims.

Another goal is to transfer the vivid pink colors, red buds, and banded patterns onto small, compact plants that he describes as semidwarfs. They tend to grow rapidly when young, then slow down when they begin to flower, remaining about a third smaller than normal mountain laurels but with dense foliage.



COURTESY OF RICHARD JAYNES

Both time and nature have precluded Jaynes' working with other *Kalmia* species. "Sheep laurel has a nice flower," he observes, "but the foliage droops in the fall and looks bedraggled all winter." He collected seeds from widely dispersed geographical areas with the idea of crossing it with mountain laurel to give it a broader, flatter leaf but never succeeded.

The western laurel and bog laurel (*K. polifolia*) have some potential for western gardens, he says, but the bog laurel tends to be leggy and neither are "good doers" in the East.

An intriguing possibility is a cross between mountain laurel and sandhill laurel (*K. hirsuta*), which grows to about two feet high with leaves less than half an inch long and flowers—usually solitary—borne in the leaf axils. Native to a limited area of the Southeast—from southern Alabama and northern Florida through Georgia to

the southeastern tip of South Carolina—it could be used to increase *Kalmia* heat tolerance. Tom Dodds, a nurseryman in Semmes, Alabama, is growing open-pollinated crosses of the two plants, but so far hasn't responded to Jaynes' urging to select and propagate selections.

Today Jaynes seems to have the best of both worlds, officially retired but working at what he loves best at Broken Arrow, which lies on a knoll ringed with wooded hills. The house he and Sarah built in the '60s takes advantage of a superb view. On the south, the land slopes to a valley of birches and oaks. In the distance the Sleeping Giant, a low bulky mountain ridge, presents its northern face. In winter, conifers marching across a slope to the south hold snow like a row of Christmas trees.

And in fact, that's what they are. The 500 trees young Jaynes won from the 4-H Club have expanded to 20 acres of white

pinus, balsam, fraser and Douglas firs, and white and blue spruce. "We have 'choose and cut' Christmas trees, and my own kids have been involved on a part time basis."

Jaynes is openly proud of his offspring, all three of whom have followed him into scientific careers: both sons have doctorates in chemistry, and his daughter has a master's degree in psychology. He is more reluctant to talk about his own achievements, but he admits to being delighted with the number of new mountain laurel selections in the trade.

"*Kalmia* is becoming available in garden centers. Instead of a handful of nurseries producing a few plants, you're seeing acres and acres of container-grown mountain laurel. It gives me satisfaction to know that I was involved with that."

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*Sydney Eddison is author of A Patchwork Garden and A Passion for Daylilies.*



# Hydrangeas— *So Passé, So Today*

*Crude? Quaint? Refined? Trendy?*  
*All of the above.*

B Y K A T H L E E N C U L L E N

**S**ome hydrangeas are nostalgic plants. Like lilacs, they beckon us back—the mopheads perhaps to a seaside cottage where we spent a lazy summer, the peegees to Grandma’s Victorian farmhouse.

But while we choose some plants for these sentimental reasons, we also tire easily of the same old thing. Now and then we like to be the first kid on the block with something different. Horticulture is as prone to trends as any other realm of ornamentation, and now that those in the know are moving to natives, hydrangeas can fill the bill here as well, with their oakleaf forms and hills-of-snow.

It’s been held that the Greek genus name refers to the shape of the seed capsule of the first species discovered—the shape of a water vessel. But I rather like to think of Colette’s more creative observation that hortensias (aka mopheads, snowballs, florist or French hydrangeas) are hydrocephalic plants—plants that have water on the brain. This is certainly apropos, since these hydrangeas have an insatiable thirst.

When it comes to species names, there is a great deal of taxonomic confusion, as you’ll quickly see by all the cross-references in *Hortus Third*. Compared to Elizabeth McClintock, who wrote that entry for the huge botanical guide, most other experts tend to be splitters, listing more species than actually exist. The only sure distinction is made by a close examination of the inflorescence, McClintock maintains. “They must look at the small flowers under a dissecting microscope! But they don’t want to do that, you see.”

The amateurs add to the confusion with a maze of common names. If a gardener asks a nursery for a “snowball bush,” does she want a viburnum or a hydrangea? A blue snowball is probably *Hydrangea macrophylla*. But a white snowball could be *H. arborescens*, *H. paniculata*, or *Viburnum opulus*. And for a little mental exercise, ponder this conundrum: Not all lacecaps are macrophyllas as not all macrophyllas are lacecaps.

*Hydrangea macrophylla* has two major subcategories: the hortensias—or whatever other common name you prefer—and the lacecaps. *H. paniculata* goes by the common names of tree hydrangea or peegee hydrangea, a clipped version of *H. paniculata* ‘Grandiflora’. *H. petiolaris* is more correctly *H. anomala* subsp. *petiolaris*, and more simply the climbing hydrangea. The two natives are *H. quercifolia*, the oakleaf hydrangea, and *H. arborescens*, called hills-of-snow hydrangea after a well-known cultivar.



*‘Annabelle’, above, is an improved variety of the old-fashioned hills-of-snow hydrangea. Hortensias, opposite—also called mopheads, snowballs, and French hydrangeas—spell nostalgia to some gardeners, vulgarity to others.*

LEFT: MICHAEL S. THOMPSON; OPPOSITE: ANN REILLY; PHOTONATS



PAMELA HARPER

Since the natives are currently chic—and they have waited long enough to come into the limelight—they’ll get first billing here.

*H. arborescens*, discovered in the United States in the early 1700s, ranges from Iowa to New York and as far south as Louisiana and Florida. With a range like that, you might guess that it would be tough, and it is—hardy in USDA Zones 3 through 9.

The species, however, isn’t much to look at. It’s a floppy little thing with dull white fertile flowers (alliteration helps one remember that fertile hydrangea flowers are fuzzy and sterile ones are showy) and not used much as an ornamental.

But the cultivar ‘Grandiflora’, or ‘Hills-of-Snow’, is one of those nostalgic shrubs, popular since its discovery in the wild in the late 19th century. It has mostly sterile white flowers that weigh the branches down, creating an effect like—you guessed it—hills of snow. An improved variety, ‘Annabelle’, found in Anna, Illinois, by J. C. McDaniel, has even showier flowers on stems said to be stronger.

*H. quercifolia* has been receiving much attention from the horticultural paparazzi of late. One of its great features is its exfoliating bark. But to me its primary asset comes in the fall when its oaklike leaves turn a deep mahogany that reminds me, for some quirky reason, of men’s cordovan wing-tipped shoes. The flowers usually also turn russet, although on a couple of occasions I’ve seen them go from white to a dingy, dead, straw color. Perhaps they

had a stressful growing season, although the plant is said to do just as well in dry shade as in its native moist woodlands.

Oakleaf hydrangeas were discovered in 1792 by English explorer William Bartram, growing along the banks of rivers and creeks. He sent seeds to Peter Collinson in London, where the plant didn’t bloom for a decade, then became a smash hit.

Two hundred years later there are easily 20 cultivars for gardeners to choose from, although two are getting most of the press today. ‘Snowflake’ was introduced in the 1970s as an improvement on ‘Harmony’, since its large flower heads don’t weigh the branches down as much. Its hose-in-hose flowers give it a slightly fringed appearance. ‘Snow Queen’ from Princeton Nurseries, introduced by Wayside Gardens in 1981, is even sturdier and more compact.

The oakleaf’s divided foliage gives it a coarse texture that can be hard for a designer to deal with. I find it too clumsy-looking for a refined garden setting. But it is truly magnificent in a woodland, perhaps because nature intended it to be there. In the right place, plants have merit regardless of trends and fashions.

It’s often said that most plants now grown in American gardens come from Asia. The Ice Ages are blamed for ripping asunder many closely related plants, and perhaps these landscape stalwarts shouldn’t be considered exotic foreigners so much as misplaced cousins. Three of our long-popular hydrangeas—the hortensia,



MICHAEL S. THOMPSON

the peegee, and the climbing hydrangea—are native to Japan and China.

The hortensias are “in your face” plants that strut their stuff with abandon, and they can evoke the same response as people who lack inhibitions. In *Home Ground: A Gardener’s Miscellany*, Allen Lacy calls them artificial looking—“a major mistake on the part of the evolutionary process.”

One of my favorite writers, Christopher Lloyd, finds them both to bless and to blame, noting that “they are regarded, in refined circles, as crude, blatant, obvious, coarse, vulgar. . . . I do not like all these hortensias at all times and in all places, but they have a tremendous luxuriance and vitality that one cannot help admiring.”

If we observe hortensias closely through the growing season it’s easy to see why the English sometimes call them “changeables.” The flowers emerge a chartreuse in early to mid-July and then magically color up in intense shades of blue, purple, and pink, depending on the pH of the soil. And unlike many plants that offer such intense colors, they are quite willing to perform in some degree of shade.

Size is also in this hydrangea’s favor. It grows to only about five feet and can be kept much smaller with proper pruning. It



KATHLEEN CULLEN

The fall foliage of the oakleaf hydrangea, left, may be its most striking feature. Opposite is a popular oakleaf cultivar, 'Snowflake'. Lacecaps, above, are a less-often used relative of the hortensias.

forms a neat, compact, dense mound that never gets leggy or messy the way many other deciduous shrubs do.

All hydrangeas make wonderful dried flowers, but the mopheads give us the greatest range of colors for that use. If we bring them in as cut flowers and forget to add water to their vase as weeks go by, they just quietly dry their petals and keep their form for years. This is especially true toward the end of summer when a natural drying process occurs in the plant. If left on the plant the blooms will begin to change colors as the various pigments in the petals recede. Last to go is the chlorophyll, which mixes with the other passing pigments to form mottled hues.

In "Blue Hydrangeas" poet Rainer Maria Rilke memorialized these chameleons ". . . as old blue letter-paper which the years have touched with yellow, violet and gray; . . . But suddenly the blue seems to review itself in one last cluster—and see how the pathetic blue rejoices in the green."

If you find the mopheads, however celebrated, just too predictable, there is a wide range of *H. macrophylla* cultivars.

The lacecaps are becoming a bit more popular, but deserve even wider promo-

tion. 'Blue Wave' has proven quite hardy, and the delicate tracery of its pink-lavender-blue flower heads gives it a subtle, refined appearance that will tone down the ostentatious hortensias. It prefers partial shade; an east wall or the edge of a woodland is perfect.

Also ideal for a woodland is the variegated lacecap called 'Mariesii Variegata' or sometimes just 'Variegata'. Since it is grown primarily for its foliage, I usually don't worry about it getting enough sun to flower heavily. The leaves fairly glow in the dark, and planted in masses, the plant can draw a viewer toward a focal point or feature in the woods.

A variegated form that I just ordered from Heronswood Nursery is 'Quadricolor', described as having foliage in distinct shades of pale green, cream, deep green, and yellow, with white flowers. It sounds like a knock-out.

'Ayesha' is often called the "lilac hydrangea" because the emerging flower petals have a form similar to the florets of *Syringa*. The flower heads are more elongated than most mopheads, approaching the cone shape of the peegee and oakleaf. It's purported to be borderline hardy here on Long Island, although Alan Rosen,

## CARING FOR HYDRANGEAS

**H**ydrangeas are one of the easiest shrubs to grow. They are not prone to severe insect or disease problems, and as long as they receive sufficient water they require minimal care.

The most-often asked questions about growing them refer to pruning and failure to flower. Since many of the hydrangeas bloom on old wood, a late pruning will often cut off the flower buds for the following season. *Hydrangea arborescens* and *H. paniculata* flower on new wood and so can be pruned in spring. Some writers say that cutting *H. arborescens* to the ground in fall will reduce the chance of winter kill. I've never understood this, especially since I find it to be one of the hardiest hydrangeas around, and recommend cutting it back for aesthetic reasons only; shorter stems make it less floppy.

The best way to prune any of the hydrangeas is to get down into the base of the plant and cut out the old, thick, woody stems at their base, rather than shearing at the top. Top shearing not only can remove developing flowers but also can leave the plant with an artificial ball shape.

The hydrangeas that fail to bloom tend to be gift hydrangeas grown in hot houses for sale by florists. These are often too tender to acclimate to cold winters, and any flower buds that form are eventually killed by frost. It may be possible to grow them in a container that can be moved to a protected spot in winter.

And then of course, there is the matter of the "changeables." The hortensias are extremely sensitive to aluminum, the uptake of which is regulated by the soil pH.



JERRY PAVIA

*Near-neutral soil will produce this hubbub of colors on hortensias.*

as iron and result in sickly yellow leaves. This pH adjustment can be done at any time, but is best in fall or early spring. It can take a year or more to see any significant color change.

—Kathleen Cullen

If you want flowers in the pink ranges, you need to add lime to your soil. Adding aluminum sulfate will intensify the blues.

Before you add either, check your soil pH. For healthy hydrangeas, the ideal is between 5.5 and 6.5, and for striking color you will have to go outside these limits. But extremes, especially toward the alkaline end, need to be avoided. A pH that is too high can interfere with the assimilation of vital nutrients such

owner of Plants Preferred nursery, has successfully grown it here for several years. Like most of the "changeables," it has flowers that vary from pink to blue depending on soil pH.

If you're looking for a small hydrangea, the dwarf 'Pia' is the one to select. This hortensia displays reddish pink flowers on a demure three-foot frame. Caution is needed in placing it, however, since the flower buds can be killed in severe winters.

Another compact plant is the unique and tough 'Lanarth White'. The blooms are lacecap in form, with the fertile flowers blue and the sterile ones white. The leaves are narrow, pointed, and pale mat green.

Like the hortensias, *Hydrangea paniculata* is sometimes dismissed as crude—and for the same reasons considered

quaint. It can be trained to a single trunk for a spot where even a small tree might be too big. If the common 'Grandiflora' is too big at 10 to 15 feet, there is a more diminutive variety called 'Tardiva' that might suit your taste and purpose.

All varieties arch over gracefully as they mature to develop an almost-weeping form. With a little patience—a trait that seems to be in short supply among many of today's gardeners—planting a pair about eight to 10 feet apart will eventually form a grand double umbrella, perfect as an entrance to a special garden. I find that growing the peegee as a tree displays it to its best advantage, although the venerable Gertrude Jekyll liked to cut it back every year and grow it bushy.

The cone-shaped flowers develop into a rich, creamy white late in the summer and

fade to a delicate, mottled rose. I often suspect that those same people who bad-mouth this plant in the garden are the ones willing to pay a florist up to three dollars per stem for the dried blooms.

Also from Asia but held in much higher repute—praised by authors from Russell Page and Margery Fish to Michael Dirr and Donald Wyman—is the climbing hydrangea, *H. anomala* subsp. *petiolaris*. The famous English garden designer William Robinson described one couple growing it up the sides of a sunny lattice near French windows. "... so charmed were the owners with the tender foliage, feathering the coign of the window, that they made more lattice-work in front of the window so that the creeper could extend and form a natural sunshade before the glass." This plant is unique not only because it climbs, but also because of the way it climbs. Clinging by rootlike tendrils that emerge from its internodes, its opposite branches spring out in many different directions, rather than just laterally on one plane, thus giving the vine a very bushy appearance.

This splaying tendency is a factor that should be considered before planting it in cramped quarters. It will not grow flat like Virginia creeper or ivy. And like the peegee "umbrellas," it may require a bit of patience, seeming to take forever to show some growth. But once it does, watch out! If you have a large wall on the north side that you'd like to see covered in green and white, plant it in a hurry and anticipate at leisure. After four or five years it will begin to cover territory and put on a show of large, creamy fertile flowers ringed by overlapping, four-petaled sterile flowers.

There are those who have experimented successfully with growing this climbing hydrangea into a frustrated shrub. To this I can only respond: "But why?"

If you're an adventurous gardener, you don't need to stop here. The hardness of some other hydrangea species is open to debate, but the English admire them enough to overwinter them in a protected area, and there's no reason for American gardeners to be more timid.

If the hortensias are sanguine, overfed, buxom ladies taking lunch in the garden, *H. aspera* subsp. *sargentiana* is a lean, bearded contemplative preferring to be off alone in the woods. Usually listed incorrectly—according to McClintock—as *H. sargentiana*, it was found in China by E. H. Wilson and introduced in 1908. When you see the foliage and flower buds for the first



JOSEPH G. STRAUCH JR.

time, you would never guess you were looking at a hydrangea. The elongated leaves are covered with a raspy pubescence and their undersides are a striking silver. The atypical buds open to beautiful lacecaps in mid-July.

Like the oakleaf hydrangea, it is uncomfortable in the social situation of the garden, but in a protected woodland its strong but gentle texture is truly inspiring.

Hydrangeas are a lot of things, but rarely indifferent, today seemingly going in and out of fashion simultaneously. But between the showy and the subtle, the formal and the casual, the rampant and demure, it is difficult to lend any credibility to anyone who boasts of hating hydrangeas.

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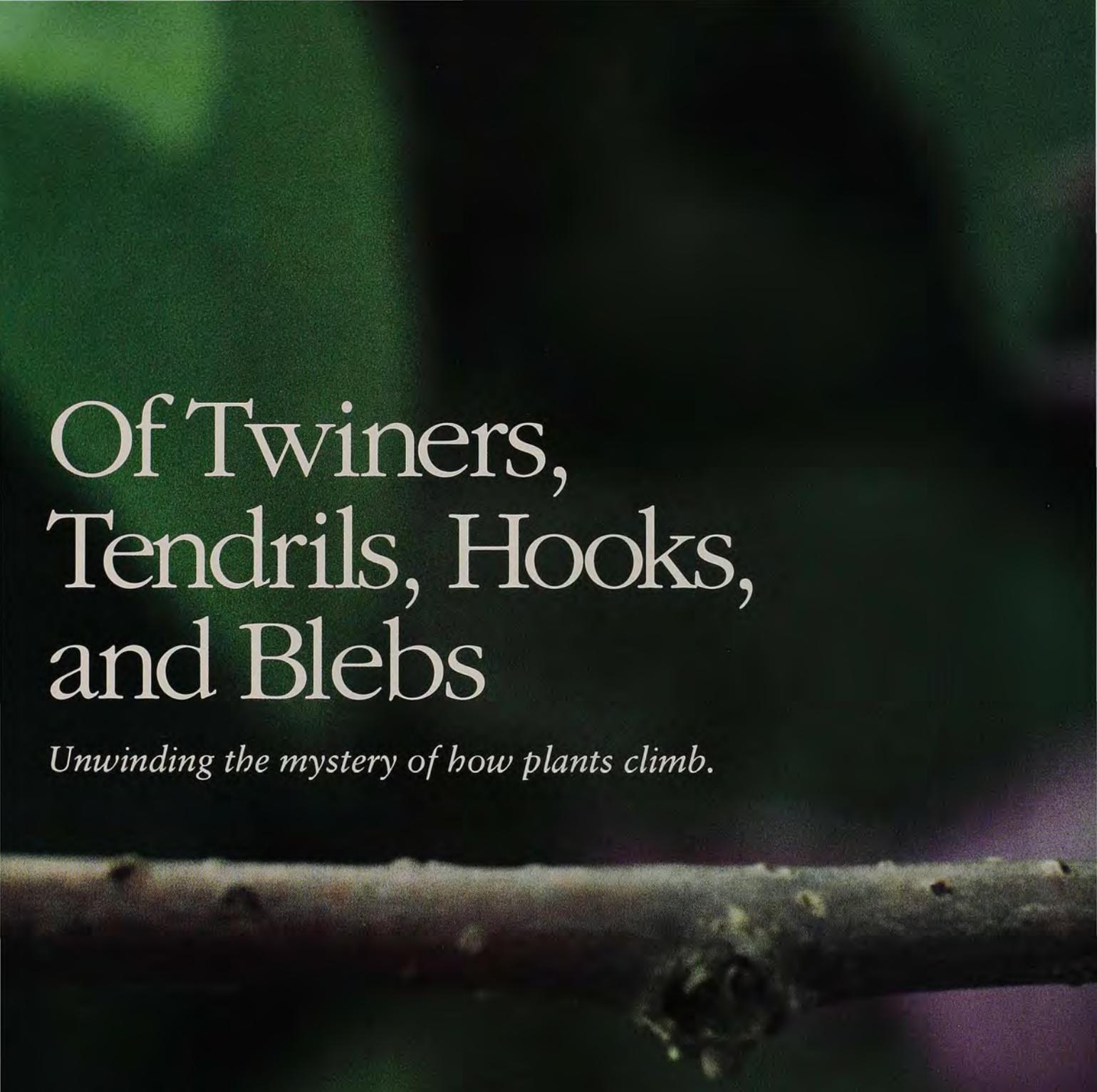
The peegee hydrangea, left, arches over gracefully and can be trained as a weeping tree. Unlike other Asian members of the genus, the climbing hydrangea, below, is almost universally praised. *Hydrangea aspera* subsp. *sargentiana*, bottom, has atypically long, fuzzy leaves with silver undersides.



GALEN GATES



KATHLEEN CULLEN



# Of Twiners, Tendrils, Hooks, and Blebs

*Unwinding the mystery of how plants climb.*

B Y R O B E R T G E N E V E

**T**he *Power of Movement in Plants*—that's the title of a wonderful book published by Charles Darwin in 1880. Today it's probably little read, and few people realize that the framer of the theory of evolution was also an influential plant scientist. Darwin's evolutionary theories were based on an understanding of how

species adapt to their environments, and he spent many years probing this question in plants. Darwin was interested in what he called plant "locomotion." He published studies on movement in carnivorous plants, as well as on the bending of stems towards light, known as phototropism. And in "The Movements and Habits of Climbing Plants," published in

1867, he described the adaptations that allow vines to climb.

Some of the best plant physiologists of Darwin's day were likewise fascinated with vines. The study of climbing plants is no longer a research priority, but in the late 1800s it was the arena for a number of simple, elegant experiments that greatly advanced our understanding of plant responses to light and gravity, plant hormones, and plant-water relations.

Not only were the adaptations of

ROBERT GENEVE



*Clematis vines are leaf climbers. Along the leafstalk is an irritable section that "feels" a potential support.*

vines in perfect concert with the new theory of evolution, but their movements could be detected by the limited—yet imaginative—experimental tools of the time. It's a measure of these early insights that our understanding of climbing plants has not changed fundamentally since 1910. The accomplishments of these pioneers are worth revisiting for what they can teach us about a remarkable class of plants—and about the history of science itself.

A scientific interest in climbing plants had emerged at least as early as the descriptive anatomical works of Marcello Malpighi, a 17th-century Italian physician. But the first significant work on the subject was published in 1827 by Hugo von Mohl, a German botany professor. That the topic should have taken so long to attract serious attention is surprising, given the prominence of the grape—usually just called “the vine”—throughout botanical history and European culture in general. But earlier authors simply referred to vines as climbing and mentioned the “claspers” they used to do it. Mohl seems to have been the first to look further: he noticed that physical contact was an important factor in the “irritability” of tendrils.

Such was the state of the field when Darwin turned his attention to it. His careful descriptions defined four classes of climbing plants, and these definitions are still useful today. Twining plants make up the first class. These have no specialized adaptations for climbing: they simply coil their stems around a support. Most climbing plants are twiners. The group includes climbing beans, honeysuckles, hops, morning-glories, wisteria, and many others.

Tendrill climbers make up the second class. These vines have specialized organs—tendrils—that clasp in response to touch. Familiar tendril climbers include grapes, cucurbits (cucumbers, melons, and gourds), edible peas, and sweetpeas.

Plants in Darwin's third class scramble up supports by means of hooks. Brambles of the genus *Rubus* climb this way. Mechanisms as obvious as hooks aren't very rewarding to study, so this class never attracted much attention.

The fourth class consists of species that use adventitious roots to attach themselves to a support. Here we find a small but familiar group of plants, including English ivy (*Hedera* spp.), wintercreeper (*Euonymus fortunei*), and poison ivy (*Rhus toxicodendron*). Early researchers weren't greatly interested in this group either, with



PHOTOS BY ROBERT GENEVE



one exception. The vanilla orchid (*Vanilla planifolia*) sparked curiosity because its aerial roots behaved like tendrils: they made a clasping movement in response to touch.

You might not think that Darwin's first class, the twining plants, would yield much in the way of interesting data. But the revolving movement of the shoot tip—a characteristic of twiners—fascinated Darwin and his contemporaries. Darwin invested considerable energy in describing this movement, known as circumnutation. So did Julius von Sachs. A gifted teacher, Sachs was a professor of botany at the German University of Würzburg. He is

often considered the “father of botany.” His lecture notes, which he published in 1887, are still worthwhile reading for every student of plant science. Sachs's lecture 38, entitled in translation “The Revolving of Tendrils and Twining Plants,” shows his flair for teaching. Here's the analogy he uses to explain circumnutation: “The free sweeping apex of the twining plant behaves much as a man whose arm is extended horizontally and groping towards all points of the compass in order to fasten to a support.”

Sachs described the process of twining in remarkable detail. He noted that shoots arising from seed or dormant rootstock don't twine initially: they grow fairly straight. Circumnutation doesn't usually begin until the shoot has developed several internodes—the intervals between the leaf buds. Generally, only the youngest two or three internodes move and they usually move at different rates. The overall result, if you follow the path of the shoot tip, is an S-shaped or elliptical pattern. A complete revolution usually takes one or two hours. Sachs noticed that the direction of twining could be either clockwise or counter-clockwise. Any particular species will usually twine in only one direction. Most twine counter-clockwise.

Other researchers supplied additional details. Hugo de Vries was a student of Sachs's who went on to teach plant physiology at the University of Amsterdam. In 1873, he drew ink lines along the stem of a honeysuckle to show that the stem below the shoot may twist during circumnuta-



The tendrils of Virginia creeper, left, have small projections on their tips that enlarge into adhesive disks. The vines of a honeysuckle, opposite, show the turns its stem made in twining to grab a support. Unattached tendrils of gourds, below, can hang like surreal springs up to a foot long.



tion. It had been noted earlier that twining plants cannot twine around a horizontal support. This led to speculation that gravity was involved in circumnutation. In 1906, Wilhelm Pfeffer observed that a potted vine twining around a vertical support will uncoil its uppermost internodes when placed on its side. A professor of botany at the University of Leipzig, Pfeffer too had studied under Sachs.

In a particularly ingenious set of experiments, de Vries disproved the common assumption that twining plants were somehow reacting to physical contact with a support—that they “felt” a support and reacted by coiling around it. De Vries tied a fine thread to the shoot tip of a kidney bean. He ran the thread through a pulley and counterweighted the bean shoot with just two or three grams. That was enough to pull the shoot’s tip upward for two or three internodes. After a few days, the stem coiled up in spirals—just as if it were climbing an invisible support.

Tendrils, Darwin’s second class, are perhaps the most celebrated vines largely because tendrils do “feel” and react to contact. Darwin defined tendrils as “filamentary organs, sensitive to contact and used exclusively for climbing.” He recognized that these “irritable” organs could be modifications of leaves, branches, or flower stalks.

The leaf climbers are an especially diverse group. In some cases, very little outward adaptation of the leaf is apparent. Yet when a leafstalk of such a vine touches a

support, it twines around it. You can see this readily in the climbing nasturtiums (*Tropaeolum* spp.). Darwin noted that only six minutes of contact is necessary to get nasturtium leafstalks to curve, but that the leafstalks will straighten again if contact is not maintained.

Another group of leaf climbers produces compound leaves. In these species, the irritable portion of the leaf is sometimes along the leafstalk, as in clematis vines. In others, the terminal leaflets may be modified into threadlike tendrils for clasping supports. You can see this approach in peas (*Pisum* spp.).

Perhaps the most unusual leaf climbers are the gloriosa lilies (*Gloriosa* spp.) and the tropical pitcher plants (*Nepenthes* spp.) In *Gloriosa*, the midvein of the leaf extends beyond the leaf tip to produce a coiled hook used for clasping a support. In a similar but more spectacular way, the pitcher plant leaf has a terminal midrib that grows into a long filamentous tendril. As it grows, this tendril may coil around a support. At its tip it develops the famous “pitcher,” which traps and digests insects. Sachs and some of his contemporaries believed that the pitcher only developed on tendrils that had found a support to coil around. But I have seen many *Nepenthes* in conservatory hanging baskets in which every tendril had produced a pitcher without any coiling.

Grapes (*Vitis* spp.) offer an interesting variation on the tendril theme. By 1887, Sachs had detailed the similarities between branches, tendrils, and flowers on a grape

vine. Careful observation revealed organs in transition: these were part flower and part tendril. Interestingly, modern tissue culture of grape can induce the production of either tendrils or flowers, depending on the hormone concentrations in the culture medium.

Some of the most spectacular tendrils might best be described as modified branches. Good examples of this type of development can be found in the Cucurbitaceae, the family that includes cucumbers, melons, and gourds. The tendrils of gourds (*Lagenaria* spp.), especially, are extraordinary for both their size and shape. They make a wonderful show when trained to an overhead trellis or pergola. Any unattached tendrils will hang in tightly coiled spirals like surreal springs up to one foot long.

In 1909, Pfeffer described the developmental stages of tendrils. Initially insensitive to contact, the tendril begins to circumnutate once it is fully extended, just like the shoot tip of a twining plant. Several decades earlier, Darwin's experiments had described in methodical detail the rotational time and elliptical shape of many species' circumnutating tendrils. Darwin also observed the minimum pressure required to stimulate a coiling response by placing threads of various weights on a tendril. Some species, like peas and clematis, responded within minutes to weights of less than a milligram.

But it was Pfeffer who recognized that a tendril is not equally sensitive throughout its length. Usually the base is less sensitive than the tip. He also noticed that some species have tendrils that are sensitive on only one side, while other species produce tendrils that are sensitive all the way around. Today we distinguish between thigmotropic and thigmonastic tendrils. "Thigmo" comes from the Greek word for touch. Thigmotropic tendrils curl in the direction of the contact stimulus. Thigmonastic tendrils always curl in the same direction, whether that matches the stimulus or not. The cucurbits, for example, produce thigmonastic tendrils. In some species, these tendrils have specialized cells along their inner surface to act as touch receptors—either dome-shaped "tactile papillae" or warty projections called "tactile blebs."

Tendrils move in three ways. Initially the tendril circumnutates to increase the chances of contacting a support. After making contact it "curls." The curling movement is produced by an enlargement of the outside cells; it can be reversed if the



MICHAEL S. THOMPSON

*Ivies use adventitious roots to climb, as this one is doing on a Douglas fir trunk. Early researchers found this group less interesting than the twiners and tendril climbers.*

contact is removed. Finally, if the contact stimulus continues, the tendril will "coil." Coiling requires growth of the tendril with the outer cells enlarging more rapidly than the inner ones. Normally coiling continues whether contact with the support is maintained or not, and the coils tend to grow progressively tighter. De Vries removed the support of a cucumber tendril after it had made five and a half coils and the tendril just kept spiraling, eventually producing eight smaller coils.

Coiling can exert considerable pressure. De Vries demonstrated this by offering a tendril a paper support, which the tendril then crushed. The pressure is produced by continued coiling as well as by an increase in the tendril's diameter. (Early investigators noticed that tendrils coiled around a support tended to be thicker than those that were coiling in mid-air.) This continued coiling tends to draw the main stem closer to the support, thereby making other tendril contacts more likely. Pfeffer also thought that coiled tendrils might act like shock absorbers, to buffer the plant in rough weather.

Tendrils may respond in several ways if they fail to find a support. Sometimes a tendril will just dry up and fall off. In other cases, as with the cucurbits, the tendril will coil into tight loops and lose its sensitivity to touch.

The type of tendril that I personally find the most fascinating is the kind that has a

small fastening disk at the tip. The most common and most studied example is the Virginia creeper (*Parthenocissus quinquefolia*). The plant produces typical filamentous tendrils, but with small projections at the tips. If the tips touch something, they enlarge into little disks and secrete an adhesive that glues the tendril to the support. Only at this point does the tendril coil, pulling the stem closer to the support. Over time the tendril turns woody and dies, but it continues to furnish a sturdy connection to the support.

The texture of the support's surface is important. Rough surfaces are best and if a tendril encounters a crack, it will often thrust its tip inside. This may be due to a process called negative phototropism—a tendency to avoid light. In general, as every school child knows, plants grow towards light: they are positively phototropic. But not in the case of many vines. Vines may deploy their leaves in light, but by bending their shoot tips or tendrils towards the shade, they give themselves a better chance of finding a support. In Virginia creeper, this penchant for growing away from light was probably first described by Malpighi around 1650. It was well known to Darwin and his contemporaries.

The adhesive disk adaptation occurs in only a few genera of tendril producers, and it attracted attention fairly early: the first anatomical study of the disk was published in 1885. In 1977, two researchers looked at the disk through an electron microscope. Anton Endress and William Thomson described the complex cell divisions that formed it and observed that the epidermal and subepidermal cells secreted a mucous material. They postulated that the adhesive was a mucopolysaccharide similar to the substances algae and barnacles secrete to glue themselves in place.

Our ability to observe the diversity of nature has advanced incredibly since these early observations on climbing plants were made. But it's intriguing to look over the shoulders of these 19th-century plant scientists—to watch them plumb the mysteries of plant movement with their simple, elegant experiments and meticulous observation. Those mysteries go to the heart of plant physiology: they concern plant response to light, gravity, and touch. Even as our own century draws to a close, those mysteries have yet to be fully revealed.

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# Play It Again, Sambucus

*Whether you want fruit or foliage,  
the once-popular elderberry deserves a fresh look.*

BY MARTIN WATERMAN

**E**lderberries were once a popular plant. In North America during the 18th and 19th centuries, they were a valued addition to many gardens and landscapes—both for their fruit and their ornamental qualities. But fashions changed, new plants became available, and elderberries declined into obscurity. Today, most gardeners know virtually nothing of our native *Sambucus* species or of their exotic relatives.

Elderberries are members of the honeysuckle family, Caprifoliaceae. *Sambucus* contains about 20 species, six of which are native to North America. Best known is *S. canadensis*, the common elderberry. Long before the arrival of European colonists, native North Americans ate the berries and used other portions of the plant for medicine. Here in Atlantic Canada, for instance, our native Micmacs and Maliseets made a sedative tea from the flowers. The colonists recognized it as a relative of the European elder, *S. nigra*, and found uses for many parts of the plants, making jams and jellies as well as teas and ointments. The hollow stems were fashioned into spiles—the little tubes that are used to tap sugar maples for making maple sugar and syrup.

Most elderberries are generously proportioned: *S. canadensis* may reach 10 feet and have a six foot spread. They're at their best in summer. The lush, compound leaves have from five to 11 leaflets, depending on the species. The foliage can make even Nova Scotia look a little tropical. Most species bloom in June or July. The flowers are usually born in large fragrant clusters



ANITA SABARESE

*The fruit of the common elderberry can be turned into delicious jelly, jam, or wine, but you'll have to beat the birds to the ripe berries.*

or cymes of snowy white, which can have a welcome cooling effect in hot weather. Soon afterwards bunches of dark red, purple, or black berries appear. The weight pulls the branches down—an assuring suggestion of plenty.

Contemporary trends may revive the elderberry's fortunes. Edible landscaping, the replacement of traditional landscape material with food plants, may bring the elderberry back onto the lawn. So may the growing interest in using native plants. Elderberries also have much to offer wild-

life gardeners, since an elderberry in fruit is a magnet for birds.

Elderberries in fruit can draw people too, and a number of *S. canadensis* cultivars have been bred for fruit production. These offer the gardener a chance to rediscover what must surely be one of our least-known native fruits. Yet elderberries are a versatile food. Gardeners who take the trouble to plant them usually wish they had discovered them earlier.

You can eat the berries raw, but for most of us they're an acquired taste in their

## MINDING YOUR ELDERS

Elderberries are easy to grow, as long as you choose a suitable site. They aren't particular about soil type but they do like plenty of moisture. Elderberries won't tolerate standing water, however, so you'll need to find a spot with good drainage. European elderberries usually profit from some light afternoon shade. The American forms will tolerate a bit of light shade, but are usually better off in full sun.

Elderberries are normally propagated from cuttings, either hardwood or softwood. Rooting hormone is rarely necessary since they root so easily on their own.

Depending on the severity of your winters, you may find that your plants die back their first year. But don't despair: once established, elderberries are hardy at least through USDA Zone 5 and many will grow much farther north.

Once your plants are acclimated, your biggest problem is likely to be restraining them. Elderberries are prone to suckering, so you may want to prune out unwanted shoots in early spring. My spring pruning strategy is usually to reduce the plants to about half a dozen year-old shoots and two or three two-year-old shoots. Of course, if you're planting elderberries as a hedge, your pruning should be more limited.

Spring is also a good time to work some composted manure—or any other nitrogen-rich fertilizer—into the soil. But be careful not to cultivate too deeply around the plants: you may injure their shallow root systems.

Organic gardeners will be pleased to learn that elderberries are relatively free from disease and insect problems. The only trouble you're likely to have is competing with the birds for the fruit.

—Martin Waterman

natural state. I once heard someone describe wild elderberries as tasting like ink. This description delayed my initiation into the elderberry realm. I probably should have known better than to trust someone else's taste buds—especially someone familiar with the taste of ink.

Elderberry jellies, jams, and sauces don't require practice to enjoy. Neither does elderberry wine, which in my opinion is one of the best fruit wines you can make. Some people make juice out of the berries; others dry them and use them in baking as if they were raisins. In Atlantic Canada and New England, people make elderberry flower pancakes by dipping flower clusters in batter and frying them. In general, elderberries aren't very acid, which can make them rather bland. They're often cooked with vinegar, rhubarb, or some other acid food to sharpen the taste. Elderberries are also low in pectin, so they're often combined with high-pectin fruits. Euell Gibbons, perhaps the best-known wild foods advocate, recommended combining them with crab apples, which would boost both the pectin level and the acidity. You can find myriad recipes for elderberries in natural and wild foods cookbooks.

Of course you can gather wild berries, if there are elderberries in your neighborhood—and if you can get to them before the birds do—but I recommend the cultivars if you're interested in the fruit. These far exceed the species in flavor and yield. Here are some of my favorites, most of

them developed at the Canadian Ministry of Agriculture's Research Station in Kentville, Nova Scotia:

'Johns' was selected more than a century ago. A vigorous plant that produces large clusters, it can grow to 10 feet.

'Kent' is an excellent choice where early ripening is desired—either in short-season areas, or just to get an early start on the harvest. It has large uniform fruit.

'Nova' is another early variety with especially sweet fruit.

'Scotia' is only moderately vigorous, but its fruit is especially high in soluble solids and unusually acid.

'Victoria' is perhaps the best tasting of the available cultivars, and its berries tend to "shell" readily from their stems. But it is only moderately productive.

'York' is a vigorous, heavy-bearing late variety with big juicy berries.

A half dozen or so well-established bushes can yield over 100 pounds of fruit. You'll need to plant at least two cultivars for proper pollination, though, since elderberries are only somewhat self-pollinating. Enjoy, but one word of caution: the roots, stems and leaves of the plant are said to be poisonous.

Consider also a few of the fancier members of the elderberry genus selected or bred primarily as ornamentals. Among the North American natives, *S. caerulea* is well worth noticing. A denizen of the West, it's found from northern California to British Columbia. It's usually a large shrub but it

can grow to 50 feet. The leaves don't differ greatly from those of *S. canadensis*. The berries are large, dark blue, and edible. In the Southwest, there are some desert varieties of *S. caerulea*. These have grayer leaves, smaller leaflets, and fewer berries.

*S. callicarpa*, the red coast elderberry, occurs along the coasts of the Pacific Northwest. It varies in height from eight to 20 feet and produces small, bright red berries. They're beautiful—but not edible.

*S. racemosa*, the European red elder, is native to Europe and western Asia. The leaves of the species are much the same as those of *S. canadensis* and the flower clusters are smaller. Yet *S. racemosa* has yielded several remarkable cultivars.

*S. racemosa* 'Sutherland Cutleaf Golden' is "one of the showiest elderberries," says Peg Prag, co-owner of Forestfarm, an Oregon nursery that offers a selection of elderberries. "It's considered one of the best golden-leaved shrubs. It's lime green in the shade and that's also very pretty." But she cautions that the plant will tolerate only light shade.

*S. racemosa* 'Plumosa Aurea' has striking, chartreuse foliage that complements its yellow flowers and bright red berries. The best foliage occurs on the youngest branches, so the shrub should be cut back regularly.

*S. nigra*, the European or common elder, is another unpromising species that has produced some exquisite cultivars. These aren't usually grown for their white flowers or their black berries, but for their foliage. They aren't as tough as the native elderberries, largely because all the European species have a hard time with our hot summers. "If they're not in some shade, they'll look miserable in August," says Robert Popham, co-owner of Fairweather Gardens, a New Jersey nursery that sells a variegated form of the plant. Popham recommends that all the *S. nigra* cultivars be cut back hard, not just to encourage new foliage, but to discourage flowering. "The flowers aren't too attractive and they drain off energy that could have gone to the foliage."

*S. nigra* 'Albo-variegata' has cream-colored leaf edges, scented white flowers, and shiny black berries. "It's very showy," says Prag. "You can catch the effect of the leaves from quite a distance."

*S. nigra* 'Marginata' is similarly eye-catching but has silver-edged leaves. "To get the best effect," says Popham, "you really need to cut it to the ground each



spring.” Variegation fans may wish to note that there’s also a yellow-variegated cultivar called ‘Aureo-marginata’.

*S. nigra* ‘Laciniata’ has very finely cut foliage—Prag calls it “kind of ferny-leaved.” This plant is a favorite of the famous English plantsman Graham Stuart Thomas, who called it “one of the great beauties of summer.” Thomas recommends growing it in part shade, which will encourage finer foliage.

Even the work-horse *S. canadensis* has its more refined cultivars. ‘Aurea’, for instance, produces bright red berries that contrast beautifully with its bold, golden foliage. “It holds its color even in the sun,” says Popham, “which is something that many golden-leaved shrubs won’t do.”

*S. canadensis* ‘Maxima’ features enormous flowers and leaves—as well as huge yields of fruit. Its flower clusters are up to 15 inches across and its leaves may grow to 18 inches long.

What elderberries should you plant? While ornamental cultivars have merit, at the risk of trying your patience, I would point out that the fruit cultivars are also beautiful. I’m interested in edible landscaping—in pressing food plants into double duty as ornamentals.

While it’s true that elderberries are definitely not for the formal landscape they’re great in the edible landscape. They’re also perfect candidates for naturalizing, especially in the North, and great for creating a woods’-edge effect, whether there’s a real

woods behind them or not. Some people grow them as hedges, and I’ve even seen some planted as specimens. It’s worth noting, in this connection, that they tolerate heavy pruning, so you don’t have to be content with their somewhat rangy habit.

Another virtue is the bush’s appeal for wildlife, especially birds. If you like birds, you’ll be amazed at what elderberries can do—just leave the fruit unpicked. In my area I’ve noticed robins, catbirds, eastern kingbirds, nuthatches, Swainson’s thrushes, and eastern phoebes. Grouse will also feed on elderberries. Alder flycatchers, goldfinches, and yellow warblers nest in the dense foliage.

If you’re planning some major landscaping, elderberries can offer another service. Their rapid growth will populate open terrain while slower trees and shrubs play catch-up. About their only serious siting limitation is that they don’t do well in heavy shade. (See sidebar, page 36.) And don’t crowd them: in winter, especially, a little extra space makes it easier to forgive the coarse, rough form.

I have my fruit cultivars growing amidst purple coneflowers and some other prairie plants, and they look wonderful. In another area, I’ve interplanted them with gooseberries and currants.

Other gardeners in my locale use wild grape (*Vitis riparia*) as a companion plant. That probably sounds bizarre but it works well. Conventional solutions usually call for smaller, more intensely colored plants.

Native to the Pacific Northwest, the red coast elderberry, left, bears lipstick red fruit that looks good enough to eat, but isn’t. The chartreuse foliage of *Sambucus racemosa* ‘Plumosa Aurea’, below, lights up an informal landscape.



I’ve seen elderberries memorably arranged with hardy roses and bleeding-hearts. I’ve seen excellent plantings with spring bulbs, white potentillas, and low blue junipers. The elderberry’s lush foliage can be an effective foil to so many garden favorites, why limit the possibilities?

If you’ve got room for a versatile shrub—one that’s tough, ornamental, and edible—consider the neglected elderberry.

*Martin Waterman is a free-lance writer and horticultural researcher in Petittcodiac, New Brunswick.*

## SOURCES

- Bear Creek Nursery, P.O. Box 411, Northport, WA 99157. Catalog free.
- Fairweather Gardens, P.O. Box 330, Greenwich, NJ 08323, (609) 451-6261. Catalog \$3.
- Forestfarm, 990 Tetherow Road, Williams, OR 97544-9599, (503) 846-7269. Catalog \$3.
- Mellinger’s Inc., 2310 West South Range Road, North Lima, OH 44452-9731, (216) 549-9861. Catalog free.

**I**t was a mild rebuke, but a rebuke just the same. As part of a strategy to increase awareness of herbaceous perennials in the United States, the Perennial Plant Association (PPA) had just named *Phlox stolonifera* as its first "Plant of the Year." In a letter to the association, published in the PPA newsletter, English plantsman Phillip Swindells enthusiastically congratulated his overseas colleagues on their choice of species. But he went on to encourage PPA members to consider the horticultural value of the many other members of the genus *Phlox*.

What is ironic about this situation is that an English plantsman felt it necessary to explain to his American counterparts the merits of a plant genus that, save one species, is entirely endemic to North America. Swindells went on to scold, with British civility, "On my many regular visits to nurseries and gardens in the United States, I have been disappointed to learn that fine natives are underutilized by the nursery trade, especially as we in England exploit them extensively."

Ouch!

What do the British (and other Europeans) see in the 50 or so species in this genus that we Yanks have missed? Perhaps we need to take a close look at these American natives that are coveted on another continent.

While botanists dicker over subdivisions in the genus, to the average eye phloxes fall into two groups. The first includes those plants with an essentially upright growth habit. The best-known representative of this group would be the common garden phlox (*P. paniculata*). Widely grown for its showy panicles of flowers and especially

appreciated for blooming during the dreaded midsummer lull, garden phlox cultivars range from two to five feet in height. Over the years selection and breeding work both at home and abroad have yielded numerous named cultivars representing an array of colors.

The second basic group of phloxes are the mat or cushion-forming species. These are represented by one of the most popular herbaceous perennials in America, the creeping phlox (*P. subulata*). With prostrate stems, dense, needlelike foliage, and an early spring blooming time, this species fills a totally different niche in the garden than its taller relative. As with garden phlox, there are numerous cultivated selections of creeping phlox.

It seems that most Americans are perfectly content with what these two species offer for our gardens. But our nation's woods, grasslands, mountains, and deserts are host to a great array of phlox species, each of which displays its own beautiful interpretation of either the upright or creeping theme.

Like the garden phlox, the majority of the upright members of the genus are na-



DICK KEEN



DON JACOBS

Since the 19th century, breeders have tinkered with garden phlox to create bold cultivars like 'Sandra', above. In the right of the opposite photo is a phlox Georgia plantsman Don Jacobs contends is the true 'Chattahoochee'. The popular plant usually sold under that name is bluer, like his own 'Eco Regal', to the left.



# *On Fire for Phlox*

*Why should it take a nudge from Europeans to spark interest in this all-American flower?*

BY JAMES H. LOCKLEAR

'Betty Blake', below, is a cultivar of cleft phlox, so called because of its deeply divided petals. 'Alpha' and 'Omega', bottom, are selections of our tall meadow phlox made by Alan Bloom in England.



PHOTOS BY PAMELA HARPER

tive to the eastern part of the United States. Four species in particular are noted for their horticultural value.

*P. divaricata* is known by a number of common names including wild sweet William, Canadian phlox, and blue phlox. My personal favorite, however, is the name "timber phlox." Timber phlox occurs over much of the eastern United States, often associated with flood-plain forests. As one might expect, it prefers semishade and relatively moist conditions. It reaches 12 to 15 inches in height and blooms in the early spring.

In the wild, timber phlox is typically bluish purple. But in certain parts of its range other colors have been found. Don Jacobs, proprietor of Eco Gardens in Decatur, Georgia, has been searching the southeastern United States for natives of superior color and hardiness. So far, Jacobs has released five named cultivars. One of these is *P. divaricata* 'Eco Regal', featuring purple-blue flowers with violet-red eyes. This attractive cultivar is already being grown in England, Holland, Germany, and Austria.

The prairie phlox, *P. pilosa*, is another widespread eastern species. Its growth habit, height, and blooming time are similar to timber phlox, although it is more tolerant of sun and its flower color tends toward pink. Jacobs says that one of the most popular phlox cultivars, *P. 'Chattahoochee'*, is a member of this species named for a small town in northern Florida, and is pinker than the plant usually sold under that name. In a recent catalog, Siskiyou Rare Plant Nursery of Medford, Oregon, renamed the bluer 'Chattahoochee', long thought to be of *divaricata* parentage, *P. pilosa* 'Moody Blue'. It's a beautiful plant, regardless of its name, with its red-eyed lavender blue flowers, and one that's easily grown.

Meadow phlox (*P. maculata*) is similar to garden phlox in growth habit, but blooms about a month earlier. One of our tallest phlox species, it reaches two to three feet. A distinguishing characteristic is the shape of the flower clusters, which are narrower and more cylindrical than those of *P. paniculata*. There are several cultivars of meadow phlox available, including rose pink 'Alpha' and white, fragrant 'Omega', both selections made by Alan Bloom of Bressingham Gardens in England.

The cleft phlox (*P. bifida*) straddles the line between the uprights and the creepers. Growing up to eight inches tall, it has a



DAVID CAVAGNARO

dome-shaped habit. As the name implies, each petal is divided by a cleft, making the flowers appear to have 10 petals instead of the phlox standard of five. *P. bifida* 'Betty Blake' is an outstanding dark purple form selected and named by Panayoti Kelaidis, curator of the Rock Alpine Garden at the Denver Botanic Gardens. Kelaidis probably knows as much about phlox as any person in North America, and has an excellent eye for superior selections. 'Betty Blake' is among his personal favorites, as is *P. 'Whiteout'*, a vivid white cultivar with cleft petals, presumably of *P. bifida* parentage.

None of these upright species, however, is as well known or as widely grown as the standard garden phlox (*P. paniculata*). Europeans have been fine-tuning this species ever since it was first introduced into cultivation in the 1800s and the majority of cultivars grown in American gardens today have their origins in England and Germany. Actually, there are still impressive new cultivars being developed; in the past couple of years Wayside Gardens of Hodges, South Carolina, has featured several exciting selections from Bloom.

John Elsley, director of horticulture for Wayside, hopes for even more improvements in this very popular species. He would especially like to see more compact growth, heavier flowering, and an



ROB SIMPSON

In 1990 the Perennial Plant Association gave *Phlox stolonifera*, above, its first Perennial Plant of the Year Award. The more commonly grown creeper, *P. subulata*, mingles at left with cypress spurge.

extended flowering season. And he, like everyone else, would like to see more resistance to powdery mildew, the bane of garden phlox.

Jacobs is working towards these goals through a breeding program that involves crossing mildew-resistant forms of *P. paniculata* from wild populations found throughout the southeastern United States with the best of the European cultivars. His efforts have resulted in two releases, 'Eco Purity' and 'Eco Day Glow', both exhibiting sturdy stems and mildew resistance.

A cooperative research project involving the Long Island Research Laboratory in Riverhead, New York, and the University of Vermont is approaching the mildew problem from a different angle. The initial findings show that certain garden phlox cultivars are more resistant to mildew than others. These cultivars may not only perform better in northeastern gardens but could also prove useful in breeding resistance into new selections. The project has also found encouraging evidence that powdery mildew can be controlled with horticultural spray oil, a more environmentally friendly control than fungicides.

While the commonly grown creeping phlox, *P. subulata*, is native to the northeastern United States, the great majority of creeping species occur west of the Missis-

sippi. That's hardly surprising since there are altogether about twice as many phlox species in the West as in the East, and botanists are still finding new ones; two new phloxes have been discovered in Wyoming in the past five years. The majority of low-growing phloxes are spring-blooming plants.

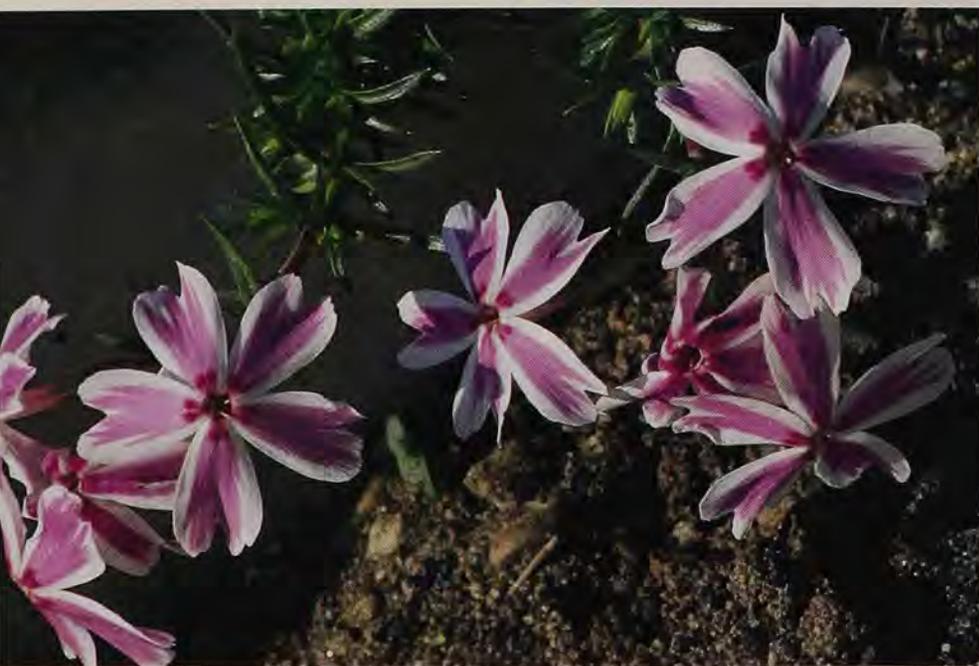
These western species range longitudinally from the Arctic Circle to the Chihuahuan desert and all kinds of places in between, often in the most inhospitable habitats. Ironically, while these hardy plants often thrive under adverse conditions in the wild, their deep taproot and preference for dry, rocky soil put them at a disadvantage in the garden. The late Edgar Wherry, discussing the horticultural potential of these low-growing species in his book *The Genus Phlox*, states that most "would be of interest only to specialists in rock gardening." Indeed, it has been determined rock gardeners, both here and abroad, who have brought many of these gems into cultivation.

Labeled "the prize of the phlox tribe" and "the most beautiful of all the phloxes," the periwinkle phlox (*P. adsurgens*) is a favorite among phlox connoisseurs. Endemic to the Siskiyou Mountains of northern California and southern Oregon, this plant stays under four inches tall and tolerates semishade and acidic soils. A pink-

flowered cultivar named 'Wagon Wheel' was selected by Lawrence Crocker and Boyd Kline, the founders of Siskiyou Rare Plant Nursery. Siskiyou offers one of the finest selections of low-growing phloxes in the country, listing 20 different species, cultivars, and hybrids.

Another popular phlox from the Pacific Northwest is the Douglas phlox (*P. douglasii*) and its hybrids. In addition to their visual appeal, these plants have a later and more extended period of bloom than is typical among low-growing phloxes. *P. douglasii* 'Crackerjack' is a crimson red selection that is offered by many nurseries specializing in rock garden plants and is often mentioned by rock gardeners as a favorite.

There has been quite a bit of excitement among phlox aficionados in recent years over the introduction of several selections of phlox from the desert grasslands of Chihuahua, Mexico. These plants were discovered in 1978 by the late Paul Maslin and his wife Mary of Boulder, Colorado. An additional search was carried out in 1981 by Maslin, Kelaidis, and Baldassare Mineo of Siskiyou Rare Plant Nursery. Among the selections made were individuals with flower colors unusual for the genus—bright orange, reds, and vermilion with yellow centers. One of these, *P. mesoleuca* 'Arroyo', is described as car-



JESSIE M. HARRIS

*Like many American immigrants, a creeping phlox cultivar from Tasmania called 'Tamanomagalei' underwent a stateside name change, to the more pronounceable 'Candy Stripe'.*

mine red. Unfortunately, these have proven difficult in cultivation unless an effort is made to duplicate the year-round dryness of the plants' native habitat.

Some of the western phloxes most promising for use in the garden are native to the grasslands of the Great Plains. Wherry noted two of these in particular—alyssum-leaved phlox (*P. alyssifolia*) and Oklahoma phlox (*P. oklahomensis*)—as deserving “wider horticultural use.” The PPA funded a research project to evaluate the horticultural potential of three species from the Great Plains, carried out jointly by myself and Dale Lindgren of the University of Nebraska.

*P. alyssifolia*, *P. andicola*, and *P. hoodii* are attractive and hardy, and occur naturally in a broader range of conditions than other western phloxes, making them a little more at home in the garden. The fragrant alyssum-leaved phlox in particular occurs in a variety of flower colors, shapes, and sizes, and shows great potential for the selection of superior forms.

The western states cannot lay claim to all the best low-growing members of the genus. One of the finest is *P. stolonifera*, also called creeping phlox, which is native to an area stretching from Pennsylvania to Georgia. It is one of the few creepers that is tolerant of shade and acid soil, making it useful for planting under trees or at the

foot of shrubs such as azaleas and rhododendrons. It produces pastel-colored flowers ranging from white through lavender and purple. The cultivar ‘Home Fires’ is a rose pink selection made by Wherry near his home in Swarthmore, Pennsylvania.

While the species mentioned so far all offer beauty, durability, and interest, the standard creeping phlox, *P. subulata*, is still pretty hard to beat. It is widely adaptable and over the years has yielded some very exciting variants that observant plantsmen and women have developed into named cultivars. Unfortunately, the best of these—‘Fort Hill’, ‘Schneewitchen’, and the “Millstream” series—are not usually carried by American garden centers and nurseries, although they are available from many specialty mail-order nurseries. (See “Sources and Resources.”)

As with garden phlox, most creeping phlox cultivar selections have been made for us by obliging Europeans, particularly the English and Germans and, more recently, the Czechs. If American horticulturists feel no embarrassment about this, perhaps we might at least blush a bit at the recent appearance of a new *P. subulata* cultivar, ‘Candy Stripe’ (formerly ‘Tamanomagalei’)—introduced into the United States by a nursery in Tasmania!

Those who find themselves wanting to know more about our continent’s treasury

of phloxes might run into a bit of difficulty. The most recent American book on the genus is the aforementioned *The Genus Phlox* by Wherry, primarily a scientific, botanical treatment, published in 1955. A new book on phlox that is due out in the near future is being written by (sigh) a German plantsman, Hermann Fuchs. Fortunately, an English version will be released in the United Kingdom.

One way to get better acquainted with phloxes is to visit some of the better collections around the United States. In the opinion of Kelaidis, the best are found at the New York Botanical Garden, Stonecrop Gardens in Cold Spring, New York, the Missouri Botanical Garden, the Denver Botanic Gardens, and the Berkeley Botanical Garden at the University of California-Berkeley. The phlox collections are typically displayed in the rock garden areas of these institutions.

While it might seem that the world has run away with our plants, a growing number of horticulturists at American nurseries, botanical gardens, and universities have turned their attention to these beautiful natives. Perhaps it’s time the rest of us got on fire for phlox.

*Former director of the Dyck Arboretum of the Plains in Hesston, Kansas, James H. Locklear recently became director of the Nebraska Statewide Arboretum in Lincoln.*

## SOURCES AND RESOURCES

The quarterly *Bulletin of the American Rock Garden Society* contains not only authoritative articles on phlox but also advertisements from rock garden and wild-flower nurseries, many of which offer nice selections of phlox. Write American Rock Garden Society, 15 Fairmead Road, Darien, CT 06820.

Carroll Gardens, 444 East Main Street, P.O. Box 310, Westminster, MD 21157, (410) 848-5422. Catalog \$2.

Lamb Nurseries, East 101 Sharpe Avenue, Spokane, WA 99202, (509) 328-7976. Catalog \$1.50.

Milaeger’s Gardens, 4838 Douglas Avenue, Racine, WI 53402, (414) 639-2371. Catalog \$1.

Siskiyou Rare Plant Nursery, 2825 Cummings Road, Medford, OR 97501, (503) 772-6846. Catalog \$2.

Wayside Gardens, 1 Garden Lane, Hodges, SC 29695, (800) 845-1124. Catalog free.



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# PRONUNCIATIONS

- Bothriochloa* boh-three-oh-KLOH-uh  
*Buddleia alternifolia* BUD-lee-uh  
 al-ter-nih-FOE-lee-uh  
*B. davidii* B. dah-VID-ee-eye  
*Episcia cupreata* ee-PISH-yuh  
 koo-pree-AY-tuh  
*Euonymus fortunei* yew-ON-ih-mus  
 for-TOON-ee-eye  
*Gloriosa* glor-ee-OH-suh  
*Hedera* HED-er-uh  
*Hepatica americana* heh-PAT-ih-kuh  
 ah-mer-ih-KAN-uh  
*Hydrangea anomala* subsp. *petiolaris*  
 high-DRAN-juh ah-NOM-ah-luh  
 subsp. pet-ee-oh-LAIR-iss  
*H. arborescens* H. ar-boh-RES-enz  
*H. aspera* subsp. *sargentiana* H. ASS-per-uh  
 subsp. sar-jen-tee-AN-uh  
*H. macrophylla* H. mak-roh-FIL-uh  
*H. paniculata* H. pan-ik-yew-LAH-tuh  
*H. quercifolia* H. kwerc-sih-FOE-lee-uh  
*Ilex vomitoria* EYE-leks vom-ih-TOR-ee-uh  
*Kalmia angustifolia* var. *angustifolia*  
 KAL-mee-uh ang-gus-tih-FOE-lee-uh  
 var. ang-gus-tih-FOE-lee-uh  
*K. hirsuta* K. her-SOO-tuh  
*K. latifolia* var. *angustata* K.  
 lat-ih-FOE-lee-uh var. ang-gus-TAH-tuh  
*K. latifolia* var. *apetala* K.  
 lat-ih-FOE-lee-uh var. ay-PET-ah-luh  
*K. latifolia* var. *fuscata* K.  
 lat-ih-FOE-lee-uh var. fus-KAH-tuh  
*K. latifolia* var. *myrtifolia* K.  
 lat-ih-FOE-lee-uh var. mir-tih-FOE-lee-uh  
*K. latifolia* var. *obtusata* K.  
 lat-ih-FOE-lee-uh var. ob-TOO-suh  
*K. latifolia* var. *polypetalata* K.  
 lat-ih-FOE-lee-uh var.  
 pah-lee-peh-TAL-uh  
*K. microphylla* var.  
*microphylla* K.  
 my-kroh-FIL-uh var.  
 my-kroh-FIL-uh  
*K. polifolia* K. pah-lee-FOE-lee-uh  
*Lagenaria* laj-eh-NAIR-ee-uh  
*Lonicera brownii* lah-NISS-er-uh  
 BROWN-ee-eye  
*L. japonica* L. jah-PON-ih-kuh  
*L. periclymenum* L. pair-ih-KLY-meh-num  
*L. sempervirens* L. sem-per-VY-renz  
*Michelia alba* my-KEE-lee-uh AL-buh  
*M. figo* M. FY-go  
*Nepenthes* neh-PEN-theez  
*Nepeta cataria* NEP-eh-tuh kat-AH-ree-uh  
*N. faassenii* N. fas-SEN-ee-eye  
*N. gigantea* N. jy-GAN-tee-uh  
*Parthenocissus quinquefolia*  
 par-then-oh-SISS-us kwinq-keh-FOE-lee-uh  
*Phlox adsurgens* FLOKS ad-SIR-jenz  
*P. alyssifolia* P. ah-liss-ih-FOE-lee-uh  
*P. andicola* P. an-DIK-oh-luh  
*P. bifida* P. BIF-ih-duh  
*P. divaricata* P. dih-vair-ih-KAH-tuh  
*P. douglasii* P. dug-LASS-ee-eye  
*P. hoodii* P. HOOD-ee-eye  
*P. maculata* P. mak-yew-LAH-tuh  
*P. mesoleuca* P. mez-oh-LOO-kuh  
*P. nivalis* subsp. *texensis* P. nih-VAL-iss  
 subsp. teks-EN-sis  
*P. oklahomensis* P. oh-klah-ho-MEN-siss  
*P. paniculata* P. pan-ik-yew-LAH-tuh  
*P. pilosa* P. pih-LOW-suh  
*P. stolonifera* P. stoh-lon-NIF-er-uh  
*P. subulata* P. sub-yew-LAH-tuh  
*Pinus palustris* PIE-nus pah-LUS-triss  
*Pisum* PY-zum  
*Quercus incana* KWERC-kus in-KAN-uh  
*Q. stellata* Q. stel-LAH-tuh  
*Rhus toxicodendron* RUS tahk-sik-oh-DEN-dron  
*Rosa carolina* ROH-zuh kair-oh-LY-nuh  
*R. gymnocarpa* R. jim-no-KAR-puh  
*R. nitida* R. NIT-ih-duh  
*R. multiflora* R. mul-tih-FLOR-uh  
*R. nutkana* R. noot-KAN-uh  
*R. palustris* R. pah-LUS-triss  
*R. setigera* R. seh-TIJ-er-uh  
*R. virginiana* R. vir-jin-ee-AN-uh  
*R. woodsii* R. WOOD-zee-eye  
*Rubus* ROO-bus  
*Saintpaulia* saint-PAUL-ee-uh  
*Sambucus caerulea*  
 sam-BOO-kus seh-ROO-lee-uh  
*S. callicarpa* S. kal-lih-KAR-puh  
*S. canadensis* S. kan-ah-DEN-siss  
*S. nigra* S. NY-gruh  
*S. racemosa* S. ras-eh-MOH-suh  
*Schizachyrium*  
 skits-ah-KEER-ee-um  
*Sinningia speciosa* sih-NIN-jee-uh  
 spee-see-OH-suh  
*Syringa* sih-REENG-guh  
*Tropaeolum* troh-PEE-oh-lum  
*Vanilla planifolia* vuh-NIL-uh plan-ih-FOE-lee-uh  
*Viburnum opulus* vy-BER-num OP-yew-lus  
*Viola pedata* VY-oh-luh peh-DAH-tuh  
*Vitis riparia* VY-tiss rih-PAIR-ee-uh





# STUDY TOURS

## TRAVEL/STUDY TRIPS FOR THE AHS GARDENER

### JULY 29-AUGUST 11, 1994 GARDENS OF BAVARIA AND SWITZERLAND

Although Bavaria and Switzerland are neighbors, their approaches to gardening could not be more different. From the grand palace gardens of the Wittelsbach Kings to the botanical treasures found on Mainau Island in Lake Konstanz to the charming farmhouse gardens in the Emmental Valley, each day brings different gardens in different settings. The itinerary begins in Munich, takes us into Bavaria, and then on to Lucerne and Geneva in Switzerland. The program includes a side excursion to Interlaken to make the cog railway trip to the Schynige Platte Alpine Botanical Garden, where the collection of native Swiss alpine plants is nearly complete. Leading this program for AHS will be Board Member André Viette and his wife Claire.

### SEPTEMBER 7-20, 1994 GARDENS OF SPAIN

Beginning with the great Muslim garden of the Moors in the 12th century, gardens in Spain reflect not only the influences of the Koran but also the monarchs that came from France and Holland. Our trip begins in Seville and continues to the Costa Del Sol, Granada, and Madrid. We will visit the Muslim gardens and a wide variety of private gardens where owners strive to collect and grow an immense variety of trees, plants, and shrubs. From the Casa de Pilatos, home of the Duchess of Medinaceli in Seville to the Placio de Liria, home of the Duchess of Alba in Madrid, each private garden is different in style and content. Leading this program for AHS will be long-time AHS Board Member Julia Rappaport and her husband, Irving.

### OCTOBER 8-15, 1994 GARDENS AND FALL COLORS ALONG THE HUDSON

An exploration voyage on board the *M/V Nantucket Clipper*, along the Hudson River from New York to Albany, this program features an exceptional collection of private gardens including Far-A-Field, home of former AHS Board Member John H. Whitworth Jr., and Stonecrop, home of long-time AHS members Frank and Anne Cabot, along with Lisbourne Grange, home of AHS members Mr. and Mrs. William Moss. We will visit private gardens designed by landscape architects Fletcher Steele and Lynden Miller and the home garden of esteemed plantswoman Louise Beebe Wilder. The fall colors along the Palisades and in the Berkshires promise to be in full glory. Leading the program will be former AHS President Everett Miller and his wife, Cass. Guest lecturer for the voyage is Caroline Burgess, director of Stonecrop in Cold Spring, New York.

Leonard Haertler Travel Company, 7922 Bonhomme Avenue, St. Louis, MO 63105.  
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*Tour participants will visit Stonecrop, home of Frank and Anne Cabot, during an October trip along the Hudson River.*

PHOTO COURTESY OF CAROLINE BURGESS

*Far*

*from the maddening*

*crowd...*

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