American Horticulturist

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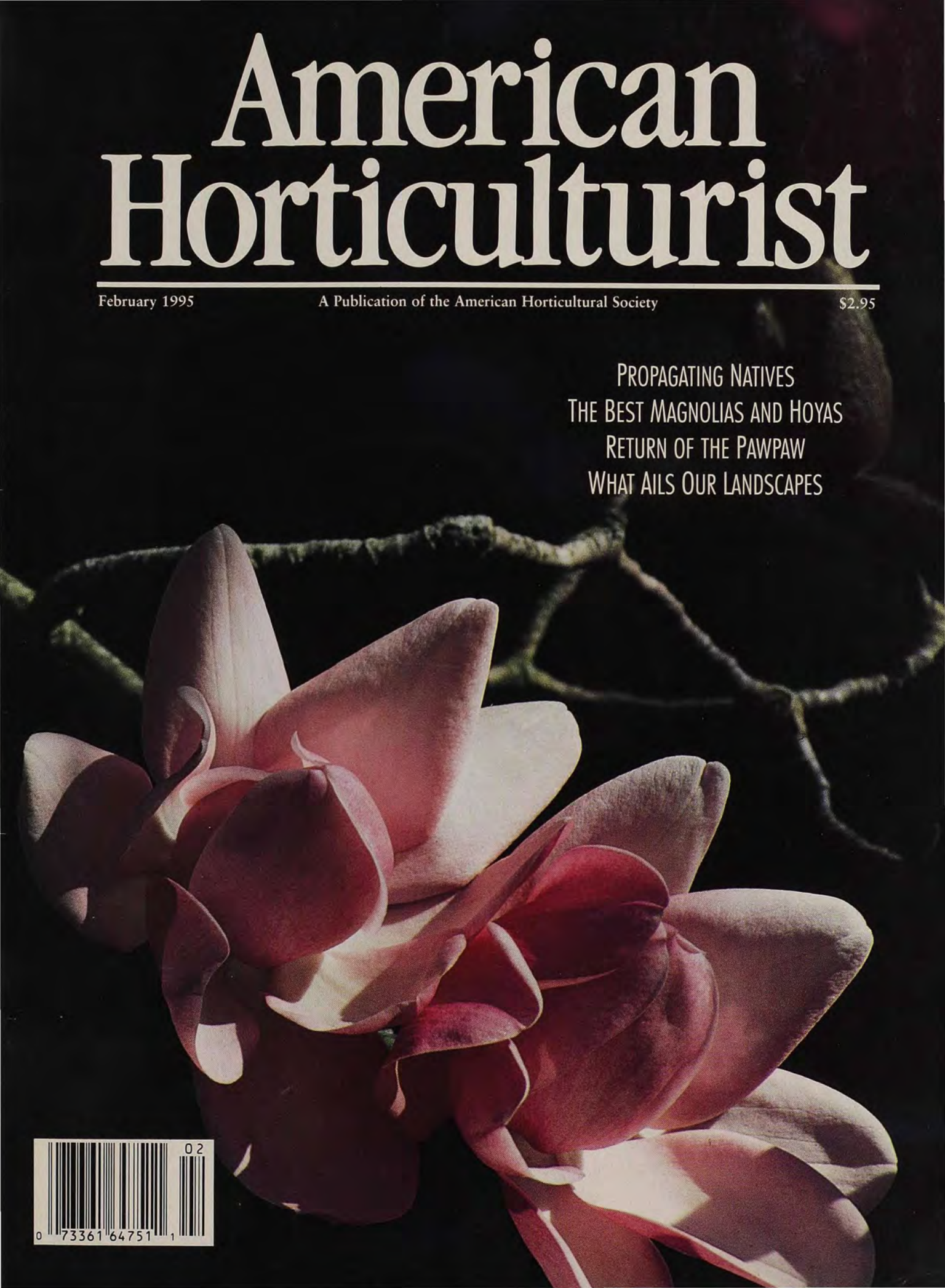
PROPAGATING NATIVES
THE BEST MAGNOLIAS AND HOYAS
RETURN OF THE PAWPAW
WHAT AILS OUR LANDSCAPES



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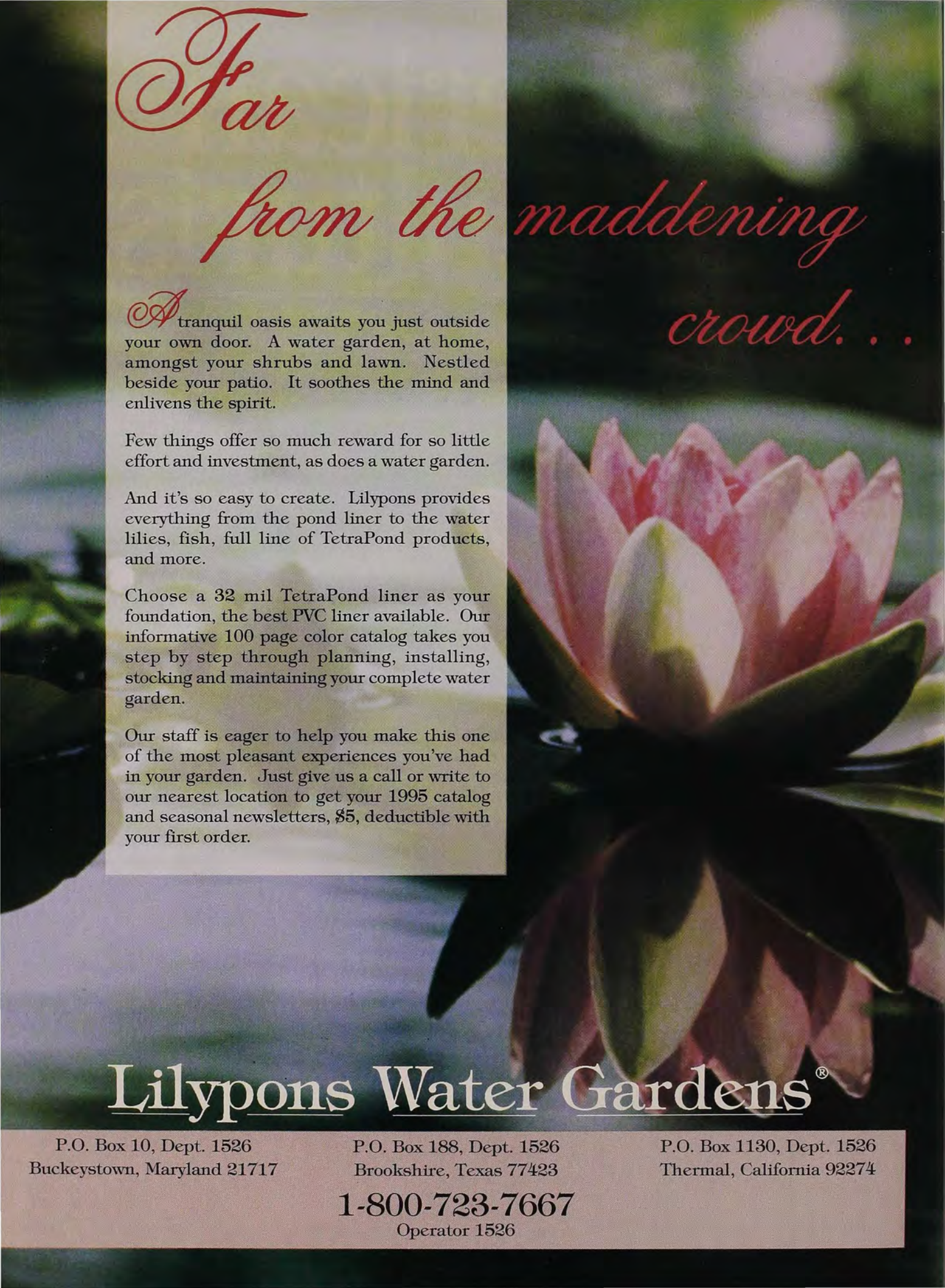

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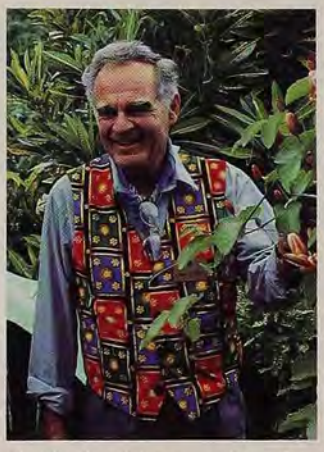
ARTICLES

DEPARTMENTS

FEBRUARY'S COVER
Photographed by Jo-Ann Ordano: Photo/Nats

In her book, *The World of Magnolias*, Dorothy J. Callaway says that *Magnolia campbellii* was one of the most common trees in the Himalayan forests in the 1850s when Joseph Hooker collected plants there and described mountainsides turning pink with its blooms. Its harvest for firewood and timber for planking and tea boxes has made the tree scarce, she says, and plants remaining in the wild today are usually suckers from harvested trees. *M. campbellii* has been known to reach 115 feet, but usually grows to only 30 to 60 feet in cultivation. This tree was photographed at Strybing Arboretum in San Francisco. Beginning on page 18, Callaway writes about "Proven Performers" in this genus, based on a survey of Magnolia Society members.

COMMENTARY



During the American Horticultural Society's trip to Hawaii in November, I asked the 45 travelers to list organizations they belonged to, in addition to AHS, on the community, city, state, regional, and national levels. Altogether, nearly 230 plant, garden, environmental, or other groups were represented.

I believe that this is a fair sampling of AHS members, and that all of you have needs for inspiration, information, and volunteerism that no one group can provide. While general requirements—planting, culture, and pest management—are common to many plants, other information about gardening is specific down to individual cultivars and is often undocumented, so that knowledge is transmitted only through personal contacts. This is why one of AHS's most important roles is that of an umbrella organization, helping diverse groups of gardeners to communicate.

Our commitment to this role will be manifest in 1995 through a variety of programs. We have arranged free admission for members to a large number of public gardens and flower shows. At many of the shows, we will present an AHS certificate for outstanding garden design and the AHS Bole Medal to flower displays of horticultural excellence. Help make sure that your favorite botanical garden or flower show participates next year!

Other important events in 1995 will be the National Forum II at Longwood Gardens, April 23 and 24, where a broad array of horticultural organizations will draft a long-term plan based on the recognition that ours has become "a nation of gardeners," and the third annual AHS-coordinated youth gardening symposium in Pasadena, California, June 27 through 30, where the four keynote speakers and 40 presenters will stimulate youth education in the West.

For the seventh year, AHS celebrates its tradition of highlighting other horticultural groups with articles on "Proven Performers," this year contributed by the Magnolia Society and the Hoya Society International. They should open your eyes to new possibilities for your landscape and indoor garden, no matter what your climate or level of gardening experience.

In addition, Richard Devine writes about how he collects seeds and cuttings of native plants to enhance the landscape where he works in north central Florida, and landscape designer Kathleen Cullen offers some thoughts about what ails our suburban landscapes.

David Ellis, an assistant editor of *American Horticulturist,* reports on renewed interest in our native pawpaw. It is a trip down memory lane for me, since my father, Mr. Carl, never missed an opportunity to promote this tree's sweet-tasting fruit. He loved to point out the many variations in leaf, plant, and fruit forms found in Iredell County, North Carolina, and to sing about picking up pawpaws and putting them in a basket. It ranked right up there with another favorite childhood song, "Carolina in the Morning."

Nothing could be finer than sharing the fruits of your experiences. Celebrate the many organizations that are helping to ensure that it happens, and use AHS as your umbrella. *H. Marc Cathey, AHS President*

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OFFSHOOTS

In Harmony with Nature

by Hilary Townsend

Conventional wisdom, as well as some academic research, points to the conclusion that plants like being talked to. They respond to praise, grow better if their progress is admitted, and have been know to die of fright in the hands of an angry or dissatisfied owner.

Other research explains all this away by saying that if you talk to your plant you're showering it with carbon dioxide (I think), and that is what makes it grow. Or while you're chatting it up you're devoting all your attention to it and will probably feed and water it at the same time, and that is what makes it grow. And as for plants dying in the face of your anger, well, the symptoms that caused you to get so overwrought with it were probably terminal in the first place.

Very well, then, whatever the rights and wrongs of these theories, I decided to test them for myself. When I'd lived the hectic life of a college lecturer I'd always been too busy to give my house plants much attention, so I'd chosen plants that would thrive on neglect, and to my relief they did.

After I retired I decided that the one thing I had now was time, so my house plants would all get much more care—so much that they'd all win prizes at local shows. This also meant that now I could widen my scope and buy more exotic and fragile plants.

On an impulse at the village plant sale I bought a billbergia *(Billbergia nutans)*. It wasn't much to look at, but it seemed healthy enough, with its narrow, spiny leaves and deep green color. True, the leaves had nasty razor-sharp edges, which meant you had to dust carefully or they'd get you, but the plant looked promising. "Easy to grow," the plant book chirruped. "And the curiously colored tubular flowers are most attractive. Flowers in June."

Thus encouraged, I examined the billbergia daily for curiously colored flowers or tubular anything. Nothing appeared for the next 18 months, except more shiny, nasty-tempered green leaves.

Finally, six weeks before Christmas I lost patience. "Either you get your act together and flower," I bawled, licking my scratches, "or you're in the next plant sale this village holds. And I mean that!" Six weeks later the plant was smothered with curiously tubular flowers, and very pretty they looked on Christmas Day.

So now I'd established that plants really do respond to what you say to them (well, the billbergia did anyway), so I tried an experiment. Why not sing to them? It would create a less dotty impression if anyone dropped by, and anyway, I like singing. I haven't much of a voice but can sing in tune, and the family has grown accustomed to it. I found myself going back to the songs of my childhood, learned in singing classes at school or through a lovely radio series my mother and I used to listen to many years ago called "Singing Together." Did people sing more in my youth? I think they must have, for music came flooding back.

The geraniums got the old song "Bobby Shaftoe"—it seemed to suit them. Some low-growing African violets got the spiritual "Swing Low, Sweet Chariot," some variegated ivies got the old folk song "The Keel Row" (not quite sure why), and a windowsill of shade-loving ferns got the hymn "Hills of the North, Rejoice."

I opened the window. A very pretty yellow clematis *(Clematis tangutica)* was growing up the wall. "Jerusalem the golden, With milk and honey blest!" I sang. Some little pansies in the window box looked up at me, their faces full of what I hoped was envy and longing, so they got "All Pansies That on Earth do Dwell."

At this, I swear, a large and flourishing zebra plant *(Aphelandra squarrosa* 'Louisaie') seemed to demand my attention, so that was a cue for "All Things Bright and Beautiful." Fortunately, we've no close neighbors.

I'm seriously thinking now, because I'm so encouraged by all this, of going for some of the really difficult house plants. There are several I've never really had the courage to try, such as bougainvillea and oleander. Perhaps, too, I'll have a go at growing some of the really unusual orchids, the sort that as a rule only thrive in a well-regulated greenhouse, which I have not got.

And another thing, now that I'm getting so much enjoyment out of singing to my plants—for I really do enjoy it—I'm beginning to plan ahead and structure the vocals, so to speak; I mean, certain plant-care operations lend themselves to particular types of songs.

When I'm repotting, for instance, perhaps I'll treat them to "Where Have All the Flowers Gone," "Rock of Ages," and because my farmer's hands are large with rather unwieldy fingers, what about "O God, Our Help in Ages Past"?

Come feeding time, I water in liquid fertilizers according to the book, with rhododendron fertilizer for the lime-hating camellias and azaleas, and basic foliage plant fertilizer for everything else. So this gives another chapter to the concert program with "Drink to Me Only with Thine Eyes" and "Green Grow the Rushes O."

Then once a year I've decided those plants that are really thriving and doing well on their musical interludes will get a special treat. I shall line them all up on the back porch, water them thoroughly and feed them well, and treat them all to the vocal part of Beethoven's Ninth Symphony. It's no more than they deserve.

Hilary Townsend is a free-lance writer based in the United Kingdom where she writes on gardening issues. This is her first article published in the United States.

MEMBERS' FORUM

Natives and the South

Until this past July at the Cullowhee Native Plant Conference, I was unaware of any American magazines that carried many articles about native plants. I have received other publications in the past but became disillusioned at the number of non-North American gardens that were constantly presented. My subscriptions could not end soon enough.

I live in the deep South and very little of what looks great in Britain looks even tolerable here. Your magazine was pointed out at Cullowhee as having an average of 29 percent of its articles pertaining to native North American plants and how to successfully grow and incorporate them into a garden setting.

I have only recently begun to landscape part time, and I welcome outside input from sources that give good solid information. I thumbed through several months' worth of this past year's publications at the conference, and I know that a subscription to your magazine will be money well spent.

I leave you with the reminder that there are gardeners in USDA Zone 8 just as avid as those in Zones 4 through 6. Don't forget us. *Lynn Libous-Bailey*
Leland, Mississippi

We've been hearing from so many Zone 8 and 9 gardeners lately it isn't likely that we'll forget you!

We heard about the informal study of gardening magazines conducted by Gary Smith at the University of Delaware when Assistant Editor David Ellis was conducting research for the pawpaw article that begins on page 28. It's great that someone was spreading the word about the American Horticultural Society at the excellent Cullowhee conference, and we hope you'll enjoy all the other benefits of AHS membership as well as our publications. Although it isn't our intention to devote a certain percentage of coverage to natives, we do focus on American gardens and gardeners. Our natives are receiving long overdue attention as plants that are often "the right plant for the right place" in the garden.

A Native Too Far South

The October "Natives at Risk" article on the Sebastopol meadow foam was quite accurate as to information on *Limnanthes vinculans*. However, the reader may believe that southern California is the area spoken about. Sebastopol and Cotati are approximately 60 miles north of San Francisco in Sonoma County. In fact, the local California Native Plant Society sells a T-shirt with the endangered vernal pool flora as a logo. *Wendy A. Born*
Sebastopol, California

Our Native Tongue

Upon reading Kathleen Fisher's review of Des Kennedy's *Crazy about Gardening* in August, I was quite startled to see that she considers "hose pipe" to be an un-American turn of phrase. It was the *only* term used for that piece of equipment by my family (New Englanders for more than 350 years) and friends when I was growing up in Connecticut in the '20s, '30s, and '40s. It is still in common use in my family and among my neighbors in a different part of Connecticut. I have never heard any of them say "garden hose"!

It is also listed in my unabridged Webster's, Second Edition, with no qualifier. Please restore "hose pipe" to its native status. *Elizabeth E. Pingree*
Old Saybrook, Connecticut

We asked acquaintances who grew up in various parts of New England. Plain old "hose" was the first pick. We'd love to hear more about the etymology of this term or its use in other regions.

Correction

Due to an editing error, Montgomery Place was incorrectly described in the article "Rustic Pleasures" in the October issue. Architect Alexander Jackson Davis altered the original 18th-century structure for the Livingston family.

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THE URBAN GARDENER

Philadelphia Cream

"More space!" It's the rallying cry of most urban gardeners. There's never enough, it seems, for plant lovers to get their fill. But folks in Philadelphia, Pennsylvania, know that where there's a seed there's a way, and each year hundreds of them put their petunias where their mouths are in the Pennsylvania Horticultural Society's City Gardens Contest.

Two of the 1994 winners have created their own private oases using little space and a relatively short amount of time. And while Dennis McGlade, creator of the prize-winning rooftop garden, came to the contest with years of design experience as a landscape architect, amateurs can take heart from the winning flower garden by Tom and Jill Cohen, novice gardeners who turned an undeveloped strip into an intimate setting for two.

When McGlade bought his 100-year-old, four-story building five years ago, he knew he wanted a garden, but had no land to work with. His only alternatives were windowsills or the roof. Fortunately, an existing stairway and opening to the roof made the skyline the best choice. With approximately 400 square feet to work in and two or three growing seasons to iron out the glitches, McGlade has created a beautiful observation point for a remarkable view of the city. But it took a lot of planning and effort to get there.

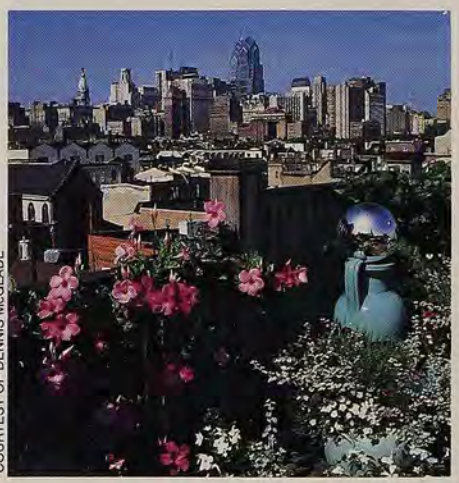
"You have to put some serious thought into walking on your roof," McGlade says, "before you even begin to worry about plants." In addition to making what is normally overhead sturdy enough to be trod underfoot, he had to make sure the roof could support the weight of soil, plants, structures, and garden furniture. McGlade adds that 100 pounds of plants in the spring can easily become 300 pounds by the fall. "It's just amazing to see the power of water and the sun on plant growth up there."

Besides having to support all that weight, the roof presented another challenge. The roof had been built on a slope for better drainage, so the new deck has three levels to accommodate the foot-and-a-half drop. The decking was built in sections from pressure-treated pine. Although McGlade has never had to clean debris from under the deck, these sections are removable for easier cleaning and repairs.

The deck rests on long boards called sleepers. These are 3-by-14-inch beams cut at an angle to compensate for the roof slope, so that the decking on the sleepers is level. The sleepers rest on roofing pads that act as cushions between the sleepers and roofing membrane itself. Additional structures, such as trellising and railings, were made from untreated western red cedar. McGlade explains that excessive moisture and resulting rot are less of a threat than the harsh effects of ultraviolet rays and drying wind.

Water is another critical factor in a rooftop garden since there's seldom enough rain and no one wants to carry buckets up four flights. McGlade compares the windy environment on his roof to an oceanside location minus the salt spray. Spaghetti irrigation—narrow tubes leading from a larger central hose connected to a timer—keeps all the pots from drying out. This

IRA BECKOFF/PENNSYLVANIA HORTICULTURAL SOCIETY



COURTESY OF DENNIS McGLADE

IRA BECKOFF/PENNSYLVANIA HORTICULTURAL SOCIETY

Dennis McGlade, left, tends a butterfly bush on his rooftop garden. A mandevilla vine and gazing ball, below left, grace his striking view of Philadelphia. A fountain in the corner, below right, brings the music of water to the garden.

system is not completely self-sufficient, however, and requires some human monitoring on a daily basis.

Perennials in containers don't stand much of a chance four stories up in a Philadelphia winter. McGlade has had the most success with sun-loving annuals and tropical shrubs and vines that he grows for a single season. He fills out the space with time-tested favorites like mandevilla vines, geraniums, verbenas, licorice plants (*Helichrysum petiolatum*), and alyssum, but he also likes to do some experimenting. One new plant McGlade tried last year was glory bush (*Tibouchina urvilleana*), a Brazilian shrub that surprised him by growing from an eight-inch rooted cutting into a three- to four-foot bush with purple flowers. He has also had success with heliotrope, flowering tobacco (*Nicotiana alata*), and angel's trumpet (*Brugmansia* spp.), none of which seemed to have their fragrance diminished by the stiff breeze on the roof. He planted three passion flower vines that all grew and flowered well, but the most prolific was a hybrid with dark purple flowers, *Passiflora* × *jeannette*. McGlade also grows a variety of herbs in a strawberry pot, but he hasn't tried to use his garden for food production.

The results of McGlade's toils have obviously been worthwhile. One City Gardens Contest judge described his garden as "an exceedingly elegant pearl of a rooftop garden. The stunning city views become mere backdrops for the plants." The other judges agreed, saying that the simple design, meticulous care, thoughtful details, and pleasing colors of pink, lavender, and white with touches of yellow have resulted in "a real haven in the city."

Rather than bringing the city in, the Co-

THE CITY GARDENS CONTEST

The City Gardens Contest—sponsored by the Pennsylvania Horticultural Society in cooperation with the Pennsylvania State University Urban Gardening Program—recognizes Philadelphians for their skillful and imaginative gardening and lets them compete for prizes in several gardening categories. When it was initiated in 1975, the contest had some 100 entries; by 1985, it had grown to more than 500 entries.

All garden entries must be within the Philadelphia city limits. Home gardeners may enter front-yard or back-yard flower and vegetable gardens, or gardens grown exclusively in containers. Community gardeners may participate by entering their community vegetable gardens, their community flower gardens/sitting parks, garden blocks with street planters and window boxes, or blocks with trees and front yards.

Any daring souls contemplating a similar contest in their own city might note some of the daunting demands of such an undertaking. Last year's Philadelphia contest had approximately 375 individual entries; it took some 300 judges to visit each garden in person for the preliminary round, followed by a second round of judging to make the final decisions. These judges were all volunteers from the horticultural community. The process from entry deadline to awards banquet took nearly five months, and the five society staff members who work on the contest will be entering data, transcribing judges' comments, and sorting slides of winning gardens right up until it's time to start publicizing the 1995 event.

For more information on becoming a judge or a contestant or for more detailed information on starting such a contest, call the Pennsylvania Horticultural Society at (215) 625-8280. —*Nikole Williamson*

COURTESY OF TOM COHEN

IRA BECKOFF/PENNSYLVANIA HORTICULTURAL SOCIETY

IRA BECKOFF/PENNSYLVANIA HORTICULTURAL SOCIETY

Tom and Jill Cohen turned their nondescript back lot, left, into a lush retreat in just two years. The rear of the garden, below left, where they raise vegetables, is hidden by a vine-covered trellis, below right.

hens' 750-square-foot garden behind their townhouse has eight-foot walls to keep Philadelphia at bay. Their backyard haven provides the couple with a private outdoor extension of their home.

"We wanted to make it like a living room with no ceiling," Tom Cohen says. "After all, we weren't building a yard for the occasional party with 60 people. Most of the time it's just going to be the two of us." While that may sound like the good advice of a veteran garden planner, neither of the Cohens had any experience with plants or landscape design when they began building the garden in the fall of 1992. "We started out slowly and asked everybody lots of questions," Cohen says.

The first step the Cohens took was to erect a fence encircling their property and a trellis wall dividing the garden. An irregularly shaped wooden deck offers an alfresco dining space at the rear entrance to the house. Cohen also designed the alternating brick pattern in an additional seating area in the middle of the garden.

These structures define and divide the narrow garden into three "little rooms." Plantings around the wooden deck and brick patio are hard-working ornamentals like rhododendrons, hollies, a red plum tree, arborvitae, ivy, and lots of impatiens for lush color. Sunflowers, climbing roses, and flowering vines on the trellis create a sense of height and maturity at the middle of the garden while masking the utilitarian rear portion of the garden where the Cohens have put in raised vegetable beds, a small lawn, and more ornamentals.

The Cohens attribute much of their success to the soil in their garden. Every time they dug they found oyster shells, so they surmised that their property was once a dumping site for the fisheries on the nearby river. "The soil was already so fertile that all I ever added was some bone meal and an occasional dose of Miracle-Gro," Cohen says.

Cohen says he got a lot of helpful advice on plant selection from local nurseries. But before heading out with his checkbook, he took note of the different microclimates and growing conditions in each section of his yard.

As a result of the Cohens' careful planning, the second-season garden had the established look of a much older site. The contest judges agreed that the Cohens had achieved a perfect sense of balance and proportion in their evolving, informal garden. According to one judge, "A visit to this garden is to see the essence of city gardening." —*Nikole Williamson*
Editorial Assistant

NATIVES AT RISK

MARYL

Nohoanu

by Mary Beth Wiesner

In June 1992 the U.S. Fish and Wildlife Service applied endangered species status to 14 plants and threatened status to one other species in Hawaii. All are known primarily from Maui, a 729-square-mile island comprising two volcanoes and a connecting isthmus formed by lava flows.

One of those plants is nohoanu *(Geranium multiflorum)*. Its habitat spans mountain grasslands, open sedge swamps, fog-swept lava flows, the gulch slopes of wet forests, and occasionally subalpine shrublands.

Nohoanu, also known as hinahina, is a compact, many-branched shrub, eight to 12½ inches tall with gray to reddish or dark gray stems. Its alternate, oval leaves are green on top and gray to grayish-green underneath. The compound flowers have purple-tinged sepals; the white petals are pink to dark purple at the base with purple veins. Native yellow-faced bees *(Nesoprosopis)* have been seen visiting the blossoms and may be the species' primary pollinator.

The 11 known populations of *G. multiflorum*, estimated at fewer than 3,000 plants, are on federal, state, and private land in Haleakala National Park, Hanawi Natural Area Reserve, Koolau Forest Reserve, and Waikamoi Preserve.

Bad-mannered members of the animal kingdom are nohoanu's major enemies. In 1793 goats were introduced on Maui, and by the 1820s they had become established on other Hawaiian islands. There were millions by the mid-1800s, and their agility allowed them to reach even remote areas. By 1930 goats had nearly destroyed nohoanu and three other species within Haleakala National Park. Due to active management programs at Haleakala and at Waikamoi Preserve (where five of the 11 populations of nohoanu are located), goats are no longer an immediate threat to the plant populations, but it is possible that the wily and aggressive animals could re-establish themselves.

Just as the goats were brought under control, rabbits became a problem for the endangered native. In 1989, escaped or released domestic European rabbits invaded part of Haleakala National Park. The prolific mammals can deplete vast areas of vegetation, and five populations of nohoanu may be in their path if their range increases.

In the wetter regions of Hawaii's forests, pigs are the major threat. Rooting pigs trample native vegetation and carry alien plants in their feces and on their bodies, accelerating the spread of invasive exotics. One of those noxious aliens is the prickly Florida blackberry *(Rubus argutus)*, which forms impenetrable thickets that choke out *Geranium multiflorum* and other natives.

Gardeners wanting to grow a plant that is similar in appearance to nohoanu might look for wild geranium *(G. maculatum* forma *albiflorum)*, which is all white, *G. richardsonii*, or *G. nepalense* var. *thunbergii*, which are both white with red veins. The first two are North American natives, while the last is from Asia.

Mary Beth Wiesner is a free-lance writer living in Woodbridge, Virginia.

GARDENERS' INFORMATION SERVICE

Q: ***I have seen a beautiful pink-flowering shrub called abutilon in several gardening magazines lately and would like to try growing it in my yard. What growing conditions does it need?***

—M. O., Chicago, Illinois

A: Abutilon is commonly called flowering maple because its foliage resembles the leaves of maple trees. You won't be able to plant this shrub in your yard in Chicago because it needs an essentially frost-free climate to grow outdoors year-round.

Abutilons are often grown as house plants, however. Look for the bushier hybrids, such as *Abutilon hybridum* 'Souvenir de Bonn' and 'Satin Pink Belle', which work best for indoor conditions. There are also vine-type abutilons, such as *A. megapotamicum,* that can be trained to grow on an indoor trellis or other type of support.

To grow indoors, they need bright direct light and fairly cool temperatures. In order for them to flower, it's especially important that the nighttime temperature in your home is about 10 degrees cooler than during the day. During the summer, of course, you can move them outdoors.

Plant them in a well-drained fertile soil mix that includes some extra peat moss. Allow the soil to dry out slightly between waterings and feed lightly about twice a month during the growing season. A fertilizer like 15-30-15 stimulates blooming.

For readers living in USDA Zones 9 through 11, flowering maples are terrific for the outdoor garden because they are low-maintenance plants that will bloom for many weeks and even months. The only care they need is an occasional pruning in late winter or early spring to keep them in good shape, and some feeding with fish emulsion, liquid seaweed, or commercial fertilizer added in the spring to stimulate growth.

Two sources are Logee's Greenhouses, 141 North Street, Danielson, CT 06239, (203) 774-8038 (catalog $3, refundable with your order), and Kartuz Greenhouses, 1408 Sunset Drive, Vista, CA 92083-6531, (619) 941-3613 (catalog $2).

UP CLOSE AND PERSONAL

Come get your gardening tips firsthand from staff, award winners, and other members at the American Horticultural Society's 50th Annual Meeting June 22 through 24 in Philadelphia. Details will be in the March News Edition.

Q: ***How can I control spider mites on my indoor ferns?***

—A. C., Honolulu, Hawaii

A: Mist ferns frequently and keep them well-watered. Mites thrive in hot, dry conditions. To get rid of spider mites that are already infesting your ferns, spray both sides of the fronds with a strong stream of water. For tougher infestations, use an insecticidal soap. Spray them regularly—about once a week—until the mites are no longer a problem.

Light dormant oil sprays are nontoxic and are also effective in smothering mites. They should not be used on extremely delicate ferns, however, since the oil can clog leaf pores.

Rodale's *Color Handbook of Garden Pests* advises that a slurry mixture of wheat flour, buttermilk, and water is effective against spider mites.

If you want to try a stronger chemical spray, like Malathion, keep in mind that many ferns are sensitive to these chemicals and may be harmed by them.

You should first test any of these treatments, except the water, on a small section of the plant.

Q: *How do you grow strelitzias indoors?* *—A. G., Shaker Heights, Ohio*

A: Strelitzia, or bird-of-paradise, produces brilliant birdlike orange and purple flowers on top of long stalks of glossy greenish-blue foliage. The plants need a rich, well-drained soil containing a lot of organic matter. Place them in a brightly lit spot with temperatures of about 68 to 75 degrees during the day and night temperatures about 10 degrees cooler. During the growing season, allow the soil to dry out slightly and then water them well. Feed them with a dilute liquid fertilizer every two weeks. The plants like their foliage misted daily and year-round humidity levels of about 35 percent.

In the winter, the plants need a resting period. Keep them at about 55 degrees, decrease watering, and stop fertilizing.

Plants need to be potbound before they will flower so don't transplant them to a larger pot until the roots have filled up more than three-quarters of the soil area. Plants grown from seed take seven to eight years to flower. Those propagated by division take about four years.

Q: ***I'm very interested in learning more about palms, which isn't easy since I live in Canada. Is there a palm society that I could join?***

—V. E., British Columbia, Canada

A: Yes, there is. Contact the International Palm Society, P.O. Box 1897, Lawrence, KS 66044, (913) 843-1235. This organization offers members a quarterly publication about palms called *Principes* and a seed and specimen exchange. In addition, you can write to them with questions about palms and they will direct the letter to an appropriate expert. The annual dues are $25 for U.S. members and $30 for foreign members, including Canadian residents.

You don't say whether you have a greenhouse that might allow you to grow some small specimens. Here are two mail-order nurseries that specialize in palms and have very informative catalogs:

The Green Escape, P.O. Box 1417, Palm Harbor, FL 34682-1417, (813) 784-1991. They offer more than 300 kinds of palms with many that are quite hardy and a number that make excellent house plants.

Neon Palm Nursery, 3525 Stony Point Road, Santa Rosa, CA 95407, (707) 585-8100. They offer almost 80 species of palms and 11 species of cycads.

—Maureen Heffernan
Education Coordinator

NATURAL CONNECTIONS

Making Peace with Black Walnuts

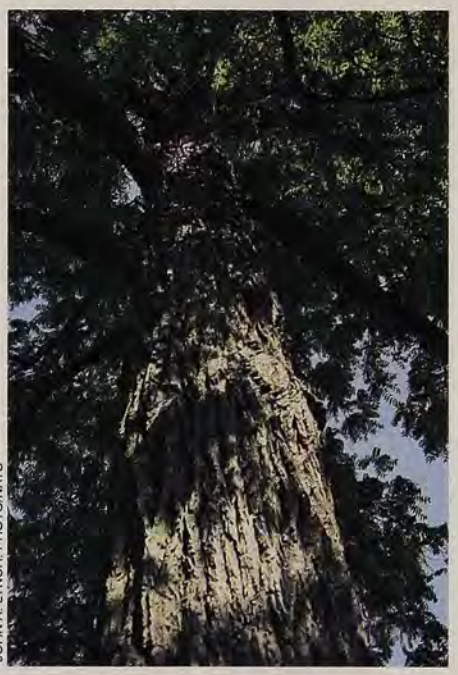
by Lucy Fuchs

Some trees are especially dear, particularly the small ornamental ones that we choose with great care. I delight in the beauty of my stewartia, weeping cherry, and hawthorn, carefully selected only after intense deliberation.

Then there are those other trees that have always been there. They come with the house—large, formidable, and the presence in the garden around which everything else happens. Some, such as one large oak, an equally large tulip tree, and several ancient maples, are beautiful. I am happy they are here and somehow feel they have been chosen for me. Others are like our difficult relatives, sometimes prickly and frequently in the wrong place. They are intrusive, incompatible. These are the trees that provide shade where it is not wanted and obscure good views.

In gardening, as in life, there are always options. Should we adjust to a less than perfect situation or cut loose? In the case of three sickly and dispirited fruit trees occupying a choice spot, after two years of unhelpful nursing and unanswered prayers, I dispatched them. What a relief! In their place now there is a bed of epimediums, astilbe, and small bulbs. Best of all, there is a splendid view of the pond.

Now consider my black walnut trees. Consider, too, my Aunt Agatha. Black walnuts *(Juglans nigra)* produce a toxin called juglone, an allelopathic chemical that kills or inhibits the growth of many plants. The first spring after our move I lost all the white rhododendrons I had planted for understory interest just below the largest group of walnut trees. At the same time my aunt visited, and her querulousness and irritability made me shrivel like the rhododendrons. Formidable challenges from both directions. Actually the solution to both problems was similar. It's called "doing the best you can with what you have." I set my aunt to mending and fixing hems. She took inordinate pride in her "small stitches," and sewing seemed to relax her and channel her aggression. At some level she was aware of her reputation in the family as being difficult, and she enjoyed the novelty of being helpful. As for the trees, I set about discovering which plants they would not threaten. I carefully explored not only the particular spot in which the rhododendrons had perished, but all the other areas on the property in which there were walnut trees.



JOHN A. LYNCH: PHOTO/NATS

Happily, I found that many of my favorite native wildflowers were obviously thriving in close proximity. Among them were Jack-in-the-pulpit *(Arisaema triphyllum)*, trout lily *(Erythronium americanum)*, marginal shield fern *(Dryopteris marginalis)*, herb Robert *(Geranium robertianum)*, mayapple *(Podophyllum peltatum)*, cinnamon fern *(Osmunda cinnamomea)*, and bellwort *(Uvularia grandiflora)*. So, naturally, I moved many of these to the area I had failed with at first. Each species took transplanting well, and I started becoming fonder of my walnut trees.

Since our property has many separate stands of walnut, I began to consider possibilities in addition to the wildflowers. I decided to experiment with plants I could risk losing because there were plenty of them in other parts of the garden. The successful ones included daylilies, epimediums, hostas, Christmas fern *(Polystichum acrostichoides)*, Jacob's ladder *(Polemonium reptans)*, astilbe, and bugleweed.

Feeling better and better about the trees, I took the additional step of reading what scientists had to report about the black walnut. As early as the first century A.D., Pliny the Elder, a Roman naturalist whose encyclopedic *Naturalis Historia* contains one of the earliest plant indices, wrote about walnut toxicity. Native Americans also knew of the properties of black walnut and sometimes used the green husks surrounding the nuts to poison and catch fish in small ponds or dammed streams. It wasn't until 1928, however, that juglone was isolated and identified as the source of the walnut's toxicity. Since that time juglone has been found in other members of the walnut and hickory families, including butternut *(Juglans cinerea)* and shagbark hickory *(Carya ovata)*.

The first symptom of walnut toxicity is wilting of terminal shoots, often followed by irreversible wilting of much or all of the rest of the plant. A mild reaction to toxicity may appear as poor flower development or reduced growth. Studies on tomato plants affected by walnut toxicity revealed that the plants' xylem—the tissue that transports water and nutrients from roots to stem and leaves—was blocked by a buildup of callus tissue.

It seems that walnuts don't even want competition from their own offspring—walnut toxicity also affects walnut seedlings. Gardeners should avoid adding the leaves of black walnut to their compost, or using them as mulch, because the juglone can leach into the surrounding soil.

Research indicates that for the most part only plants whose roots come into direct contact with black walnut roots are af-

fected by juglone. Although walnut roots can extend as far as 50 to 60 feet out from the trunk, plants that are close to the base of the tree—where walnut roots are deeper—or that have shallow root systems are sometimes unaffected.

My reading told me that although most azaleas and rhododendrons don't do well under black walnuts, *Rhododendron periclymenoides,* or pinxterbloom, and two Exbury hybrids, 'Gibraltar' and 'Balzac', are tolerant of juglone. Among bulbs listed as tolerant are the Darwin tulips 'White Volcano' and 'Cum Laude', *Tulipa greigii* 'Toronto', crocuses, snowdrops *(Galanthus nivalis),* grape hyacinths, and several varieties of daffodil.

It appears that some plants even thrive near walnut trees, in particular black raspberry *(Rubus occidentalis)* and wild hydrangea *(Hydrangea arborescens).*

On the flip side are those plants that are especially vulnerable to juglone. Among them are such fruits and vegetables as tomatoes, apples, cabbages, potatoes, and most berries other than black raspberry. Ornamentals to avoid include most evergreens, laurels, and cotoneaster.

Some gardeners, after reading about the complications caused by juglone, may be tempted to cut down their black walnut trees. But I would encourage them to keep the trees if they are attractive and in the right place. They are sure to find companion plants that will enhance the walnuts' beauty and tolerate their chemical bodyguards. The same goes for difficult relatives. There are always some ways they can shine. Next time my Aunt Agatha visits I'm going to have her help me move more astilbe under the walnuts.

Lucy Fuchs is a free-lance writer living in Ambler, Pennsylvania.

RESOURCES

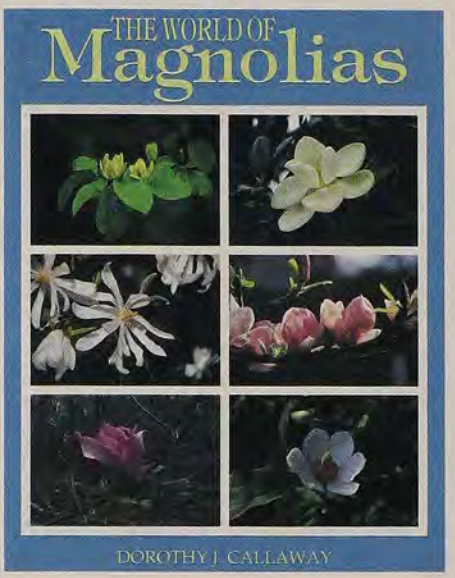
A list of plants that tolerate growing under black walnut is available from the American Horticultural Society's Gardeners' Information Service. Send a check for $1 and a SASE, along with your request, to: AHS, Attn: GIS, 7931 East Boulevard Drive, Alexandria, VA 22308-1300.

A two-page fact sheet on black walnut toxicity is available from the Horticultural Research Institute of Ontario. Requests for the fact sheet should be sent to: Advisory Services, Ontario Ministry of Agriculture and Food, Box 8000, Vineland Station L0R 2E0, Ontario, Canada.

BOOK REVIEWS

The World of Magnolias

Dorothy J. Callaway. Timber Press, Inc., Portland, Oregon, 1994. 260 pages. 8½" × 11". Color and black-and-white photographs, and illustrations. Publisher's price: hardcover, $44.95. AHS member price: $40.45.



Monographs on particular plants are the gems in any horticultural library. In this book, intended as a reference work to be referred to by the enthusiast and student alike, Dorothy Callaway has researched her subject well. Although her practical experience growing many of the species of Asian magnolias is limited, she has brought together a wealth of information gathered from all sorts of sources. Callaway explores a wide field, including the medicinal properties of magnolias and their use in the landscape, as house plants, and even as timber.

To guide the reader, the species magnolias are arranged in their botanical sections with a key to genera and to the cultivated varieties. Frequent references to Neil Treseder's nursery in Cornwall, England, which used to list many of the original introductions from the great plant collectors, may leave the reader hanging, however, because the nursery has been out of business for many years now. It would help to reveal where examples of these extraordinary plants can be found, as many of them are now fully mature.

At a time when many new hybrids are appearing, Callaway clearly explains the techniques of hand pollination and pollen collection and storage. She lists the biological considerations to keep in mind when making crosses and urges breeders to take into serious account the chromosome data available to assist them in their task.

As international registrar for new magnolia cultivars, Callaway is in a unique position to provide one of the most exciting and useful chapters in her book. The list and descriptions of modern hybrids she has compiled are very well laid out and a most welcome contribution to the field.

It could well be that future editions of this book will provide a forum for updating the never-ending list of new hybrids and cultivars, providing that breeders send in the latest information. By doing this the publishers would provide a different but truly useful service to horticulture, as there is little doubt that professionals and enthusiasts would be happy to buy each edition in order to keep up to date.

At the end of each chapter is a wonderful list of references and additional reading. To have all this information in one book is a great bonus. The illustrations, however, are disappointing for a book of this quality; it seems that the publishers of books too often lag behind the expertise of magazines in this area.

This book of international relevance makes a worthy reference for anyone interested in trees and shrubs. — *John T. Gallagher*

A collector and breeder of nerine lilies, John T. Gallagher is vice chairman of the Royal Horticultural Society's rhododendron and camellia committee and a committee member of the Magnolia Society,

Inc. A practicing pharmacist, he lives in Dorset, England.

Planting an Inheritance

Edwin A. Peeples. Stackpole Books, Mechanicsburg, Pennsylvania, 1994. 216 pages. 5½" × 8½". Publisher's price: hardcover, $19.95. AHS member price: $17.75.

For those of us who have always wanted to take a piece of land and lovingly mold it into our ideal home and landscape, or to trade in the rat race for a simpler life, Edwin Peeples' book *Planting an Inheritance* is one to savor in front of a roaring fire this winter.

Peeples chronicles the painstaking process of trial and error, triumph and failure, that he and his wife, Mimi, went through in the course of nearly 50 years spent converting a 65-acre farm in Chester County, Pennsylvania, to, as he puts it, "as near to . . . match our dreams as anyone ever does . . . for such a project is never finished so long as the owners live."

The book is written in a colloquial, introspective style reminiscent of James Herriot's tales about the Yorkshire Dales, but with subtler humor and a focus principally on plants rather than animals. Peeples binds his tale of back-to-the-land experiences with anecdotes about a wide range of plants the couple encounter and use in their daily lives. Some, like the yellow rose Peeples personifies as the "Tipsy Virgin," are imbued with individual characteristics derived from personal experience. Others are chapter-long digressions into the horticultural histories of plants ranging from black walnut trees to boxwoods.

Depending on the extent of each reader's horticultural knowledge, some of the plant lore Peeples discusses will be familiar territory. Chapters on kudzu and honeysuckle contain little that will be new to experienced gardeners. A chapter on Peeples' travails as he learns how to build a proper fire in the fireplace seems uncomfortably close to the familiar urbanite-goes-to-the-woods cliché.

For the most part, however, the information about plants is well researched and informative, and the plants selected are chosen on the basis of their relevance to the process of planning and maintaining a large piece of property. Many of the couple's discoveries and adventures are stimulated by their affinity for reading about the natural world around them.

One of the best lessons a reader can come away with is the way the couple work within the framework of the landscape and the native plants they encounter as they learn to understand and utilize herbs, wild berries, and trees.

Many of Peeples' experiences are valuable lessons for anyone thinking about a similar venture. Early in the couple's tenure on the farm they consider having a young grove of silver beeches thinned to promote the growth of other hardwoods, but decide against it for lack of money. In retrospect, as the couple realize how much they enjoy the beauty of the trees, the lack of money seems like a godsend.

Other lessons have nothing to do with horticulture. Attempts to raise various animals for food go awry for one reason or another. (Naming animals is always a mistake if one intends to eat them.)

All in all Peeples, whose earnings as a writer helped support the couple's experiences on the farm, has penned a cohesive and well-written account of successfully working with nature in the pursuit of happiness. The result is a wonderful example of how hard work, innovation, persistence, and the ability to learn from mistakes can pay off in a legacy many of us would love to emulate. —*David J. Ellis*

David J. Ellis is assistant editor of American Horticulturist.

To many people, the thought of magnolias brings images of the American South, with its southern belles and antebellum mansions. But magnolias are not just for southern gardeners; with careful attention to cultivar selection and siting, gardeners in USDA Zones 4 through 9 can enjoy growing magnolias. (Zone 4? That certainly dispels those "southern belle" images!)

While most of our native magnolias come from the southeastern states, they are just a very small portion of the magnolia species and cultivars available for use in today's landscapes. About 30 species are found in cultivation worldwide, along with countless cultivars and hybrids. Most of the cultivated forms are "precocious," having flowers that appear in the spring before the leaves emerge and producing a raucous display of color and fragrance early in the year. Other deciduous forms and the more subtle evergreen species are summer-blooming, producing fragrant flowers set off by beautiful foliage. Flower colors include all shades of purple, pink to almost red, yellow, cream, and white. With selections ranging in size from eight-foot shrubs to 100-foot trees, and habits ranging from broad and spreading to upright and columnar, there is a magnolia available for use in almost any situation in any size garden.

A word to the wise in areas prone to late frosts: Plant both early-blooming and later-blooming magnolias in your garden. In some years the very early-flowering cultivars might have their buds hit with a late frost, leaving them flowerless. Later-blooming cultivars will allow you to enjoy magnolia blossoms even in years when winter lingers. But by all means, don't shy away from the early-bloomers completely. The famous saucer magnolias (*Magnolia* × *soulangiana*) lining Commonwealth Avenue in Boston are a dazzling example of how the early magnolias can brighten up a not-yet-spring day.

Magnolia sargentiana *var.* robusta, ***below, needs a mild climate, but 'Elisabeth', opposite, is hardy to USDA Zone 5.***

MICHAEL S. THOMPSON

PROVEN PERFORMERS

Magnolias

Choose from large trees or small shrubs, flamboyant flowers or bashful blossoms.

VIRGINIA TWINAM-SMITH: PHOTO/NATS

BY DOROTHY J. CALLAWAY

To help you choose just the right magnolia for your own situation, here are some proven performers selected through a survey of Magnolia Society members. We'll start with those that can be grown in most hardiness zones and follow with more specific tips and cultivar recommendations for gardeners in various parts of the country.

Throughout the United States the most commonly cultivated magnolia is the hybrid saucer magnolia (*M.* × *soulangiana*). Although sometimes overused, especially with so many other magnolias to choose from, it still has a well-earned place in the garden. The cultivar 'Lennei' is one of the most popular, with large, magenta-purple flowers that are somewhat globe-shaped. It is hardy to Zone 4, as are 'Verbanica' and 'Alexandrina', which are typical pink forms. Slightly less hardy is another favorite, 'Big Pink', with profuse blooms that appear later than most *M.* × *soulangiana* cultivars.

Magnolia kobus var. *loebneri* (also known as *M.* × *loebneri*) is another favorite, and it can be grown with ease in most gardens in Zones 4 through 9. This is a hybrid between the common star magnolia (*M. kobus* var. *stellata*) and the larger *M. kobus*. There are three popular cultivars, any of which will brighten the sometimes dreary days before spring is in full tilt. An old standby, hardy to Zone 4, is 'Merrill', with a beautiful upright form and white flowers consisting of 15 strap-like petals. 'Leonard Messel', slightly more cold-hardy, has exceptional pink flowers that start out in dark pinkish-purple buds. 'Spring Snow' has fragrant pure white flowers with 15 to 20 petals. All are small trees reaching 25 to 30 feet in height.

The true southern magnolia, *M. grandiflora*, is a large evergreen tree that has dark, glossy green leaves with brown undersurfaces. The flowers may reach a foot in diameter and are intensely fragrant. This southern beauty may seem unattainable for many gardeners, but in fact it can be grown as far north as Zone 5 with proper selection of cultivar and planting site. Hardy cultivars include 'Edith Bogue' and 'Bracken's Brown Beauty'. For southern growers (Zones 7 through 9), there are

dozens of nice cultivars to choose from, including 'Little Gem', a dwarf, shrubby form with flowers and leaves that are smaller than typical, making it suitable even for small gardens. It ultimately reaches about 15 to 20 feet in height, compared to 75 feet for the typical species.

The sweetbay magnolia, *M. virginiana*, is another U.S. native that has long been popular for garden use. Its leaves are glossy green with silvery-white backs that flash in the wind. The flowers are about three inches across and have a wonderful lemony fragrance. The typical *M. virginiana* is a deciduous 20-foot shrub hardy to Zone 5. The southern form, var. *australis*, has a larger, treelike habit and is evergreen, but less hardy.

Several hybrids resulting from breeding programs at the U.S. National Arboretum have become proven performers. 'Galaxy' is an upright tree 30 feet tall with reddish-purple flowers eight to 10 inches across. It blooms after most frosts have passed and is hardy into Zone 5. A series known as the "Eight Little Girls" resulted from crosses between the star magnolia and the purple-flowered *M. liliiflora*. This series includes 'Ann', 'Betty', 'Jane', 'Judy', 'Pinkie', 'Ricki', 'Randy', and 'Susan'. These become large, 15- to 20-foot shrubs that produce reddish-purple or pinkish flowers just before the leaves emerge. The cultivars differ in habit, flower color, and bloom time; all can be found in the trade, but 'Ann', 'Betty', and 'Pinkie' seem to be the most popular. 'Ann' blooms the earliest of the "Girls," but still produces its reddish-purple flowers late enough to avoid most frosts. 'Betty' has flowers much like 'Ann' but blooms a bit later. 'Pinkie' has the lightest pink flowers of the "Girls" and blooms a week or two later than any of the others. All are reliably hardy to Zone 5, or Zone 4 with careful site selection.

From the magnolia breeding program formerly operated by the Brooklyn Botanic Garden (BBG) comes 'Marillyn', a multistemmed shrub with reddish-purple flowers. It resembles the "Eight Little Girls," but has a looser growth habit and is hardy to Zone 4. Also a BBG selection, the yellow-flowered 'Elisabeth' has been in the trade for 15 years and has become quite popular. The flowers are large and uniformly yellow with rose-colored stamens. The 20-foot tree is precocious, yet blooms late enough to avoid frosts and is hardy to Zone 5. Other yellow-flowered cultivars are becoming available, but this was the first, and it still deserves space in the garden.

The late Todd Gresham of Santa Cruz, California, left a glorious legacy of mag-

DOROTHY CALLAWAY

MICHAEL S. THOMPSON

DOROTHY CALLAWAY

DOROTHY CALLAWAY

The flowers of 'Leonard Messel', top left, start out as dark pink-purple buds. A related cultivar, 'Spring Snow', top right, has fragrant white flowers with up to 20 petals. The sweetbay magnolia, right, and the bigleaf magnolia, above, are both North American natives.

nolias as the result of his breeding program and they are continuing to make their way into gardens. Gresham began by crossing *M.* × *veitchii* with the purple *M. liliiflora* and a white-flowered saucer magnolia to produce vigorous hybrids with a vast array of flower characteristics and growth habits. The Gresham hybrids are precocious, but most bloom late enough to avoid frosts. Their hardiness has not yet been widely tested, but they should be safe in Zone 6 and perhaps farther north. Space does not permit a listing of all the Gresham hybrids available today, but the most popular are probably 'Dark Shadow', which has reddish-purple flowers that are ivory-white inside; 'Pink Goblet', which produces uniformly pink flowers 11 inches across on an upright tree; 'Royal Crown', whose reddish-purple flowers have inner petals held upright and outer petals drooping; 'Sayonara', a white-flowered tree with an upright habit; 'Tina Durio', with large white flowers tinged pink; and 'Todd Gresham', with flowers that are deep purple outside and white inside.

DAVID STONE: PHOTO/NATS

Gardeners in Zones 4 and 5 can grow all of the *M. kobus* var. *loebneri* cultivars, and *M. kobus* var. *stellata* cultivars are also good early bloomers. 'Centennial', with white flowers tinged pink, is hardy to at least Zone 5, and 'Royal Star', which has pink buds opening to white flowers, is hardy to Zone 4. These reach only about 15 feet in height, making them suitable for use in any size garden. The "Eight Little Girls" and 'Marillyn' offer a later flowering season, and *M. virginiana* is a good choice for summer bloom. The native "bigleaf" species, *M. fraseri, M. macrophylla,* and *M. tripetala,* have large white flowers situated in the middle of a whorl of large leaves (up to three feet long in *M. macrophylla!),* giving a tropical effect. These are most suitable for larger gardens since they reach at least 30 feet tall.

Gardeners in Zones 6 through 9 have the greatest range of options when it comes to selecting magnolias. In addition to all of those previously mentioned, gardeners in these areas can grow almost any magnolia on the market today. One favorite is *M. sieboldii*, a very versatile 10-foot shrub bearing white flowers with red stamens nestled among the petals. It is suitable to most of these zones (and perhaps

MICHAEL S. THOMPSON

'Ann', left, is one of the "Eight Little Girls" series from the U.S. National Arboretum. 'Royal Crown', above, was bred by the late Todd Gresham.

SITE MAGNOLIAS CAREFULLY, THEN ENJOY!

Magnolias are easy to grow and maintain and are affected by relatively few pests. They do not like to be transplanted, however, so proper site selection is important. Be sure the location you choose allows the plant room to grow and mature. Most magnolias do best in full sun or part shade—too much shade will cause the plant to become leggy and sparsely flowered. A slightly acidic soil (pH 5.5 to 6.5) is preferable, but with care and attention to fertilization, magnolias can be grown in soils of higher pH. With a few exceptions (such as *Magnolia virginiana),* magnolias cannot be grown in soggy soil, so a well-drained site is needed.

No matter where you live, it is best to locate the plant in an area protected from strong winds, especially if you are planting a large-leaved magnolia. A protected location is even more important in colder zones, and all evergreen species should be planted where they are sheltered from wind and snow load if possible. Planting early-blooming species in a northerly exposure will delay flowering in the spring, thereby decreasing the risk that the buds might get frosted.

The best time to plant or transplant magnolias is while they are dormant. Container-grown plants can be successfully transplanted during the growing season, but special care should be taken to ensure that they receive enough water. Magnolias have shallow root systems and should not be planted any deeper than they were in their containers. Adequate irrigation during the first two growing seasons is important to give the root system a good start.

Because the roots are soft and fibrous and feed near the surface, it isn't a good idea to cultivate the soil around them. A mulched area around the trunk helps eliminate the need for other means of weed control and helps keep the root zone moist and cool.

Once magnolias are established they are quite easy to care for. Standard fertilization recommendations work well for them and, of course, irrigation should be supplied if needed. If the plant is pruned lightly when young to encourage good form, it usually isn't necessary to prune mature trees, although sprouts and suckers often occur and these can be removed if you like. *—Dorothy J. Callaway*

MICHAEL S. THOMPSON

In Springfield, Oregon, nurseryman Roger Gossler admires the first huge salmon-pink flower on a 'Caerhays Belle' four years after grafting.

farther north), although it should be protected in hot, dry areas. Also popular in these zones are the Gresham hybrids and the many cultivars of *M. grandiflora.*

In Zones 7 through 9 on the Pacific Coast, many large precocious Asian magnolias thrive. *M. sprengeri* 'Diva', which has rosy-pink flowers, is by far one of the favorites. *M. dawsoniana* is another favorite pink-flowered form. The large, droopy, pink flowers of *M. sargentiana* var. *robusta* are extraordinary, and the hybrid 'Caerhays Belle' has 12-inch salmon-pink flowers that can be quite spectacular. Perhaps one of the most beautiful precocious magnolias, *M. campbellii*, has large pink or white flowers with a "cup and saucer" shape.

No matter where you live, you can probably grow at least a few of the many magnolias available today. The larger problem is deciding which, among all the desirable choices, to try first! These proven performers represent just a very small portion of the magnolias available, and the choice could become even harder as new cultivars continue to move into the trade. Look for new colors (more yellows, near-reds, and salmon-colored cultivars), increased cold-tolerance (as breeders work on "frost-proof" hybrids), and even more Gresham hybrids! Decision, decisions . . .

Dorothy J. Callaway is author of The World of Magnolias *(reviewed on page 16 of this issue), vice president and board member of the Magnolia Society, Inc., and editor of its newsletter,* Magnolia Magazine. *She currently serves as international registrar for magnolia cultivars and is co-owner of Sweetbay Farm nursery in Thomasville, Georgia.*

SOURCES AND RESOURCES

The Magnolia Society, Inc., is an international nonprofit society founded in 1963 for the purpose of promoting education and exchange of information on magnolias and their relatives. Membership includes *Magnolia,* a color journal issued twice a year; *Magnolia Magazine,* a newsletter issued twice a year; an annual meeting; a seed exchange; access to the society's slide library; source lists and other publications; round-robin correspondence; a checklist of cultivars; and more. Dues are $18 for U.S. members, $20 for Canadian and foreign members. For more information, contact Roberta D. Hagen, Secretary, 6616 81st Street, Cabin John, MD 20818, (301) 320-4296.

Sources of magnolias include:

Fairweather Gardens, P.O. Box 330, Greenwich, NJ 08323, (609) 451-6261. Catalog $3.

Gossler Farms Nursery, 1200 Weaver Road, Springfield, OR 97479-9663, (503) 746-3922. Catalog $2.

Greer Gardens Nursery, 1280 Goodpasture Island Road, Eugene, OR 97401, (503) 686-8266. Catalog $3.

Louisiana Nursery, Route 7, Box 43, Opelousas, LA 70570, (318) 948-3696. Catalog $5.

Roslyn Nursery, 21 Burrs Lane, Dix Hills, NY 11746, (516) 643-9347, FAX (516) 484-1555. Catalog $3.

Wayside Gardens, 1 Garden Lane, Hodges, SC 29695-0001, (800) 845-1124, FAX (800) 457-9712. Catalog free.

Woodlanders, Inc., 1128 Colleton Avenue, Aiken, SC 29801, (803) 648-7522. Catalog $2.

A more complete list of about 30 nurseries is available from the Magnolia Society.

CHRISTINE M. BURTON

PROVEN PERFORMERS

Hoyas

If you equate them with something Grandma grew, it's time to broaden your horizons.

BY CHRISTINE M. BURTON

Hoyas appear to have been among the first popular house plants in European and American homes. Indeed, one nurseryman told me the reason he didn't have any for sale was because they were so common that everyone who wanted one had already been given one by a grandmother or aunt. He was talking about *Hoya carnosa,* which was already a well-known "stove plant" (a term from the days when greenhouses were heated by stoves) when the younger Linnaeus published it as *Asclepias carnosa* in 1781.

In 1810 Robert Brown decided that, like the ugly duckling, it was among the wrong siblings. He created a new genus named in honor of his friend Thomas Hoy, head gardener at Sion House, home of the Duke of Northumberland, an avid collector of tropicals.

A close look at a plant such as *Asclepias tuberosa,* North American's common butterfly weed, reveals the five-lobed corolla and corona that the two genera have in common. But the vast majority of hoyas are vines, and their succulent-looking leaves and thick, waxy petals reveal their tropical origins. And while the milkweeds put out signals detectable only by butterflies, it's sometimes almost *too* hard for the human nose to miss the scent of some hoyas, which can be overwhelming.

Although *Hoya carnosa,* a native of southeast Asia, was the first one cultivated in Europe, hoyas were known there a half century earlier through the writings of Rumphius, "the blind seer." Rumphius had gone to Ambon in the Spice Islands (now known as the Moluccas) with the military and was later employed in the spice trade, but his hobby was writing about the plants, animals, and even rocks of the tropics. In his travels about Ambon he discovered several hoyas, named them, and described them in his famous 1741 herbal, *Herbarium Amboinensis.* By the time he got around to writing the book, however, he was blind, and the illustrations, done by someone else based solely on his descriptions, are lovely but inaccurate. Early in this century, C. B. Robinson went to the Spice Islands to look for Rumphius's hoyas and succeeded in sending only a few to his collaborator, E. D.

For the first-time hoya grower, it's hard to top the well-known* Hoya carnosa, *above left.

Merrill, in Manila before Robinson had a stroke and died in the jungle.

Not every hoya is considered a plant worth dying for. Australian farmers, dairymen, and ranchers in particular consider *H. australis* to be a noxious weed because it is fatal to livestock when ingested. On the other hand, farmers in the Solomon Islands consider the appearance of *H. guppyi* in their fields an omen that their crops will be abundant. In Asia, Malaysia, and Indonesia, hoyas were used to cure venereal disease and stomach disorders before antibiotics were available. Even today in remote areas of the Philippines, poultices are made from *H. imbricata* leaves to cure boils and other infections.

Hoyas' confused history continues today. Many are still misidentified, even by otherwise knowledgeable dealers, which is one reason the Hoya Society International, Inc., (HSI) was founded. Some growers think we've been wasting our time for almost 200 years trying to improve on *H. carnosa,* but many of the more than 200 hoyas are worth growing. HSI members have published lists of their 10 favorite hoyas on numerous occasions. Here are some that have appeared on all of those lists, as well as a few rather difficult hoyas (including some that are really weird) to challenge the more adventurous.

We can look the wide world over and never find a handsomer or more reliable house plant than *H. carnosa,* with its dark, shiny green foliage and white to silver dots and speckles. It will thrive in any soil, including clay, and tolerate any exposure, although it does best in a more porous soil and in an east-facing window. Its sap is like maple syrup, and, when in bloom, it is heavily scented at night. Some consider its scent cloying, so you might want to place it where it can be behind closed doors in the evenings. It has a number of desirable cultivars.

H. obscura has shiny, almost glassy-looking leaves that turn from purple-red to rusty-red when given some direct sun (never noon-day) and small umbels of pendant flowers. It is almost never out of bloom. There are two forms, one with flower umbels about the size of a half-dollar and one with umbels twice as large. Both are good bloomers, but the smaller-flowered one has prettier foliage.

Without a doubt, the most beautiful leaves and flowers of any hoya are on four similar plants: *H. macgillivrayi, H. archboldiana,* a yet to be identified species labeled ABG-41-48 (often sold as *H. archboldiana),* and *H. onyxoides.* Their leaves are quite large, blackish-green (bronze to red on juvenile growth), very thick, and shiny. Their individual flowers range from one-and-three-quarters to more than three inches in diameter with from seven to 15 flowers per umbel. At night their fragrance is like an expensive French perfume, rarely cloying. Their only disadvantage is that the leaves are extremely far apart, giving the plants a leggy appearance. But by careful winding of new branches that come up from the base, one can eventually obtain a compact-looking plant. The beauty of the leaves and flowers more than compensates for the long internodes.

H. nummularioides was formerly sold as *H. pubera* (another species) and is the hoya I would grow if (heaven forbid) I should have to choose just one. This small-growing, woody plant needs careful pruning to give it a nice shape and would make a good bonsai subject. Its flowers are very small, with umbels about the diameter of a nickel, but it blooms from almost every node and is very fragrant. It drops its umbels after blooming and makes new ones in the next bloom season, usually commencing in early October and continuing until Christmas. The leaves are small, dark green, and velvety. It's great under lights.

H. pachyclada has been in our collections only a short while but has quickly become a favorite because of its extremely thick, succulent leaves, compact growth habit, and reliable bloom. This is certainly one that should be more widely produced and distributed. The closely set leaves are about an eighth of an inch thick (or even more), pubescent, and light green, on stalks up to more than a half-inch in diameter. It produces large umbels of creamy white reflexed flowers in the spring and is one of the easiest hoyas to grow.

The foliage of *H. pubicalyx* 'Pink Silver' is almost identical to that of *H. carnosa,* but its flowers are purple with a purple-tipped white crown. It is often sold as *H. purpureo-fusca,* which in turn is invariably misspelled as *purpurea-fusca.* The latter has much larger, lighter green leaves with still lighter, palmately arranged veins, and is somewhat stingy with its dark purple or

TOVAH MARTIN

MICHAEL J. KARTUZ

ELVIN McDONALD

brownish-purple petals that have a solid purple crown. *H. pubicalyx* has several other cultivars worth growing.

H. vitellinoides (syn. *H. meredithii)* has rather nondescript flowers, but with leaves like these, one wouldn't care if it never bloomed (it does, frequently). Leaves measure from three to five inches long on young plants, but older plants can have leaves up to 18 inches long and four to five inches wide. They are light green and the veins (plus numerous reticulations) are dark green, which creates a very conspicuous and unusual pattern. At a recent flower show, the judges counted points off a well-grown basket of the species because "while, certainly beautiful, this suffers from iron-deficiency chlorosis." They appended a note for the grower warning that if chelated iron wasn't fed to it, it would soon die. On the contrary, a grower of this plant should avoid diminishing its beauty by darkening its leaves, which will happen if it gets insufficient light or too much nitrogen. It is quite woody and often difficult to root, but once rooted is an easy grower and a quick bloomer. Insist on a rooted plant instead of a cutting unless you are patient and experienced.

Another favorite of mine is *H. meliflua.* Thanks to stunning but mislabeled pictures in old botanical journals, it was known until recently as *H. fraterna.* The foliage is very dark green and glossy. Some specimens of it are reported to have leaves up to two feet long. The longest I've seen are 18 inches. When in bloom, it and its closest relative, *H. kerrii* (the one with the inversely heart-shaped leaves, often sold mislabeled as *H. obovata),* drip a dark-colored sap that some find objectionable. I love both, and, since they are summer bloomers, it is easy to find a place outside where the sticky sap does no harm. Inside, a plastic drop cloth beneath them is a good idea. The true *H. obovata,* which occasionally has heart-shaped leaves but more often doesn't, is a much handsomer plant that is easier to grow, blooms more prolifically, and produces less sap. All of these grow quite large.

Flowers of the most commonly available hoyas tend to be in various combinations of white or cream and pink, purplish, or red. There are several yellow-flowering hoyas, however, and *H. obtusifolia* sports some of the largest flowers—up to an inch in diameter. It is relatively easy to grow but very new to the trade, and when the Hoya Society made it available to our members, it didn't last long.

Among the "weird and often difficult" but desirable hoyas is *H. compacta,* known as the Indian or Hindu rope plant and easy to find in both green and variegated forms. Though similar to *H. carnosa,* it differs greatly in its intricate flower parts. I suspect the natural function of its curled-up leaves is the same as that of others in this category—to serve as homes for ants. While I have never seen ants on any I've grown, I call this species "the mealybug maternity ward." No matter that the rest of my hoyas are free of mealies, they will find this one and set up housekeeping. By the time you see them they are well established and ready to infest the rest of your collection. I simply refuse to grow it.

I have not had that problem with any of the others I am describing.

H. darwinii is not for the novice grow-

TOVAH MARTIN

MICHAEL J. KARTUZ

Hoya bella ***and*** **H. polyneura,** ***opposite top and bottom left, are among the shrubby hoyas best grown in hanging baskets. Two hoyas often sold under other names are*** **H. kerrii,** ***opposite bottom right, distinguished by its reverse heart-shaped leaves, and*** **H. pubicalyx** ***'Pink Silver', left, which can be identified by its purple-tipped white crown. The author finds the flowers and leaves of*** **H. macgillivrayi,** ***above, among the most beautiful of all hoyas, and its scent like a French perfume.***

HOYA MYTHS AND GROWING TIPS

One myth that needs to be dispelled right off the bat is that you should never remove hoya flower spurs (peduncles) or you will forfeit future blooms. If your plant needs trimming, prune away. If the plant was mature enough to produce peduncles, it is mature enough to produce a lot more.

Another myth is that there is something wrong if the flower spurs fall off by themselves. Some hoya species, such as *Hoya bella,* have annual peduncles that fall after blooming. They will make new peduncles at the next bloom cycle.

Most hoyas are very easy to grow. They require a loose, fast-draining soil (or soil-free mix), moderate to bright light, and warmth and humidity (it doesn't get too warm or too humid for them).

You can provide humidity by arranging plants close together on trays of wet pebbles, or with an inexpensive humidifier. Without ample air circulation, however, fungal diseases can be a problem. A small oscillating fan that sells for under $10 at the drug store will provide enough air circulation for a small collection. All house plants, not just hoyas, benefit from good air circulation, and all except cacti and succulents can use the extra humidity.

In winter, if nighttime temperatures in your home never go below 65 degrees and reach 70 or more during the day, or if you have a well-heated greenhouse, you should continue to water and fertilize on a regular schedule. A good rule to follow, summer and winter, is to water only when the top two inches of soil are dry.

If you keep hoyas cool in winter (45 to 65 degrees around the clock), discontinue fertilizing in late summer and water them only enough to keep the leaves from shriveling—once every week or two. Continue giving them lots of humidity and good air circulation. Resume watering and fertilizing around the end of January.

I suggest a balanced fertilizer (20-20-20) in the beginning when you want a cutting to become a plant as quickly as possible. Then substitute something with less nitrogen. I apply MagAmp in spring. That is a slow-release, 7-40-6 fertilizer that needs to be applied only once during the growing season.

Many people summer their hoyas outdoors. I see no benefit from the practice and a lot of disadvantages, such as exposure to mealybugs. If you are one of those who think a vacation in the great outdoors is good for your house plants, don't move them into the sun "cold turkey," even if the room they were in was very bright, and always protect them from direct midday sun. Bring them in when the forecast calls for temperatures of 45 or lower. Most hoyas will not suffer permanent damage from one freezing night, but their tops will turn to mush and it will take several months before new growth amounts to much.

Most (not all) hoyas are vines and may need support. Many people attach hoops to their pots and grow them as wreaths. I simply wind the branches around and among other branches or upon trellises. When I had a floor-to-ceiling window by my front door, I hung a child's folding safety gate, made of cedar, on the wall beside the window and trained a *H. carnosa* to grow on it. Another hoya, in a hanging basket, has been wound around itself until it looks like a giant beehive. I grow one large hoya, *H. imperialis,* in a tub into which I first set a six-foot bean pole. I also grow a hoya "tree": I put a hook in the ceiling above it and attached two lengths of chain to it by the middle rungs, then attached each of the four dangling lengths to the pot rim to give my *H. carnosa* something to climb on. After several years in the corner of my living room, lit by picture windows on two sides, it really did look like a tree. In fact, I had to move it because, during nesting season every year, birds kept crashing into the glass, trying to get to the "tree."

Small, succulent hoyas are often mounted on tree fern and cork, just as if they were orchids. Shrubby hoyas, such as *H. bella, H. lobbii, H. polyneura,* and *H. engleriana,* don't climb and are best grown cascading from hanging baskets.

Hoyas are very easily reproduced from cuttings, so steer clear of dealers asking exorbitant amounts for these plants, except for species that are relatively rare.

One last bit of advice: If you are already growing hoyas and they look healthy and bloom well, don't change a thing that you are doing, even if it is the opposite of what I have just said. Even two plants sitting in pots side by side have different microclimates. Start with the easy ones, work up to the hard ones, and remember: If it ain't broke, don't fix it.

—Christine M. Burton

er, but it is so fascinating that anyone who enjoys a challenge will want it. It has dimorphic foliage—leaves of two types. One type is about five inches long and elliptic to lance-shaped with a smooth margin. When you look at those leaves, you recognize them as leaves. The other leaf type looks something like a green golf ball. It is formed when the leaf margins stop growing, while the rest of the leaf continues to grow. The result is a multiple-chambered orb that in its natural setting becomes an apartment house for ants. In return, the ants leave their droppings to nourish the hoya. Rain water also collects in the unsheltered leaves and helps nourish the plant during dry spells.

H. mitrata is similar to *H. darwinii* in flower but much easier to grow. It also differs in acting exactly like a vine sometimes, with the leaves appearing closer together. (This change has been blamed on ant excretions but has also been reported when the growers swear no ants were present.) Before long, you'll find a cluster of leaves that looks for all the world like a big head of cabbage. Then it's possible—if one so

ELVIN McDONALD

desires—to remove the plant from its pot and provide nourishment simply by filling the "cabbage bowl" with water.

H. imbricata is another "ant plant." It has only a single, rather large leaf per node. The plant grows on tree trunks and branches, held tightly by adventitious rootlets. The leaves overlap, shingle-fashion, and, being sessile (without petioles), cling close to the tree's bark, creating a shelter for ant colonies. This one is hard to find but easy to kill, usually from underwatering. It grows best mounted on cork or tree fern where there is almost constant mist. Once established, it is a frequent and easy bloomer, with fuzzy, cream-colored, backward-curling flowers and crowns of the same color. Very new to the trade is a variegated form; the price is slightly over "an arm and a leg."

H. lacunosa is a true miniature, having small leaves and tiny flowers. While not at all weird in appearance, it does exhibit some strange traits. In the wild it lives symbiotically with ants, which add stability to their mud-dauberlike tunnels by building them around the plant's climbing stems. The hoya roots, growing inside these tunnels, are nourished by the ants' droppings. Despite being a natural climber, this one grows well as a trailing basket plant. It does better in a shadier location, even a north window. Both day and night it has a light, clean scent that is never cloying.

For the miniature lover, there are numerous miniature hoyas from which to choose. *H. serpens* (often erroneously sold as *H. minima, H. miniata,* or *H. nummularia)* has been around a long time. Its flowers are often larger than its round leaves, which are under a half-inch in diameter. Recently we've added *H. curtisii* (the round, variegated leaves are less than a half-inch across) and a true miniature form of *H. bella,* with dark green leaves only a half-inch long.

New hoyas are being discovered all the time. No matter what your taste, you ought to be able to find a few that will please you.

Christine M. Burton is the founder of the Hoya Society International, Inc. She is based in Porterdale, Georgia.

SOURCES AND RESOURCES

The Hoya Society International, Inc., was founded in 1978 as a consumer service, publishing hoya descriptions and sponsoring research to raise public awareness of hoya nomenclature. The society also reviews articles and books for accuracy, especially in species identification. It publishes a quarterly bulletin, *The Hoyan,* and a source list of hoya growers, and has a slide library available for rent. Annual dues are $25. For more information, write to Christine M. Burton, P.O. Box 1043, Porterdale, GA 30270.

Sources of hoyas include:

Glasshouse Works, P.O. Box 97, Stewart, OH 45678-0097.

House of Hoyas, 2360 Madison Street, Eugene, OR 97405.

D. J. and I. M. Liddle, P.O. Box 794, Mareeba, Queensland 4880, Australia. (Send two International Reply Coupons, available from the U. S. Postal Service.)

Rainforest Plantes et Fleurs, 1550 Rycroft Street, Honolulu, HI 96814.

CHANIN THORUT

Mature specimens of Hoya multiflora, *left, can produce up to 50 or 60 flowers at one time. If you want a hoya with big yellow flowers, it's worth looking for* H. obtusifolia, *above, which is new to the trade.*

The Pawpaw Paradox

An enigmatic native tree emerges from obscurity.

BY DAVID J. ELLIS

How has a tree bearing the largest fruits native to North America—a tree noted in 1541 by Spanish explorer Hernando de Soto, whose fruit reputedly once saved Lewis and Clark from starvation, and which has about a dozen towns and numerous rivers, creeks, and other landmarks named after it—come to be known to most Americans only as a curious reference in a whimsical folk song?

Native to eastern and central North America, from New York west to Michigan and Nebraska and south to eastern Texas and northern Florida, the pawpaw *(Asimina triloba)* bears exotic-flavored and nutritious fruits that can be eaten out of hand or made into desserts. Yet its bark and seeds contain potent compounds that show promise both as organic pesticides and cancer-fighting drugs. In addition to being a pest- and disease-resistant fruit tree, its graceful form and almost tropical foliage make it an outstanding ornamental ideal for edible landscaping.

Its proponents insist that in the next 20 to 30 years, with selective breeding, the pawpaw could fill all these roles and emerge from centuries of anonymity. They see the pawpaw becoming a versatile and cosmopolitan species, its fruit gracing the shelves of supermarkets and enlivening desserts at restaurants from coast to coast.

But this is not the first time great things have been expected of *A. triloba*. In 1916, the *Journal of Heredity* sponsored a national contest to find the best pawpaw, pointing out "drawbacks of the fruit . . . which can probably be removed by intelligent breeding." The pawpaw's failure to achieve mass popularity or commercial success can be traced to those "drawbacks": the fruit's thin, soft skin, which makes it perishable and difficult to market; the highly inconsistent flavor of wild pawpaws; and the 10 to 12 large seeds that make the fruits difficult to eat. There is also a pervasive myth that pawpaws will not grow in full sun, although seedlings need protection from ultraviolet light for only one to two years.

The genus *Asimina,* which contains eight species native to North America, is the only temperate genus among the 130-odd genera in Annonaceae, the annona or custard-apple family. All the other members of the family are native to the tropics of Central and South America, the Caribbean, Africa, and Asia. Many people are familiar with *Annona cherimola*, the cherimoya sold in some supermarkets; other Annonaceae species have truly bizarre-looking fruits. Among the largest, *Rollinia mucosa* (syn. *R. biribá)* fruits look like football-size alien pods composed of yellow-rimmed segments, each with a dark, hooklike spur. *Annona montana,* the mountain soursop, has ostrich-egg-size green fruits that appear to be covered with fine scales.

Of the *Asimina* species, *Asimina triloba* is the widest ranging and bears the most palatable fruits. With the exception of *A. parviflora,* a low-growing species found along the South Atlantic and Gulf coastal plains, the others are dwarf species endemic to Florida.

When grown in the open, pawpaw trees are roughly pyramidal in shape and range from 15 to 30 feet tall. The glossy, dark

MARYL

The lush, tropical foliage of pawpaw trees, opposite, makes them popular ornamentals. The trees also bear clusters of sweet, nutritious fruit, above, that can be eaten fresh or made into desserts.

ANITA SADEMESE

MARYL

green leaves—large, oval, and alternate with distinct veins—droop from the branches somewhat in the manner of magnolias, which is not surprising given that both pawpaws and magnolias are within the order Magnoliales. In fall, the leaves turn an attractive golden yellow. The roughly oval fruits, sometimes gently curved like a mango, are from three to six inches long and weigh an average of eight to 12 ounces. They hang close to the branches, sometimes singly and sometimes in clusters of two to seven on a shared peduncle. Their skins, at first pale green with a powdery white sheen, turn pale yellow then purple or black as they ripen. The dark brown seeds are up to an inch long and a half-inch wide, usually tapering slightly from top to bottom. The tough exterior seed coat protects the endosperm, which is toxic to mammals, from digestion.

The pawpaw's triangular-petaled flowers are perhaps the most revealing testament to its tropical antecedents. Curving downward off short stems, the flowers have three outer petals framing three smaller, fleshy inner petals. Initially green, the flowers turn brown to purple and exude a disagreeable musky odor as they mature. Pawpaw trees are usually self-incompatible, so a genetically different tree is needed for successful pollination.

If or when the pawpaw does achieve the recognition its supporters envision, much of the credit will belong to the PawPaw Foundation, a 300-member nonprofit organization devoted to furthering research on and interest in the pawpaw. The foundation was founded by R. Neal Peterson, an agricultural economist with the U.S. Department of Agriculture in Washington, D.C., who has zealously championed the species for the last 15 years.

An important step toward the foundation's goals is being taken this year, as 15 universities begin regional variety trials to test the hardiness and range of the pawpaw and resurrect the process of breeding trees with more marketable fruit. Researchers will test 28 trees, including nine varieties from each of the foundation's two germplasm orchards—at Keedysville in western Maryland and at the Wye Research and Education Center on Maryland's Eastern Shore—and 10 cultivars selected from named varieties sold in the nursery trade. Each test site will get enough specimens for eight rows of 28 trees. Among the data the researchers will record and evaluate are tree growth, blossom and fruit set, fruit attributes, and required water and fertilizer levels.

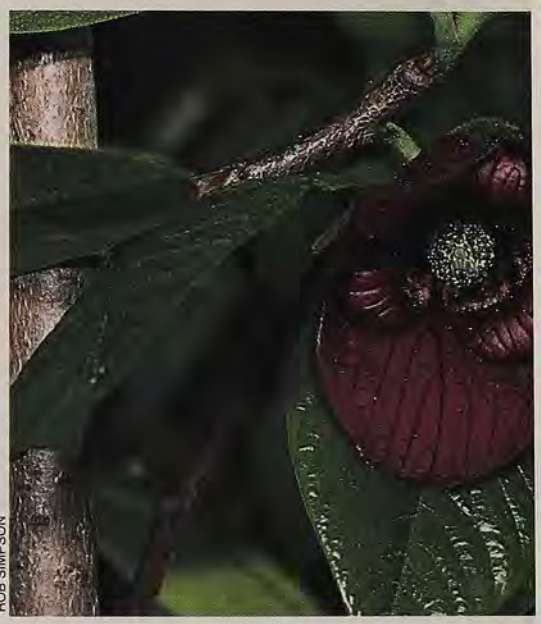
A resurgence of interest in the pawpaw was seen well before the variety trials began, however. Nursery owners report sales of pawpaws have been increasing steadily over the last five to 10 years, and some have been hard pressed to keep up with demand.

Jim Gilbert, owner of Northwoods Wholesale Nursery in Molalla, Oregon, and a PawPaw Foundation board member, started growing pawpaws in the mid-1980s. Since discovering that plants shipped bare-root had a low survival rate, Gilbert began growing and shipping his pawpaw seedlings in pots and encouraging his retail customers to do the same. He now sells between 20,000 and 25,000 grafted pawpaws annually to retail outlets across the United States and Canada. Although the pawpaw is not native to the Pacific Northwest, it has proven hardy there.

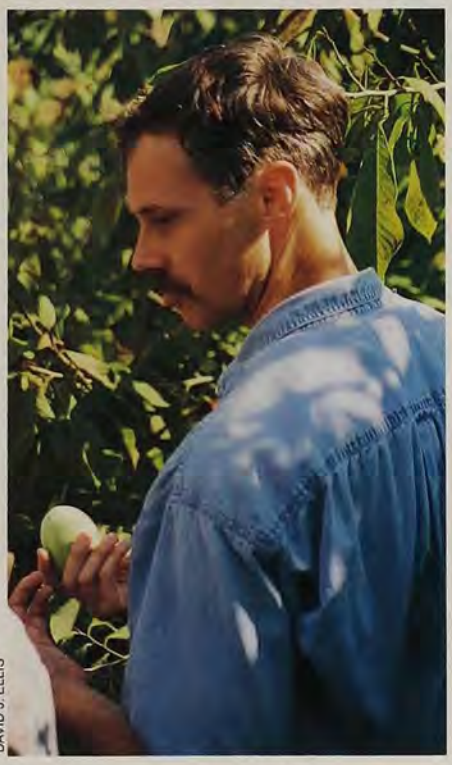
On the East Coast, Mike McKonkey of Edible Landscaping, a retail nursery in Afton, Virginia, sold about 600 trees grown from seed in 1994, but is expanding and expects to sell 2,000 this year.

The exotic flavor of pawpaws has also caught on with a few chefs. Several restaurants in Michigan, including Gutheries Restaurant in Grand Rapids and Clarkston Café in Clarkston, offer seasonal pawpaw desserts. At the Stouffer Renaissance HarborPlace Hotel in Baltimore, Maryland, Executive Chef Guy Reinbold has made salsas and chutneys from pawpaw to go with seafood and chicken dishes.

The first written documentation of the pawpaw comes from the accounts of de Soto's 1541 exploration of the lower Mississippi valley, but fossil records of the genus have been found in New Jersey dating to the late Miocene epoch, about 15 million years ago, and in Mississippi from the middle Eocene, between 45 million and 55 million years ago. But the fossil record hasn't explained why this temperate species' closest relatives are in the tropics of South America and Africa. Researchers believe the annona family originated before continental drift separated South America and Africa more than 90 million years ago. James Doyle, a botany professor at the University of California at Davis, says the pawpaw's closest living relatives are in the genus *Cymbopetalum*, found in South America, but *Asimina* is also closely related to an African genus called *Mkilua*. David Dilcher, a researcher with the Florida Museum of Natural History at the University of Florida in Gainesville, suggests that the spread of the pawpaw's ancestors



ROB SIMPSON



DAVID J. ELLIS

Seedlings grown by Neal Peterson, above, founder of the PawPaw Foundation, form the core of a germplasm orchard at Keedysville, Maryland, top left. The pawpaw's exotic triangular-petaled flowers, left, bloom between March and May.

was probably connected to an explosion in the number of mammal and bird species in the Eocene. During that period, he says, "you begin to get fleshy fruits with seeds, and nuts. The plants were actually co-opting the animal to take the seeds and move them away—a method of encouraging outcrossing."

Native Americans apparently helped redistribute the pawpaw from the southern locations where the species took refuge from glaciation to its current limits of cold hardiness and drought tolerance. De Soto and other early explorers documented the planting of trees by certain tribes, a practice that Peterson speculates could have been the base for a rudimentary process of selection based on fruit quality. He points out that Native American cultures have been known to cultivate and domesticate other important food or medicinal crops, including maize and squash. In addition to harvesting the fruit, Native Americans used the fibrous inner bark of the tree for weaving baskets and as a type of cloth.

Native Americans even played a role in naming the pawpaw. The genus name *Asimina* is said to be a derivation of *assiminier,* the French form of *rassimina,* a Native American word for the fruit. The common name is believed to stem from the resemblance of the pawpaw to the fruit of the unrelated tropical tree *Carica papaya,* commonly called papaw.

As settlers adapted to their new homeland, the pawpaw was assimilated into the fabric of rural life in the Midwest and South, serving as an emergency food source for farmers when crops failed and leaving the legacy of its name on numerous landmarks. With the gradual shift of the population from rural to urban areas in the late 19th and early 20th centuries, the pawpaw began to fade into obscurity, known to many only through the lyrics of the children's folk song "Way Down Yonder in the Pawpaw Patch."

Although he ate pawpaws as a child growing up in West Virginia, Peterson's serious interest in pawpaws was sparked in the late 1970s while doing his graduate work at West Virginia University in Morgantown. As a lab assistant for an ecology class, he spent considerable time amid stands of pawpaws along the Monongahela River. "I was studying genetics and evolution, and I was interested in wild food plants. I thought, 'This is a wild fruit,' and I made this leap of imagination. If thousands of years went into the progress we have in apples, then what would you have if you put the same effort into pawpaws?" Peterson began researching the history of the pawpaw and learned about pawpaw collections and breeding programs developed earlier this century by George Zimmerman, Benjamin Buckman, John Hershey, H. A. Allard, and at the Blandy Experimental Farm, now affiliated with the University of Virginia. "I realized the starting point for work with the pawpaw was not random wild accessions but a select base of germplasm, if it could be found," says Peterson.

Over the course of five years, Peterson tracked down the sites of all the historic collections. Working in a near void of written records, he gathered open-pollinated seeds representing the remnants of historic pawpaw cultivars in those orchards.

The seedlings produced from those

seeds, along with seedlings from promising germplasm collected in the wild, formed the backbone of what would become the foundation's orchards in Maryland. As the collection expanded, Peterson realized that the program he envisioned was much bigger than one person could handle, so in 1988 he formed the PawPaw Foundation to bring together researchers, nursery owners, and others interested in growing and improving the pawpaw.

Faced with a tremendous amount of germplasm, Peterson learned to be ruthlessly selective, quickly weeding out trees that lacked desirable characteristics. Among the top considerations for marketing are thicker-skinned and less perishable fruits; fewer and smaller seeds; single rather than clustered fruits; increased yield; lower toxicity in skin, flesh, and seeds; smaller trees for easier harvesting; improved hardiness and drought tolerance; and delicious fruit.

Taste-testing is crucial to the process; consequently, foundation members taste hundreds of pawpaws each fall. Each is evaluated on aroma, color of flesh and skin, texture of flesh, flavor, and aftertaste. The texture of the flesh ranges from that of a ripe avocado to thick yogurt or heavy custard. Flesh color varies from creamy white to yellow, golden, and even pale orange.

When cut open, ripe pawpaws have fragrance and taste ranging from mango to piña colada or caramel. Undesirable pawpaws can smell or taste bitter, resinous, or sulfurous. Peterson says an individual's reaction to the first taste of pawpaw is as likely to be based on the interesting consistency of its flesh as on its intense flavor. "We've found texture, especially in novice tasters, to be a major factor in their response to pawpaws."

The pawpaw's unorthodox method of ensuring seed dispersal is one of its supreme paradoxes. The skin and flesh of immature fruits contain the same toxic compound found within the seeds. Animals that snack on unripe pawpaws are likely to become nauseated and, thus, less likely to eat immature fruits again. This characteristic seems to be the basis for the apparent sensitivity to pawpaws seen in a small percentage of people. A PawPaw Foundation board member, Colleen Anderson, can eat little or no pawpaw fruit without suffering a reaction, and another board member, Jerry McLaughlin, is very sensitive to underripe pawpaws.

McLaughlin specializes in pharmacognosy, the study or use of natural products for medical purposes, at Purdue University in West Lafayette, Indiana. He has identified a number of compounds in the pawpaw that show promise as both natural insecticides and cancer-fighting drugs.

Despite his own experience, McLaughlin believes pawpaws cause allergic reactions in no more people than do fruits such as strawberries. "I don't think pawpaws will cause much of an allergy problem," he says.

McLaughlin, who began working seriously on pawpaws around 1980, says plants from the annona family have traditionally been used by many cultures for various medicinal and herbal purposes. An extract from annona seeds is a remedy for hair lice in India. In Thailand, leaves of the genus *Goniothalamus* are sprinkled on the floor to keep insects out of the house.

To date, McLaughlin has isolated nearly 30 compounds from *Asimina triloba* and an additional 45 compounds from *Annona bullata*, which grows in Cuba. Pawpaw leaves contain some compounds, but the seeds and bark are the most productive sources. Harvesting twigs and branches seems to be the best way to obtain material that can be regenerated with minimal damage to the tree. Dried twigs are pulverized and soaked in an alcohol solution to extract a crude concentrate. The raw compound is so powerful it kills brine shrimp at less than one part per mil-

MARYL

ANITA SABARESE

Breeders would like to reduce the size and number of the pawpaw's large glossy brown seeds, above. Anita Azarenko, top, a researcher at Oregon State University in Corvallis, checks the aromatic quality of a pawpaw. Opposite, PawPaw Foundation members examine some of the pawpaw's tropical relatives from the annona family, including the large spiny fruits of* Rollinia mucosa, *brought by Har Mahdeem, at right, a breeder of Annonaceous fruit trees with Zill High Performance Plants, Boynton Beach, Florida.

MARYL

lion (ppm), compared with strychnine, which requires about 75 ppm.

Individual compounds are long chains of carbon atoms known as fatty acids, or acetogenins. One molecule of a compound McLaughlin calls "Asimicin" is enough to kill a cancer cell. McLaughlin has determined that a dose of one-millionth of a gram is effective in treating cancer in mice, but there is little margin for error. "As with any anti-cancer drug, we have to walk a tightrope between a dose that will kill cancer cells and a dose that will kill normal cells," he says.

Cancer cells have shown increasing resistance to drugs designed to kill them—they develop a "pump" that rids them of the drugs. But tests show that pawpaw compounds are able to shut down the activity of the cancer-cell pumps so other drugs can enter and kill the cells. McLaughlin is testing pawpaw compounds in combination with Adriamycin, a drug used in chemotherapy.

McLaughlin has also tested pawpaw compounds for use as organic insecticides. So far, one extract kills such pests as nematodes, tobacco horn worms, bean beetles, potato bugs, and cabbage loopers. He feels the insecticide holds great promise, especially in ornamental horticulture. "There's a real need to find botanical alternatives to pesticides," he says.

Despite the promising early returns on pawpaw compounds, McLaughlin is still seeking major pharmaceutical or chemical companies to finance the additional research and testing needed to get the compounds over the final hurdle of federal approval. In the meantime, he has patented the most promising of the compounds in expectation of future development.

Production of effective pharmaceuticals made from pawpaws might stimulate a demand for orchards where pawpaw twigs and branches can be harvested annually, but in the long term Peterson predicts that if the pawpaw's compounds are approved as pesticides or anti-cancer drugs, researchers will quickly develop synthetic forms of the products. "In practice you'll probably see separate industries established," he says.

Although he has high hopes that pawpaws will eventually attain widespread popularity, Peterson has a more modest vision for the next decade. He sees a place in the supermarket for pawpaws alongside other exotic fruits such as kiwis and mangos. "I think in the near future, say about 10 to 15 years, the pawpaw will have a small market and a specialty market," he says. "I think it'll be used in restaurants, in some specialty stores, and in some of these specialty catalogs that sell fruit baskets."

David J. Ellis is assistant editor of American Horticulturist.

SOURCES AND RESOURCES

The PawPaw Foundation is a nonprofit organization dedicated to research and development of *Asimina triloba*. Membership is $15 annually. For further information, write the PawPaw Foundation, P.O. Box 23467, Washington, DC 20026, or call (202) 484-1121.

Sources of pawpaws include:

Grafted pawpaws

Burnt Ridge Nursery, 432 Burnt Ridge Road, Onalaska, WA 98570, (206) 985-2873. For catalog, send first-class stamp.

Campberry Farms, Rural Route 1, Niagara-on-the-Lake, Ontario L0S 1J0, Canada, (416) 262-4927. Catalog $2.

John Gordon Nursery, 1385 Campbell Boulevard, Amherst, NY 14228, (716) 691-9371. Send a legal-size SASE for catalog.

Hidden Springs Nursery, 170 Hidden Springs Lane, Cookeville, TN 38501, (615) 268-2592. Catalog $1.

Northwoods Retail Nursery, 27635 South Oglesby Road, Canby, OR 97013, (503) 266-5431. Catalog free.

Seedlings

Edible Landscaping, P.O. Box 77, Afton, VA 22920, (804) 361-9134. Catalog $2.

Hartmann's Plantation, Inc., 310 60th Street, Grand Junction, MI 49056, (616) 253-4281. Catalog free.

Learning

BY RICHARD DEVINE

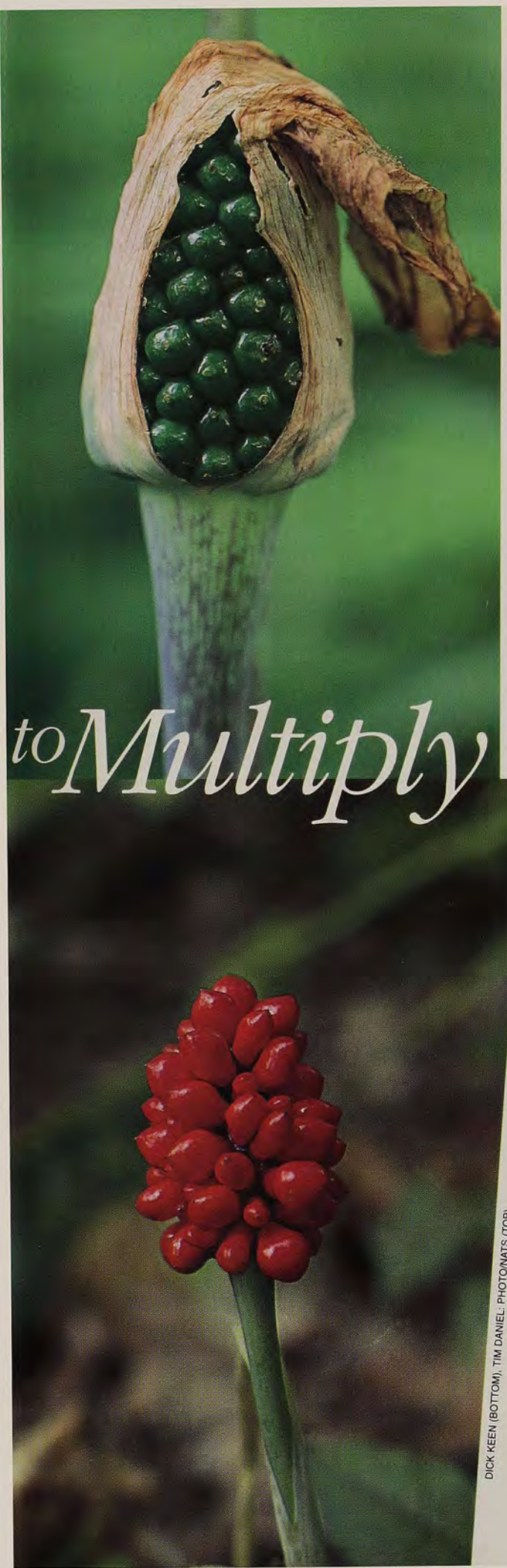
When I was hired as head gardener of a private estate in north central Florida 18 years ago, the landscaping was somewhat formal and limited to exotic shrubs and annual bedding plants like begonias, dahlias, and impatiens. The landscape's natural upland forest backdrop of live oaks, laurel oaks, sweet gums, and pines went unnoticed by all of us. Natural landscaping was not in vogue.

Nor did there seem any need to propagate our own plants. My budget was ample, so I purchased everything as plugs or mature plants. It took too long to grow usable plants from seed, I felt, and germination was too chancy when we needed thousands of plants at one time.

What I didn't want to admit was that I still had problems. Each year I lost a lot of plants to disease. That shade-providing tree cover made it difficult to grow grass and many exotic annuals. Fungus outbreaks made it necessary to use pesticides and to replug or resod grass every year. To alleviate those problems, we constantly trimmed and thinned the trees to bring in more light. We spent large amounts of money and energy just to maintain the status quo.

About seven years ago, struggling to persevere, I began to search the horticultural literature for some answers. I found an increasing number of references suggesting that humans had gotten out of sync with the environment and that we needed to use more native plants in our landscape. Today, natives have

DICK KEEN (BOTTOM), ROB AND MELISSA SIMPSON (TOP)



After Jack-in-the-pulpit blooms in spring, far left, the fertilized female, at right in bottom left photo, begins to swell with seed-bearing fruits. When they turn bright red, seed collectors know they're ready for harvest.

DICK KEEN (BOTTOM), TIM DANIEL: PHOTO/NATS (TOP)

to Multiply

With some study and patience, you can propagate your own favorite natives.

become celebrities of sorts. They've been neglected and overlooked for so long that we buy them and venerate them in gardens where they should naturally reign supreme.

Soon after I began buying native plants, I realized how many places they might be used and how many more I needed. We had room for literally thousands of wildflowers throughout our gardens, woodlands, and lanes. But many of the plants were either unavailable in nurseries or too expensive to purchase in large quantities. With two large greenhouses, we certainly had the facilities to propagate our own—it just seemed like a natural extension of growing them. So after I purchased plants, or as I tramped through the woodlands and along roadsides, I began to collect seeds and cuttings to add to our own stock.

The techniques we use to propagate native plants are no different from those used for any other plants. I learned early on, however, to familiarize myself to some degree with the life cycle of the plants to be propagated—when they set mature seed and how to recognize seeds that are ready for collecting. Much of this information was easily obtained by talking to others who shared the same interest—native plant societies, and horticulture and gardening groups—and from a number of fine books on the subject. (See "Resources," page 40.) I found that there was no substitute, however, for just traipsing around in meadows and woods and taking good field notes in the process. Good notes taken over a number of years save a lot of wasted time later, since the information gathered can be used to nar-

row down collection times.

Recognizing ripe seeds is usually—although not always—straightforward. The telltale sign of maturation tends to be a color change, with the seeds themselves turning from white or green to dark brown or black. In some plants—penstemon, lobelia, hibiscus, stokesia, iris—seed pods and capsules may turn dark brown. In others—dogwood, magnolia, red chokeberry—the fruits turn a more colorful hue. There are many wet areas near the estate, and it isn't difficult for me to pinpoint collection times for bog-loving Jack-in-the-pulpit (*Arisaema triphyllum*), whose bright red berries are visible from a considerable distance. In yet others, such as many members of the aster family (ironweed, goldenrod, Joe-pye weed), the formation of a fuzzy or silky tuft gives away their maturity. The black, swollen seed head of black-eyed Susan (*Rudbeckia hirta)* or purple coneflower (*Echinacea purpurea*) is another example of obvious change.

Some plants, on the other hand, hide their delicate condition rather well. Seeds of butterfly weed (*Asclepias tuberosa*) can be ripe even though the pod is still green. The only way you can tell for sure is to open the pod. If the seeds are dark brown or black, they're ready.

Some wildflowers set seed and disperse them relatively quickly, while in others, maturation seems to drag on for many months. I sometimes mark plants that develop inconspicuous seed heads with a red ribbon or flag while they're in flower as a reminder to revisit them later. If I'm not sure I will get back in time, or if I know the plant disperses its seeds explosively, I tie a paper bag over the inflorescence to catch the seeds. The maturation process of pinkroot *(Spigelia marilandica)* seeds, for instance, is famous for proceeding slowly at first and then accelerating so that the seeds are scattered when you least expect it. The first time I collected *Spigelia* seeds, I dropped the pods into a plastic cup on my desk and promptly forgot about them, assuming that they would split open and drop the seeds passively. Several days later, while I was working at one end of my desk in the quiet of morning, I became aware of a popping sound at the other end. Searching cautiously for the origin of the sound, I discovered the *Spigelia* seeds spraying all over the room! Now when I return to the greenhouse with seed capsules that are turning brown but aren't quite ready to split open, I hang them on the wall in a paper bag until they finish ripening.

Larger seeds, such as those of stokesia, hibiscus, and iris, are easy to remove from their capsules by hand. Smaller seeds encased in tough capsules, such as penstemon or verbascum, can be dislodged by crushing them. Other tiny seeds, such as those of columbine or salvia, are hard to retrieve by hand but fall out easily when shaken vigorously in a paper bag.

Any chaff can be removed by running the seeds through a sieve, gently blowing air over them, or winnowing—pouring the mixture from container to container under a light fan or breeze. More often than not, though, I skip this step, since I find it easier—and usually no more hazardous to the germination process—to scatter seeds and chaff together on the soil surface.

When seeds have a fleshy covering, like those of Jack-in-the-pulpit, it's best to remove it. This pulp can delay germination up to several months and make the fruits a target for mold. We usually soak the fruits overnight and then remove any clinging pulp under running water. Before you clean seeds in this manner, however, it's good to know how big they are. The first time I cleaned the seeds of firebush *(Hamelia patens)* this way, I hadn't been able to find information on their size. By the time I macerated the fruit and ran it through a sieve, the seeds had disappeared.

ROB AND MELISSA SIMPSON

PRISCILLA CONNELL: PHOTO/NATS

Our native dogwood, below left, produces seeds with a pulpy outer covering that should be removed before storing or sowing them. Butterfly weed, above, can have ripe seeds while its pod is still green. Once the dry brown pods split open, right, the seeds are scattered to the winds.

DAVID CAVAGNARO

I finally isolated the one-third-millimeter black seeds by mashing the purple fruit on a paper towel, spreading it out with my finger, and picking through it with the aid of a magnifying lens.

Some growers recommend removing these small seeds by running the fruit through a kitchen blender and running the resulting concoction through a sieve, or soaking the seeds in warm water and yeast that starts the fruit fermenting. I've never had to resort to such brews, however, and for small seed quantities I often just remove the pulp by hand.

While many seeds are easily germinated, others have complex chemical or physical barriers that prevent their germinating at the wrong time. The breakdown of those barriers is synchronized to seasonal cycles so that seedlings will have the longest possible time to adapt to their environment before cold weather sets it. The seeds of native plants are likely to have more complicated barriers than commercially sold seeds, which are bred to be easy to grow.

The easiest way to break these barriers is to let nature do the work. Seeds sown in cold frames in fall will germinate in their own time after going through the proper sequence of warm and cold. We use the smaller of our two greenhouses as a cold frame of sorts, growing in it only those plants that can withstand ambient temperatures (and we lower winter fuel bills in the bargain).

If you're impatient and don't want to wait a year or more for a seed to germinate, you can sometimes speed up the process. Hard seed coats such as those of blue star *(Amsonia tabernaemontana),* iris, and coontie *(Zamia pumila),* which slow the penetration of water, can be scarified—nicked or punctured with a knife or other sharp tool, or rubbed against sandpaper.

Coontie, an attractive and versatile evergreen shrub, is a doubly hard nut to crack. Each seed, originally attached to a cone-shaped structure that emerges from the plant's center, is encased in a tough outer membrane and a hard inner shell. Under natural conditions it takes many months for water to penetrate the seed coat. With information provided by a neighbor who teaches biology at a nearby middle school, our grounds staff germinated hundreds of coontie seeds in just a few weeks by first peeling off the outer layer and then snipping off the tip of the inner shell with pruning shears.

Similarly, the germination time of blue star can be reduced from four months or more to about one month by first breaking off the tip of the seed coat and then soaking the seeds overnight in water.

Not all seeds need such elaborate preparation; just filing a notch in the coat may be all that's necessary to allow water to penetrate to the embryo.

Exposing seeds to an artificial winter or summer to hasten germination is called stratification, after an old English practice of layering the seeds in flats outdoors. After removing the pulpy outer covering from dogwood *(Cornus florida)* and southern magnolia *(Magnolia grandiflora)* seeds, we mix them with moist sand and put them in a vial or plastic bag and refrigerate them for 90 to 120 days. Once they've had their required cold period, there's little to stop germination: We've had New Jersey tea *(Ceanothus americana)* seeds germinate in vials stored in the refrigerator because we waited too long to sow them. Keep in mind that seeds from

the same species grown in different parts of its natural range may vary slightly in the time that they need to be exposed to cold. So especially if you'll be letting nature do your stratifying for you, it's best to collect seed locally.

Some plants need both warm and cold treatments. Seeds of fringe trees *(Chionanthus virginicus)* develop strong root radicles during warm stratification and produce stems during cold treatment.

Lengthy dry storage at room temperature will lower the germination rate for most seeds, so if we won't be sowing them for more than a month, we clean and dry them and store them in the refrigerator in vials or plastic bags. We've found plastic film containers excellent for storage of small seeds and Zip-Loc bags for larger seeds. Some books suggest including a small amount of silica gel or powdered milk in cheesecloth to absorb any moisture, but unless you plan to store the seeds for a long time, I don't think that's necessary.

In nature, the pulp on fleshy fruit such as hollies, Jack-in-the-pulpit, or chokeberry *(Aronia arbutifolia)* serves to keep the seed somewhat moist prior to germination, so while we remove the pulp to prevent mold, we store these seeds in moist sphagnum moss in a plastic container. Dogwood and southern magnolia, however, have hard shells under their pulp, and we store them dry like most other seeds.

Here in Florida, most seeds can be sown outdoors almost year-round without any danger. Depending on weather conditions, and whether we have enough seeds to tolerate a lower germination rate, we often sow seeds directly where they're going to grow, such as in our meadow. In other instances, we scatter the seeds thinly on soilless mixes spread one-and-a-half to two inches thick in 1-by-2-foot flats, and then spray them with water to achieve good contact. Very tiny seeds generally don't require covering. The general rule is to cover larger seeds to a depth four times their width, but the depth isn't critical as long as they're covered. We label each flat with the species and date of sowing (we keep more detailed records in a computer), then cover each with a sheet of glass to keep the soil surface from drying out.

Most of the wildflower seeds germinate in one to three weeks. Shrubs and trees can take considerably longer. Don't give up hope, and don't throw away the flat too soon. One group of American holly seedlings popped up six months after we planted them, just when I had decided nothing was ever going to happen.

Once the seedlings are up, we fertilize them with a dilute solution of a balanced fertilizer, such as 20-20-20. Although it's best to transplant them when the first set of true leaves are expanding, I find more often than not that we don't get to them until they've become a tangled mess that has to be pulled apart for planting. Last spring we had good germination with cardinal flower *(Lobelia cardinalis)*—so good that the plants in one of the flats couldn't be separated. Rather than throw them out or spend hours separating them, I slipped the whole mass from the flat and pressed it down into the wet soil of a lowland. Most of them rooted and are now flowering. Seedlings are a lot tougher than most people give them credit for. Some seem to do quite well even with rough treatment, as long as they receive enough moisture while they're getting established.

ROB AND MELISSA SIMPSON

Crinum lilies, below, form large clumps and can be easily reproduced by division. The author found that cardinal flower, blooming above and in seed at right, germinated abundantly.

JESSIE M. HARRIS

Another excellent way to propagate some plants is through stem and root cuttings. We take cuttings quite often when we only need a few plants or when they root relatively easily. Cuttings will give you a mature plant faster than seeds and will also produce an exact replica of a special parent plant. Deciding whether to take root cuttings or stem cuttings and, if the latter, whether to take softwood, semi-hardwood, or hardwood cuttings, takes

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some research and experience. Generally, softwood cuttings are those taken in spring, semi-hardwood cuttings are those taken in summer, and hardwood cuttings from deciduous shrubs and trees are those obtained in fall when the plant is dormant. Many needle-leaved evergreens can be rooted from stem cuttings taken in late fall. Source books on propagation and just plain trial and error will show you the best time to take cuttings of a particular species in your area.

Sanitation is crucial when taking cuttings. All equipment should be thoroughly cleaned with a 10-percent bleach solution and disinfected again between cuttings. Using pruning shears, we take our cuttings early in the morning when the air is cool and still humid, and usually in the early spring or late fall, again because temperatures are cooler. We pop the cuttings in a plastic bag to keep them moist until we get back to the greenhouse, where we cut the stem again, this time using a razor blade and on a slant to expose as much of the stem's surface area as possible. Now working with a cutting three to four inches long, we remove all the flower buds and all the leaves on the bottom third of the stem. If the plant has large leaves, as do *Leucothoe axillaris, Hamelia patens,* and many rhododendrons, we cut off half of each of the remaining two to three leaves to prevent excess water loss through transpiration. This also keeps the leaves from touching each other, which might spread disease.

Depending upon how easily a particular species roots, we treat the cut end of the cutting with one of a number of different strengths of rooting hormone. Root-Tone and Hormodin, both dry mixes of hormone in talc, are the two we use most often. There are also rooting compounds in liquid form, which we have never tried although I hear they work well. Some plants, such as coral honeysuckle *(Lonicera sempervirens),* root easily even with dilute concentrations; in fact, we've rooted them in water. Others, such as leucothoe, require stronger doses, and a few, such as fringe tree, are virtually impossible to root from cuttings.

We next stick the cutting into a soilless mix, after making a hole for it with a finger so all the hormone powder won't be knocked off. I don't think the type of soilless mix matters so much as that it is well-drained and free of contaminants. We use a mix of half peat and half perlite; peat and sand works fine, too. We've also had excellent results with Pro Mix, a commercial product containing predominantly peat and perlite that's used extensively in the nursery trade for growing bedding plants.

To give the cuttings a moist environment until roots form, we put the flat of cuttings in a 3-by-8-foot tent made of 1-by-2-inch lumber, covered with translucent polyethylene sheeting. If we're trying to root just a few cuttings, a styrofoam cooler covered with clear plastic sheeting works well. Individual pots can be covered with large freezer bags held away from the plant with sticks and secured at the bottom of the pot with a rubber band. Maintaining high humidity is important, however you do it, since water loss is a new cutting's biggest enemy. The establishment of a good root system can take a couple of months or more.

When thinking about propagating herbaceous perennial natives, don't forget division just because it's easy! Just as with

ROB SIMPSON

ANITA SABARESE

Swamp mallow, in bloom at top, produces seeds, above, that clearly darken when ripe and are easy to remove from its pods.

the exotic ornamentals we grow in our perennial beds, it not only increases the number of individual plants in our collection but also rejuvenates older plants that are too crowded. Divisions also flower sooner than seedlings. Our stock of blue-eyed grass *(Sisyrinchium atlanticum)* has increased from 80 original plants to more than 1,000 in just a few years simply by our pulling them up in the fall, separating the clumps, and replanting them. We also use this method on Stokes' aster *(Stokesia laevis)*, orange coneflower *(Rudbeckia fulgida)*, long-leaf coreopsis *(Coreopsis gladiata)*, crinum lilies *(Crinum americanum)*, and many others.

We try to divide the plants when they're dormant or at least a good long time before they're ready to bloom—either early spring for fall bloomers or early fall for spring bloomers. All you need is a sharp knife, spade, or shovel. Many times, plants can be pulled apart by hand. Just make sure that each division has enough roots and eyes to survive on its own. The divisions can be potted, as we do with orange coneflowers (you can give them more attention as their roots get established) or replanted as we do with the blue-eyed grass (there are too many of them to pot and we know they establish well with a minimum of attention). Some plants, such as columbine, are easily disturbed by this process so they have to be handled carefully. (This is another instance where you have to get to know the individual plant, through reference books or personal experience.) The divisions are then watered and mulched, which keeps moisture at their roots and prevents overheating in summer. With the sandy soils we have in Florida, we have to check them often to make sure they stay moist until they're established.

This narrative is in no way meant to be a thorough primer on plant propagation. Rather, it's intended to spark an interest in a fascinating and complicated biological process. Propagating native plants growing nearby—and not endangered—is fun, economical, and a way to obtain plants that may not be readily available from nurseries. But above all, it's an educational process that brings us closer to the natural world that surrounds us.

Richard Devine is a free-lance writer and the horticulturist for a private estate. He lives in Crystal River, Florida.

RESOURCES

Richard Devine recommends the following references:

Collecting, Processing, and Germinating Seeds of Wildland Plants by James A. and Cheryl G. Young. AHS member price: $22.50.

Growing and Propagating Showy Native Woody Plants by Richard A. Bir. AHS member price: $26.95.

Growing and Propagating Wildflowers by Harry Phillips. AHS member price: $15.

Seeds of Woody Plants in North America by James A. and Cheryl G. Young. AHS member price: $44.95.

See ordering information on page 17.

Unwelcome Vistas

A designer analyzes our dysfunctional suburban landscapes.

STORY AND PHOTOGRAPHS BY KATHLEEN CULLEN

Unlike our ubiquitous foundation plantings, this dooryard garden beckons guests to the front door and perfectly complements the style of the house.

It's quite miraculous that I've never been in a serious car accident. As if in a horticultural blackout, I often arrive at my destination not knowing how I got there because I habitually observe gardens and landscapes more than I do the road.

On one of these voyeuristic trips, I challenged myself to define the essence of a successful landscape. Going beyond horticultural do's and don'ts and into psychological and social influences, I realized that putting the wrong plants in the wrong places is not the major problem with so many of our landscapes. It goes deeper than that. It's more a matter of our motives, attitudes, and expectations.

In my 11 years as a landscape designer I have found that people usually fall into one of two categories in their approach to landscaping: either they look to others in deciding what they should do or they look to themselves. Looking to others is by far the more common approach and to my mind the root of all landscaping evils.

If we are not sure of how to do something, it is natural that we look to others for guidance. As in any other field of design, if our motive for and approach to landscaping is to do the socially correct thing, imitation is seen as the safest approach. If we merely imitate, however, we never learn. Lack of knowledge leads to insecurity; monotony leads to trends and more imitation. But what if we're imitating something that's an abomination to begin with? Then we are left with an epidemic of mistakes.

A perfect example of this is the sudden outbreak of berms in front of newly built houses. Erupting out of nowhere on an otherwise totally flat terrain, they are visually analogous to speed bumps in a foot-

ball field. The first berms were probably conceived to improve drainage in soil compacted by construction equipment. Someone may have decided that mounding new soil over the hard surface would give the plants a better chance of survival. Yes, the plants did survive better initially, which solved the landscape nursery's guarantee and replacement problem. But what about the long-term health of the plants, encouraged by the shallow layer of well-aerated soil to produce many surface roots close to the plant crown, rather than spreading in their normal way? These surface roots not only dry out more quickly, but make the plants more likely to topple over in storms because they have been unable to anchor properly. And what about aesthetics? Do we really put these berms in front of our houses because we're convinced they look right, or does the fact that everyone else seems to be doing it make it seem the classy thing to do?

Learning to stop looking at what everyone else is doing and develop our own sense of style, harmonious with the style of our homes, takes time and effort. But by doing so we can avoid many pitfalls and will be far happier with the finished product. Until we have that time, it would be far better to do nothing at all than to perpetuate the repetitively impersonal landscaping that blankets the face of suburbia.

In developing our own style, we need to take an unapologetic look at our personality. If we are by nature what is commonly derided today as a "neat freak," then so be it. Next year our personality trait might even be in vogue. In choosing a landscaping style, however, we must realize that something like a cottage garden, no matter how trendy, is just not for us. The essence of a cottage garden is its casual, unrestrained attitude. It tends to be floppy and a bit unkempt at times, so for a fastidious personality it would be a persistent itch and a big mistake. Like the platform shoes that were once the rage but gave those of us with normal feet a burning pain straight up to our shoulders, it's all wrong for us even if it's "in." So instead of the hollyhocks and cosmos that we find so appealing in pictures, we'd better consider such plants as *Ilex crenata* 'Helleri', dwarf conifers, and some well-behaved perennials and annuals. We'll be much happier with them in the end. Some insecure know-it-alls will think we are out of touch, but we'll know where that's coming from. Those who are really in the horticultural "know" realize there is a place for everything and every style, and they revel in individual differences. We must all learn to be careful with our treasured preferences—they easily become prejudices.

Along with our own personality we need to consider the personality of the house. Andrew Jackson Downing, the father of American residential landscape design, wore himself out trying to promote this most important principle: Landscaping must be in harmony with the architecture of the dwelling. A century and a half later it is still one of the most important principles. To ignore it is to create incongruous and absurd settings. We frequently disregard this when we are driven by an entirely different motive—trying to be different. In this case, instead of conforming and being socially acceptable, we want to stand out from the crowd, so we seek novelties for our landscaping.

Examples of this are often found in attempts to renovate overgrown landscaping around an older house. Stately and wonderfully stodgy old Georgian colonials, for example, are given a new look with spiraled junipers flanking the front door and weeping conifers or ornamental grasses "softening the corners," according to designer lingo. The result is reminiscent of an anachronistic amusement park. We will certainly stand out from the crowd, but not in the way we had hoped.

The more appropriate approach for such architecture would be to examine the existing plants to see if they can be pruned or transplanted. If replacements are necessary, we should not plant two-gallon azaleas but spend time shopping for large plants in scale with the house and surrounding plants. They should also be plants in keeping with the era of the house, perhaps reaching back in time for a bridalwreath spirea rather than this year's "must-have" dwarf conifer. If this is done, we will not compromise the irreplaceable feel of age that is the very soul of the house.

Scale is another crucial element of any successful landscape. A two-story house cannot tolerate the same use of dwarf plants that would be suitable to a ranch. They might be used as ground cover, but to use them as main plantings gives the effect of little corsages pinned on the house. Oppositely, if we fall in love with a little weeping cherry and plant it five feet from a ranch house, it will eventually swallow up the entire structure.

Overkill in the use of specimen plants is a mistake frequently made in landscaping contemporary houses. We often fail to realize that specimen plants are no longer specimens when they become one of the crowd. A weeping 'Blue Atlas' cedar in the midst of spiraled junipers, weeping cherries, pompon this-and-that loses its uniqueness and becomes a mere competitor rather than an accent. These sculptural plants need to be surrounded with simplicity in order to perform their best. Several might be used if they are sufficiently separated by massed background plants such as spreading yews, which act like an intermission between shows or a refrain in a song. But the beautifully simple and clean lines of contemporaries should not be cluttered with an overabundance of novelty items. They often detract

The total absence of foundation plantings, far left, can be a striking design solution. These vintage boxwoods, near left, are to be revered for their age, but the historical house would fare better if they were carefully pruned back or even removed. Poorly conceived and often overplanted berms, below, remind the author of speed bumps in a football field.

from and compete with the house rather than serving to enhance it. We cannot err on the side of simplicity.

The topic of covering up a house with plantings leads to one I find truly perplexing: the mystery and mystique of foundation plantings. If I could figure out why we do it perhaps I would also discover how to wrench suburban America away from the most persistent and unyielding habit to ever clutch the people of this land. It is not a wholesale practice in other countries to which many of us trace our roots, so it can't be in our genes. It was never seen in our early colonial days. The first symptoms began to surface after Victorian porches gave way to houses with exposed foundations that were thought to be eyesores. But whether or not we currently have ugly exposed foundations, we still insist on covering up every last square inch of the perimeter of our houses with plants. Shocking as it may seem, some houses would look far better without any foundation plants. For instance, why should we cover up a warm and welcoming front porch with shrubs? Or hide beautiful fieldstone behind overgrown evergreens? Or blur the crisp lines of a contemporary house with contradictory frill? A suitable and effective solution is often nothing at all, but we seem to find that unthinkable. Plants should frame a house, not encase it. A very pleasant effect can be achieved by having our plantings off to the side or serving as a background. Rather than planting in front of the house, we can nestle the house into a beautiful framework by working out from the rear corners back toward the front.

Another alternative to foundation plantings is the dooryard garden, an idea reminiscent of the early colonial days when landscaping was not in most people's vocabulary. A small area by the front door was enclosed to keep animals out. This space was used for the few ornamentals that these hard-working, practical homesteaders could afford. It may or may not have been an informal cottage-style garden. Each dooryard garden had a personality all its own and was planted with whatever annuals or perennials could be had from seeds or cuttings. They were certainly not designed in any sophisticated way, but rather were planted for the sheer enjoyment of watching the individual plants grow wherever they would, perhaps with the added bonus of some herbs for household uses.

These gardens work magic with Cape Cod styles as well as vintage colonials, saltboxes, and farmhouses. They add charm while evoking a feel of the house style's era. They can also give personality to a ranch or split-level that might otherwise lack definition. And a dooryard garden has a very practical benefit in clearly marking the front entrance with the welcoming feel of an outdoor foyer. Various styles of low fencing can be used to enclose a small garden that reaches out from the front door. We rarely think of fencing as anything but functional, but the many charming styles available to us today can be used as architectural features within the property.

A carefully chosen variety of evergreens, below, forms a more interesting screen than the usual row of clones, right.

It is unfortunate that front walkways are becoming obsolete and driveways are becoming integral parts of our landscapes. A great majority of houses have rather insincere hidden paths from the driveway to an equally hidden front door. I often find myself standing beside my car in a new client's driveway with a rather befuddled look on my face as I desperately seek clues to an entry. When I moved into my own house a year ago, it too had a severe case of this clogged artery syndrome. When a friend came to visit for the first time she shivered in the cold for long, miserable minutes, knocking on the garage door. Although I tend to be reclusive, that's no excuse for making people feel unwelcome. My first priority in spring was to create a more inviting front entry.

The topic of reclusiveness brings us to another strange psycho-social habit reflected in our landscapes. We call it "screening." Usually after we have planted our mandatory foundation planting, we refer to another unwritten edict that we feel compelled to obey. We head straight for the last inch of our property line and start planting rows of evergreens or erecting stockade fences. Often there is nothing to screen. Perhaps there is some atavistic territorial instinct prompting us to do this, but it doesn't do much for aesthetics. Rather than screening at our property lines, we should aim at establishing rooms within them. As much as we might like an open flow of space within a house, we would never think of living in one that consisted of just one large room. And yet that is often our approach to landscaping: Erect a wall along the property line and leave everything else open. The result usually produces a very cold feeling.

There are times when we do need to block out an unpleasant situation or view, but this screening can be an opportunity for a creative mixed border rather than a merely functional line of evergreens. Lack of funding or imagination often prompts municipalities to erect long rows of arborvitae, hemlocks, junipers, or other evergreens that will grow quickly, but they are often not much of a visual improvement over whatever they are intended to hide. Why we would want to imitate this look around our own properties is puzzling. We are fortunate today in having a large palette of plants available to us. A well-planned and well-planted grouping of them can create a wonderful visual effect while also accomplishing its primary function of screening.

We can also use a technique that I like to call "screening by distraction." If we create a visual feast or an eye-catching structure near the atrocity we are trying to disguise, we will find that the offensive sight is hardly noticed. If we have the room for them, we can also use structures for screening instead of waiting years for plants to grow. While an eight-foot stockade fence is just one more eyesore and often forbidden by zoning restrictions, an eight-foot gazebo, arbor, or attractive shed could be the answer. These structures also must conform to zoning regulations in some areas, but they are certainly an option worth considering. Adding some deciduous trees around the structure immediately provides additional screening at eye level, which affordable evergreens may fail to offer for five years or more.

One more point to remember about screening: it does not have to be at the farthest distance our property will allow. By bringing our screening plants closer to us than to whatever we are trying to block out, we can achieve privacy much faster. For instance, if our patio is too exposed to our neighbor's swimming pool, a far better solution than property-line planting is to use plants to create a room around the patio. Not only does the pool vanish, but the patio becomes more intimate. Trellising around a patio will accomplish the same goal while adding a complementary architectural feature to our landscaping. Most of the great garden designers of the past insisted that enclosure was necessary for a garden. If we think more of creating enclosed gardens within our property we won't have to worry so much about screening. And it is these gardens, no matter how amateur they may be, that add personal warmth and charm to our landscapes.

They reflect the personal participation and involvement that our lifeless and redundant landscapes so desperately need.

There is yet another unwritten rule that Americans blindly follow in their landscaping, again for reasons unknown. We seem to believe that gardens, like clotheslines, should be relegated to the back yard if we must have them. Gardens and landscapes have become two separate elements, each assigned to its own place, forbidden to mingle. The front of the house has been designated for the static outdoor decorating that we have dubbed landscaping. We position plants like pieces of furniture and expect them to behave as such, rather than as the living things they are. If we are blind to the all-important lesson of time that plants are so good at teaching us, our landscapes speak loudly of our alienation from nature.

Landscape design is the original performance art. The characters are constantly moving and changing and telling a story. The story is about life itself and what we can expect from it. Our own landscapes are the only contact most of us have with nature, yet so often we try to make them as unnatural and lifeless as possible.

Afraid to make mistakes, we imitate. Trying to be different merely for the sake of being different, we create absurdities. Adhering to meaningless and obscure rules, we stifle our personal styles and detract from that of our homes. Failing to recognize and glory in the nature of plants as living, changing things, we turn our landscapes into plastic displays. These are the real mistakes and obstacles to success in landscaping.

When I put on the brakes or circle the block for another look at a landscape that I like it is usually one that reflects the participation and involvement of the owner. It has life and personality. It doesn't matter what plants are used or how they are arranged or if they follow a formula. It can be very amateurish and naive, but its vitality tells me that whoever lives there loves being outside working on it. It is not being done for anyone else's approval but as an expression of the individual personality of the owner or owners. They will eventually learn better arrangements and decide on different plants, but the landscape will always be refreshing and successful because it has become a garden.

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H. serpens H. SUR-penz
H. vitellinoides H. vih-tel-ly-NOY-deez
Hydrangea arborescens high-DRAN-juh ar-boh-RES-enz
Ilex crenata EYE-leks kreh-NAY-tuh
Juglans nigra JEW-glanz NY-gruh
J. cinerea J. sih-NEE-ree-uh
Leucothoe axillaris loo-KOH-thoh-ee ak-sih-LAIR-iss
Limnanthes vinculans lim-NAN-theez vinn-KOO-lans
Lobelia cardinalis low-BEEL-yuh kar-dih-NAL-iss
Lonicera sempervirens lah-NISS-er-uh sem-per-VY-renz
Magnolia campbellii mag-NOLE-yuh cam-BEL-lee-eye
M. dawsoniana M. daw-sown-ee-AN-uh
M. fraseri M. FRAYZ-yer-eye
M. grandiflora M. gran-dih-FLOR-uh
M. kobus var. *loebneri* M. KOH-bus var. LOBE-ner-eye
M. kobus var. *stellata* M. KOH-bus var. stel-LAH-tuh
M. liliiflora M. lih-lee-eye-FLOR-uh
M. macrophylla M. mak-roh-FIL-luh
M. sargentiana var *robusta* M. sar-jen-tee-AN-uh var. row-BUS-tuh
M. sieboldii M. see-BOWL-dee-eye
M. × soulangiana M. × soo-lan-jee-AN-uh
M. sprengeri M. SPRENG-ger-eye
M. tripetala M. try-PET-ah-luh
M. × veitchii M. × VEE-chee-eye
M. virginiana M. vir-jin-ee-AN-uh
M. virginiana var. *australis* M. vir-jin-ee-AN-uh var. aw-STRAY-liss
Nicotiana alata nih-ko-shee-AN-uh ah-LAY-tuh
Osmunda cinnamomea ahz-MUN-duh sin-uh-MOH-me-uh
Passiflora × jeannette pass-ih-FLOR-uh × JUH-net
Podophyllum peltatum pah-doh-FIL-lum pel-TAH-tum
Polemonium reptans pahl-eh-MO-nee-um REP-tanz
Polystichum acrostichoides pah-LISS-tih-kum uh-kro-stih-CHOY-deez
Rhododendron periclymenoides roh-doh-DEN-dron pair-ih-kly-meh-NOY-deez
Rollinia mucosa raw-LIN-ee-uh mew-KOH-suh
Rubus argutus ROO-bus ar-JEW-tus
R. occidentalis R. ahk-sih-den-TAL-iss
Rudbeckia fulgida rood-BEK-ee-uh FUL-jih-duh
R. hirta R. HUR-tuh
Sisyrinchium atlanticum siss-ih-RING-kee-um ang-gus-tih-FOE-lee-um
Spigelia marilandica spy-JEE-lee-uh mair-ih-LAN-dih-kuh
Stokesia laevis stoh-KEE-zee-uh LEE-vis
Tibouchina urvilleana tih-boo-KY-nuh ur-vil-lee-AN-uh
Tulipa greigii TOO-lip-uh GREG-ee-eye
Uvularia grandiflora yew-vu-LAIR-ee-uh gran-dih-FLOR-uh
Zamia pumila ZAY-mee-uh PYEW-mih-luh

STUDY TOURS

TRAVEL/STUDY TRIPS FOR THE AHS GARDENER

APRIL 18-28, 1995
GARDENS OF THE MISSISSIPPI

Explore exceptional private and public gardens along the Mississippi on a steamboat voyage on the *Mississippi Queen* from New Orleans. Stops along the river include Natchez, Baton Rouge, and Houmas, where a special "flag stop" will be made to allow members to visit Houmas House for a luncheon reception. Included in the itinerary will be a visit to the home and gardens of AHS members Drs. Robert and Bettina Barnes and to the home of Grace McNeil, Elms Court, which was featured in the February 1990 issue of *Architectural Digest.* The itinerary includes an overnight stop in New Orleans, which will allow time for a tour and luncheon at Longue Vue, along with a number of exceptional garden visits in the Garden District. Leading this program will be long-time AHS Board member Josephine Shanks of Houston, Texas.

MAY 15-23, 1995
GARDENS OF THE ITALIAN LAKES
MAY 23-27, 1995
EXTENSION TO LONDON AND THE ROYAL CHELSEA FLOWER SHOW

May is a glorious time in the famous Italian Lake District, with grander displays of rhododendrons, azaleas, and camellias than those found in England. In this one-week program, we will visit exceptional public and private gardens along the shores of Lake Maggiore and Lake Como, including Villa il Bozzolo, owned by Signora Bozzolo, and Villa Cigona Mozzoni, owned by Contessa Eleanora Cigona. A private launch will be used to reach several of these gardens, which are accessible only from the water. Several garden owners have invited us for lunch and dinner. An extension of the program will offer an optional visit to London and the Royal Chelsea Flower Show with an excursion into the Kent countryside for a visit to Great Dixter and Sissinghurst Castle. A private garden luncheon will be held at the Weald home of Helen Bulloch. Leading this program will be AHS Board member Julia Hobart of Troy, Ohio, who recently assumed the duties of Travel Committee chairman.

Leonard Haertter Travel Company, 7922 Bonhomme Avenue, St. Louis, MO 63105,
(800) 942-6666, (314) 721-6200 (in Missouri)

Participants in our May trip to the Italian Lake District will visit the neoclassical gardens of Villa Melzi at Bellagio.

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