

On the Road With Sara Stein ✨ Collecting Plants to Save Them

THE AMERICAN GARDENER

A Publication of the American Horticultural Society

November/December 1996 \$3.95



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We will offer optional visits to the wine country of Napa and Sonoma, as well as a day touring gardens over the Golden Gate Bridge toward the Pacific Coast and then back to the Tiburon area.

As always, our banquet will be a highlight, this year featuring a look back at 75 years of the Society's history.



COURTESY OF LISA GUTHRIE



Circle your calendar now and make plans to share a fabulous weekend in San Francisco with fellow AHS members. Registration forms will be mailed in January. Our headquarters hotel is the AAA five-diamond Fairmont Hotel, high atop Nob Hill. *For more information call 1.800.777.7931 ext. 24.*

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On the cover: When is a plant rare? When can you justify collecting it from the wild? These are questions Sara Stein poses beginning on page 24. Prairie smoke (Geum triflorum) is endangered in her home state of New York, but becomes increasingly common as one moves west. Photograph by Don Johnston: PHOTO/NATS.

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commentary

When I was a youngster, a walk through the Carolina woods with my grandmother, "Miss Nanny," was a visit to hidden plant friends. She knew a place of deciduous azaleas—each one a different color and size. Near her cider apple orchard we admired the purple "upside-down" flowers of a liatris. At the edge of a strawberry patch, a thicket of native blackberries flourished, while along the stream that divided her property from the woods we found highbush blueberries. Hidden behind a neighbor's house on public land was a clump of American dogwood—with pink, red, and multiply branching variations—from which she often collected "switches" that she brought home to her converted schoolhouse, pressing them into fertile soil and covering them with glass pickle jars. We used to say that Miss Nanny could root broom handles.

This was my first lesson in germplasm—its value, the need for its preservation, and the economic impact it can have on gardening. Preserving the diversity of our cultivated plants has been an important agricultural policy issue for our country since 1930, when the basic Patent Act of 1790 was amended to include plants. In 1970 it was joined by the Plant Variety Protection Act for seeds. Less than three years ago it was amended to extend the scope of protection to derived varieties, increasing the period of protection from 17 to 20 years.

Yet how to protect wild plants of the type I enjoyed with my grandmother is still open to question, as Sara Stein explains in this issue in an excerpt from her forthcoming book, *Planting Noah's Garden*. She notes that many of our best horticulturists believe that thoughtful, conscientious collection may be the only way to save some of our plants.

Nature thrives on diversity, and so do gardeners. An article in this issue by Adele Kleine describes the many different "twists"—in both shape and color—to sculptural willow shrubs, which are perfect for small gardens in all seasons.

Writer Karan Davis Cutler will take you to Portland, Oregon, for a visit to Timber Press, dedicated to publishing authoritative reference guides for serious gardeners. Landscape designer Richard Dubé will tell you how to recognize hazardous trees to avoid injury to yourself or others, or damage to your home or vehicle.

By the way...several years ago as director of the U.S. National Arboretum I returned to North Carolina with the idea of rescuing the amazing varieties of dogwoods that Miss Nanny had succeeded in rooting, and which had flourished there for many years. I found all of the vegetation cleared, a winding asphalt road through our oasis of diversity, and the houses of five strange families on the site.

How much we have lost! Explore and appreciate our native plants, and help us find ways to preserve them.



H. Marc Cathey

H. Marc Cathey, AHS President



members' forum

REGULATING EXOTICS

I am a real estate broker active in environmental matters in my community and am trying to prod the town and county governments to adopt guidelines regarding invasive exotics. The public works employees could be very helpful in controlling such species if they just had some direction. We have a terrible problem with Asian privet, wisteria, Japanese honeysuckle, kudzu, and other plants that are so common a lot of people assume they're native. Town-owned greenways are a great place to start the ball rolling; awareness can be raised for private property as well.

Do you know of any model ordinances or regulations that I can bring to the attention of my local elected officials?

Bill Bracey
Chapel Hill, North Carolina

The National Association of Exotic Pest Plant Councils (EPPC), an umbrella group concerned about the environmental damage caused by invasive non-native plants, has such a model law. You may obtain a copy by writing to Faith Campbell, Executive Secretary, EPPC, 8208 Dabney Avenue, Springfield, VA 22152. We were unable to determine how many communities have passed such laws, although the issue is considered especially pressing in Florida.

In our September/October issue ("Outlawing Sneezing Trees," page 11) we reported on several western jurisdictions that are passing ordinances against selling or planting trees that produce copious amounts of allergy-producing pollens. The nursery industry is generally opposed to laws that prohibit selling any type of plant. In Sara Stein's article "The Weeds of Halloween," also in September/October, she contends that creating a nation of enlightened property owners is the answer. As always, we invite letters on both sides of the issue.

MADE IN THE SHADE

In response to Thea Amr's letter requesting plants for shade (July/August), I would suggest some of the newer tiarellas, such as

'Laird of Skye', 'Ink Blot', or 'Running Tapestry'. They should do very well for her in Virginia, as they are natives of the Appalachian forest. They have attractive leaves and bloom in June with very attractive off-white to pink racemes.

We use a lot of *Lamium* 'White Nancy' and consider it better behaved than ajuga, which invariably seeds into the lawn. Since Thea is considering giving up on the lawn, it might be wise to consider the violet family. *Viola labradorica* makes an excellent shade ground cover as long as its neighbors are large enough to shade out the seedlings. It is bad in lawns.

I have good luck with *Astilbe* 'Sprite' as a shade ground cover. It spreads well but is not invasive. It is among the best behaved of ground covers. Like most ground covers that have attractive flowers, it should be hit with a string mower after it blooms. 'Darwin's Snow Sprite' (white), 'Dunkel-lachs' (salmon pink with copper leaves), and 'Inshriach Pink' (pink with bronze leaves) are the same size as 'Sprite' and are also *A. simplicifolia* hybrids. I presume they would behave about the same.

Other potential ground covers are the Korean goatsbeard (*Aruncus aethusifolius*), the bleeding-hearts (*Dicentra eximia* and *D. formosa*), numerous species of *Epimedium*, and cranesbills such as *Geranium endressii*, *G. himalayense*, and *G. macrorrhizum*, all of which will do well in varying amounts of shade.

Most of these grow a foot tall or more and do not like to be walked on, but paths through the shaded areas will provide access for needed maintenance and provide a close-up view of some very interesting plants.

Kenneth Catchpole
Springfield, Illinois

DEVOTED READER

I have saved every issue of your excellent magazine that I have received during years of being a member of the American Horticultural Society. I realize that in the early months of a format change you are in a shakedown period. But you might be in-

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terested to know that as a devoted garden-er with a larger-than-usual garden with perennial beds, woodlands, ponds, wild-flower areas, bird sanctuaries, etc., although I receive magazines from a range of orga-nizations—from the American Orchid So-ciety, American Hemerocallis Society, American Conifer Society, Pennsylvania Horticultural Society, and the list goes on—I find that the magazine I refer back to with the most regularity is yours.

I hope that you will continue to pro-

vide the very informative articles on spe-cific plant types and gardening techniques that have so clearly distinguished you from the other gardening magazines and the "shelter" type of magazine.

William H. Mandel
Buckingham, Pennsylvania

Send letters to: Editor, *The American Gardener*, 7931 East Boulevard Drive, Alexandria, VA 22308-1300, or e-mail to editorAHS@aol.com.

Hunting Buffalo Grass

After reading Andy Wasowski's article about lawn alternatives ("Beauty Beyond Bluegrass," May/June 1996), Marcie Hirsch of Mount Vernon, Virginia, called to ask about mid-Atlantic sources of buffalo grass sod, which she wanted to use in place of standard turf grasses.

Finding suppliers of sod in the mid-Atlantic proved difficult. We discovered only one company—Aldino Sod Farms, Inc., in Churchville, Maryland—that is growing buffalo grass sod, and they won't have their first crop available until this spring. Aldino is growing '609', an all-female cultivar that produces no seed heads or pollen. "We are very excited about its versatility," says Heath Barberry, sales manager for Aldino. Barberry describes '609' as "a low-growing, vegetative turf grass that requires very little supplemental irrigation and only modest fertilization."

The reason eastern sod producers have been slow to offer buffalo grass is that so far no one has developed a cultivar ideal for the East Coast climate. Kevin Morris, coordinator of the National Turfgrass Evaluation Program (NTEP) in Beltsville, Maryland, says buffalo grass "will grow here, but it's not the best grass. The big problem is, it's native to the plains states where you are talking about 15 to 25 inches of rain a year and low humidity as opposed to 40-odd inches of rain and high humidity here."

According to Morris, buffalo grass also faces unfair competition from bluegrass and fescues that move in during the fall when buffalo grass usually starts to go dormant. "Some cultivars do better than others in the East—'609' is great-looking grass but

isn't hardy very far north." Morris says two other vegetative cultivars—'315' and '378'—have shown better results than '609' in eastern test plots. Both cultivars spread quickly from plugs. "Two-inch plugs on one-foot centers will grow together in about eight weeks," he says.

Still, for Easterners who want a fairly low-maintenance lawn in full sun or part shade, Morris recommends a combination of two fescues—chewing fescue (*Festuca rubra* subsp. *commutata*) and hard fescue (*F. longifolia*). "Those are the two that people ought to be looking at for lower maintenance," he says. The important thing to remember with fescues, Morris says, is that they are cool-season grasses that tend to go dormant if exposed to drought or excessive heat. "There are times of the year they won't look so good, but you want to let them go at that point and they will reward you later on." He recommends reducing mowing frequency in the heat of summer to reduce damage to the fescues.

SOURCES AND RESOURCES

Sponsored by the National Turfgrass Federation, Inc., NTEP is a nonprofit organization working in conjunction with the U.S. Department of Agriculture. For more information, contact Kevin Morris at (301) 504-5125.

SOD: Aldino Sod Farms, Inc., 3603 Aldino Road, P.O. Box 218, Churchville, MD 21028, (800) 660-8309. No catalog.

SEED: Plants of the Southwest, Agua Fria, Route 6 Box 11A, Santa Fe, NM 87501, (505) 471-2212. Catalog \$3.50.

Stock Seed Farms, Inc., 28008 Mill Road, Murdock, NE 68407-2350, (402) 867-3771. Catalog free.



offshoots

IF YOU HAVE PLANTS, THEY WILL COME

by Betsy Robinson

Bugs! Being an ardent supporter of animal rights, I am somewhat perplexed by my murderous reaction to a mealybug invasion. A judgment call, I christen it—if I do nothing, they will destroy my plants, so in this instance murder is justified. I dab and spray with soap and alcohol, cover my face with a surgical mask and dust with diatomaceous earth, and finally resort to bare-handed squishing, but still the creatures survive and procreate. They kill the begonia, thrive on the coleus, blanket the undersides of the crotons, but when they move onto my heirloom African violets, that's the last straw. I'm washing the banana croton, gnashing my teeth and contemplating toxins, when I notice a strange dot drop off my plant and slide towards the drain. "Oh no," I gasp, rescuing the ladybug just in time. As I gently place her back on her perch, I notice something amazing—not a mealybug in sight—and I have an epiphany.

I dig through my garden catalogs, pulling out those that offer beneficial insects. The man at Worm's Way is extraordinarily helpful. Mealybug destroyers (tiny black lady beetles, or *Cryptolaemus montrouzieri*, credited with saving the Southern California citrus crop in the early 1900s) would be the best bet, but they're more than \$50 for 100. Convergent lady beetles, more commonly known as ladybugs (*Hippodamia convergens*), would be much cheaper, and no, Worm's Way assures me, I'm not insane—plenty of people use ladybugs indoors. I ponder my plight as I wait for the literature they promise to send me. I'm a firm believer in literature.

From the Worm's Way pamphlet "What's Eating My Plants?" I learn that, although ladybugs "don't always provide the best pest control expected," they are "fun garden pets!" Also, you can keep them dormant in your refrigerator, if you don't freeze them to death. The pamphlet advises that to keep them from flying away, you can spray their wings—which, animal activist that I am, I pledge not to do.

From Mellinger's I purchase *The Gardener's Bug Book* by Barbara Pleasant, which, while

espousing my own philosophy that all living things have a place in this world, assures me I'm not a bad person because "good gardeners must know when to intervene on behalf of their plants." Also, Mellinger's has the cheapest listing for ladybugs, so I order. It's several days later that I calculate the number of ladybugs in a half-pint, and I frantically phone friends.

NOVEMBER, DAY 1

When my order arrives I carry my 9,000 new pets up the stairs with great trepidation, feeling their tiny vibrations against the sides of the box. I wonder how my two dogs will react. Despite tremendous guilt over keeping the ladybugs prisoner following what was no doubt a harrowing trip from Ohio via the U.S. Postal Service, I follow the directions on the box and put them in the refrigerator to await evening release.

At 6:30 p.m. I stick scissors under the staples to pry open the box. It occurs to me that I have no idea how these bugs are packed, and I hope I'm not stabbing anyone to death. But, I reassure myself, they've been in the refrigerator and are probably too logy to be clinging to the ceiling of the box. I'll just shake a few onto each plant, then close up the rest.

The first thing I learn about ladybugs is that four hours in a refrigerator has no effect whatsoever on their mobility. The second and third things are that ladybugs are not dogs (the words "sit" and "stay" are irrelevant), and they do not respond well to herding.

At the first crack in the box, there is a mass exodus. Seemingly millions of frantic, thirsty ladybugs scurry out like soldiers from the Trojan horse, swarming over the windowsill, onto the floor, up my arms, and across the walls. The water-filled saucer under the ivy becomes a camp ground, and in minutes the entire pot is covered in black-spotted red clumps as they strain for a sip of water. There's no turning them back, and I call those friends who promised to adopt to tell them it is now or never. They've all changed their minds. At 7 p.m., with one fatality, I finally get the box closed and look at the little red hordes crawling across my living room carpet. Only one solution, but it's nighttime in New York City and I'm no fool. I call my friend with a German shepherd mix, and she, I, and our three dogs proceed



to Central Park to liberate the remaining 8,000-odd bugs.

We do not sleep easily this night, the bugs and I. The *Spathiphyllum* and its basket are their preferred seating, and several hundred vie for position. Others seem dazed and wander about the apartment as if trying to find their way back to Ohio. I

spend the night imagining things crawling on me. The dogs sleep fine. Rosie eats one bug but is otherwise oblivious despite the fact that several have taken up residence in her rawhide chews.

DAY 2

Sharing a two-room apartment with a thousand ladybugs quickly desensitizes one to fear of creepy, crawly things. After trying to rescue the stragglers on the living room carpet from possible starvation, I discover that ladybugs are far more timid than I about contact, and I begin to bond. I feel a sharp pang of loss when, later that day, I discover one drowned in Rosie's water bowl.

By evening I deal calmly with those that wander up my arm when I'm relaxing on the couch, and as I transport

them back to the windowsill, I notice one rather huge bug writhing strangely on the radiator grating. Upon closer examination, I discover it is, in fact, two bugs vigorously doing what happy bugs do. I smile and return to the TV.

Sources

MELLINGER'S, INC.,
2310 West South
Range Road, North
Lima, OH 44452-9731,
(800) 321-7444.
Catalog free.

NATURE'S CONTROL,
P.O. Box 35, Medford,
OR 97501, (541) 899-
8318. Catalog free.

WORM'S WAY, INC.,
7850 North Highway
37, Bloomington, IN
47407, (800) 274-9676.
Catalog free.

DAY 3

Normally this would be my day to clean the foliage, but I think it best to leave everything be. Infested plants touching other plants is now fine—it creates bridges for the ladybugs—and vacuuming is *verboden*. The ladybugs are quite fond of the jade plants and are making good progress in eating them clean of pests. Same for crotons, but the coleus looks like a mealybug condo.

DAY 10

Cold morning. I tiptoe over to close the windows and find one tired ladybug staggering across the carpet. The Worm's Way man said you could release them indoors anytime of year, but perhaps he assumed I'd keep my windows shut. But I can't trap the poor things in a hothouse life cycle. What population remains desperately wants to be asleep, but I wake them, pleading "Eat! Eat!"

DAY 18

I give up on the coleus. The jades and the crotons are clean, and the violets are still fighting. Most of the ladybugs are gone—departed or sleeping in the woodwork—so I might as well close the windows. And, as I do, I silently thank my little helpers.

JUNE

Summer. Warmth. Mealybugs! It seems mine was a fleeting cure. But I have spotted one decrepit ladybug, two healthy adults, and one infant (the progeny of the radiator frolic?) crawling up from the baseboard. The experiment was a flop, but the ecosystem lives!

Betsy Robinson, a free-lance writer living in New York City, has written for several gardening and pet magazines.

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Plant a Row For The Hungry

Garden Writers Association of America
10210 Leatherleaf Court, Manassas, VA 22111



gardeners' information service

Our local historical society is transcribing the diaries of one of our state's pioneer women, Myra Parsons. She and her husband farmed about 1,000 acres along the shores of Lake Huron beginning in 1876. A mother of seven children, she was a gatherer of herbs and practitioner of homeopathic medicine. She mentions a plant called mountain mist, which we have been unable to identify. —S.K., Bay City, Michigan

Myra Parsons was certainly remarkable; where did she find time to keep diaries? It appears that mountain mist is a common name for *Pycnanthemum virginianum*, more often called mountain mint. A member of the mint family, its leaves and stems give off a minty aroma when rubbed. It has pinkish white flowers up to one-half-inch in diameter that often form a cymelike cluster. It grows up to two feet high on stiff, erect, many-branched stems. There are actually about 20 species of *Pycnanthemum* native to North America, but *P. virginianum* is one of the most common. Found in upland woods and meadows from Maine to North Dakota and south to Georgia, it is not considered showy enough for most gardens, but can be dramatic if you encounter groupings in the wild.

I've always admired caladiums but never grew them until this year. One plant put up two leaves and then a strange-looking thing that definitely was not a leaf. It turned out to be a spathe with a fat spadix inside. How common is this, and does the spadix contain both male and female flowers?

—E.M., Alamogordo, New Mexico

It's not very common for caladiums to form flowers, but apparently the environmental conditions in your garden were just right for them. Like the related calla lily and Jack-in-the-pulpit, the flowering structure consists of a hooded, petal-like bract called the spathe and a spike called a spadix. The tiny flowers are crowded along the spadix with the female flowers on the lower part and the male flowers above them. Following pollination the plant will form white berries.

On a visit to Butchart Gardens on Vancouver Island I gathered some cones of monkey-puzzle tree. Can I start some plants from them?

—C.C., Calgary, Alberta, Canada
Monkey-puzzle tree (*Araucaria araucana*), also known as Chilean pine, is a semitropical conifer native to southern Chile and southwest Argentina. It is said that it was named monkey-puzzle tree because it was thought that even a monkey would have difficulty climbing its spiny trunk

and unruly tangle of branches. It is commonly grown as an unusual ornamental in the Pacific Northwest and has been known to survive outdoors as far north as Vancouver Island, apparently because of its maritime climate. It is considered hardy only through USDA Zone 7, however, so you could not grow it outdoors there in Calgary. While it's not practical as a permanent house guest, since it can attain a height of more than 50 feet, it's in the same genus as Norfolk Island pine, which is commonly grown inside.

Seeds must be ripe and separated from the cone. They should be planted about a quarter-inch deep in a sandy peat mixture. Young plants prefer light shade and, when grown indoors, cool temperatures. Plants grown from seed tend to be less shapely than those grown from cuttings.

My office-grown gardenia won't flower. What can I do?

—A.B., Allentown, Pennsylvania

Now often listed as *G. augusta* 'Fortuniana' or even as *G. fortunei*, *Gardenia jasminoides* var. *fortuniana* and its cultivars are chiefly greenhouse-grown for the floral trade and are often not very rewarding when grown in the home or office. For any success you need to follow the practices of commercial growers. In winter the plant should be kept at 45 to 50 degrees in indirect sun with fairly dry soil to discourage growth. In spring, prune the plant lightly, move it to a warmer and brighter location, and resume watering. During the summer, feed it regularly with fertilizer for acid-loving plants or with fish emulsion. Ensure your gardenia is exposed to moist air by placing the pot on a tray containing pebbles and water. To develop flower buds, gardenias require at least a half-day of sun and nights cooler than 70 degrees. Any variation from these conditions is likely to result in bud drop. Therefore, the typical office environment is not conducive to a flowering gardenia.



Camera Clues?

WALTER SALMON, an AHS member who lives in Yonkers, New York, called to ask if we could recommend a relatively inexpensive automatic camera that has a short enough focal distance to get close-up photographs of flowers. The professional photographers who take close-ups for our magazine use very sophisticated equipment. We would appreciate hearing from any of our members who have had good luck taking close-ups of plants with a midlevel automatic camera.



A new cultivar developed at the Hampton Roads Experiment Station in Virginia Beach, Virginia, should make it possible to grow gardenias outdoors a bit farther north. A mature plant is said to produce up to 50 flowers from late summer into November. But while a cold hardiness rating of Zone 7 makes 'Chuck Hayes' a full zone hardier than other gardenias on the market, it would still need a protected situation where you are in Zone 6.

—Neil Pelletier, Director
Gardeners' Information Service



mail-order explorer

GLASSHOUSE WORKS: THE SECRET'S OUT

by David J. Ellis

Like honeybees flocking to a nectar-laden flower, each spring and summer busloads of fervid garden pilgrims converge on tiny Stewart, Ohio. Located about 12 miles east of Athens in the southeastern part of the state, the former mill town is home to Glasshouse Works nursery, the brainchild of Tom Winn and Ken Frieling.

"This is a nursery that grew out of a passion," says Diane Heilenman, gardening columnist for the *Louisville Courier-Journal* and author of *Gardening in the Lower Midwest*. Heilenman says Glasshouse Works "has had a cult following for a long time, but I think in the last couple of years they have popped over the top from a nursery purely for plant aficionados to a more popular nursery." Heilenman says the nursery "suits me because I like to try a whole lot of different things. They offer a lot of collections so you can play around and indulge yourself with different types of plants."

"They are the best," says Patti Lee, a floral designer who lives in New York City. "They have plants no one else can get because they trade with botanical gardens all over the world."

Fenner Hughes, an X-ray technician who works for the Federal Bureau of Prisons in Henderson, North Carolina, says he started out buying house plants. "Now it's perennials, shrubs, and trees—I got away from indoor plants and began moving into the yard," he says. Hughes says he keeps a few tender plants in a greenhouse in winter and moves them outside in summer. "I've bought several varieties of sugar cane because they add a nice touch to the perennial garden."

"We were originally pretty much a tropical house plant nursery through about the middle '80s, when we began importing variegated plants from Japan, many of which were hardy," says Winn. More recently they started reintroducing hard-to-find Victorian bedding plants. Now their main catalog is divided into sections for tropicals and subtropicals, succulents, perennials, and trees, shrubs, and vines. "The last few years there has been a synergy coming out of that," says Frieling. "People who generally have grown only hardy plants look at our collections of Victorian bedding plants and tropicals that flourish as annuals and begin ordering those."

Among the hottest bedding plants right now are coleus, of which Glasshouse Works has more than 100 selections, and parrot leaf or calico plants (*Alternanthera* spp.). "People are searching desperately for different *Alternantheras* to make foliage clocks and other intricate geometric designs," says Frieling.

Durrell Nelson, grounds manager for Nauvoo Restoration, Inc., which is rebuilding a frontier town in Nauvoo, Illinois,

calls the nursery's selection of coleus, wandering jews, and other foliage bedding plants "as good as any in the country." Nelson is using Glasshouse Works' Victorian bedding plants to help re-create authentic period plantings.

A GROWING HOBBY

As graduate students in the English literature department at Ohio University in nearby Athens in the early 1970s, Winn and Frieling turned to growing plants as a way to ease the pressures of graduate school, renting greenhouses to contain their expanding collection of tropicals. Once out of school, Winn taught French and German literature, and Frieling taught English.

Their foray into commercial growing began innocently enough when friends opened a plant store and asked Winn and Frieling to propagate some of their plants for sale in the store. Soon they were selling plants to several small businesses around Athens.

In the late '70s Winn and Frieling began selling plants in the catalog of Country Hills Greenhouse, owned by Carol Wilson. When Wilson retired from mail-order in 1981, they took over her mailing list and Glasshouse Works made its formal entry into the mail-order business. They retained the original name of their hobby greenhouse, which Winn describes as



PHOTOS BY PAM SPAULDING



In one of their display houses, right, Glasshouse Works co-owners Ken Frieling, left, and Tom Winn are surrounded by a vast array of tropical treasures. The exotic giant jade vine, above, is a favorite with visitors to the nursery.

“a bauhaus interpolation of the German for ‘greenhouse.’”

“We had a lot of good people help us get started,” recalls Winn. Early supporters included George Elbert, a house plant expert and founder of the New York City Indoor Plant Society, who Winn says “was very instrumental in getting us to a more national level.” Longwood Gardens horticulturists—including Dutch Huddleston and Pat Nutt—helped set up elaborate trades for some unusual plants. Winn and Frieling worked closely with the New York Botanical Garden for many years. More recently they have collaborated with Bob Hayes at the Brooklyn Botanic Garden and continue to learn about new plants through the writings of Elvin McDonald, former director of special projects at the garden.

Part of Winn and Frieling’s success lies in their willingness to share their introductions with other nurseries and botanical gardens. “Like all good growers and collectors, they share new plants rather than trying to be exclusive,” says New York floral designer Lee. Agrees Winn, “We’ve always been very cooperative with everyone else. We learned early on that if you have the only plant with unusual variegation and you don’t pass it on to others it can be lost.” Frieling does most of the propagating and breeding, while Winn is adept at spotting new variegated plants. Frieling’s breeding efforts include the Hocking series—named after the river that runs through Stewart—of compact, heat-tolerant begonias with brilliantly hued foliage.

SPREADING THEIR WEB

With the increased publicity in the last few years, Winn and Frieling have had to make changes to the way they do business. Recently they set up a World Wide Web site that allows purchasers to browse through color images of some plants and place orders. “We used to be able to list things we’d have five or 10 of, but now we don’t dare offer our rarest things except through specialty catalogs or on the Net,” says Frieling. Their specialty lists often contain successes from “oddball seeds” acquired from foreign botanic gardens, along with a few plants that are mainly of

interest to zoos and botanic gardens, such as the cocoa tree (*Theobroma cacao*).

Julian Duval, executive director of the Quail Botanical Gardens in Encinitas, California, says, “Some of the plants I’ve bought from Glasshouse Works were just unavailable anywhere else at the time, including pony tail palms [*Beaucarnea* spp.], fouquierias, and clubfoots [*Pachypodium* spp.]. They have a wonderful collection of plants from Madagascar in general.”

Many customers who started out with mail-order now make regular pilgrimages to Glasshouse Works. “I used to visit for a long weekend every year,” says Lee, “but that’s not enough anymore. The nursery is so huge it’s like a candy store. Everywhere you turn there’s something underneath or behind something else. You turn around and it’s like, ‘Wow, look at that!’” A perennial favorite of those who visit the nursery is the giant jade vine (*Strongylodon macrobotrys*), which Frieling says “knocks people out of the water.”

Heilenman also recommends visiting the nursery. “They have monster plants that just reach out and grab you—it’s a very tactile, personable place,” she says. Heilenman adds that when Winn and Frieling have time—which is less often now that they have so many visitors—“they will expend any amount of expertise on you that they think you can absorb.”

Visitors to the nursery may have a difficult time finding Stewart on the map, but to Winn and Frieling it’s part and parcel of their success. “There are so few Brigadoons left in the world. I’m glad we found one of them,” says Frieling.

David J. Ellis is assistant editor of *The American Gardener*.

To receive a catalog, send \$2 to Glasshouse Works, Church Street, Stewart, OH 45778-0097. The nursery is open to visitors Thursday through Saturday from 10 a.m. to 6 p.m. For directions, call (614) 662-2142, fax (614) 662-2120, or e-mail to plants@glasshouseworks.com. You can also vicariously visit Glasshouse Works via its new Web site at <http://www.glasshouseworks.com>.





urban gardener

VEGETABLES UNDER GLASS

by Linda G. Ballard

Ever since I was a small girl I wanted a greenhouse. My grandmother was a wonderful gardener, and I even had a small garden of my own. But I was fascinated by British gardening books, and all of those gardeners always had a greenhouse. For my fifth anniversary my husband gave me a card promising "the greenhouse of your choice." Then we found out how expensive they are.

Fifteen years later, in September 1994, we finally built a six-by-nine-foot lean-to greenhouse on our back deck, and we've been happily experimenting ever since.

Many people who put up greenhouses do so because they want orchids or some other kind of beautiful tropical plants year-round. Our goal was to produce our very own favorite vegetables, without pesticides, and have them available every day, even in midwinter. Our tomatoes, hot peppers, herbs, radishes, bush beans, carrots, and potatoes have been fruitful and fantastic. They never seem to know what season it is, and they sure beat the tasteless out-of-season vegetables from the grocery store. With fresh vegetables and herbs always available, my cooking style has changed, and I'm convinced we're getting healthier. Even our four sons—ages seven through 16—have joined the fun. They can't eat a fruit or vegetable without saving the seeds. Our purchased seeds may do better, but their "free" plants aren't far behind.

We spent about five years shopping for a greenhouse, and finally chose one manufactured by the Vegetable Factory. It cost about \$3,200 with shipping—more than many others the same

Our goal was to produce our very own favorite vegetables and have them available every day, even in midwinter.

size, but we liked the fact that the clear plastic sides could be opened to screens on all sides, and we would be able to upgrade it as much as we wanted. I've looked at a lot of other greenhouses since then, and it still seems to be the best engineered. It took about four days for my husband, Lee, and our two older sons, Marc and Jason, to build the greenhouse, which came in nine well-packed cartons with every part clearly marked and very detailed directions for assembly.

The greenhouse can be reached through sliding glass doors from the kitchen, and since I don't work outside our home, I



spend a lot of time in it. I never thought I would enjoy just staring at dirt and playing in the mud so much! Maybe this is my second childhood.

SOME ASSEMBLY REQUIRED

But the project hasn't been all play. For insulation, since the deck is eight feet above ground, we glued Styrofoam strips (two feet wide and three-quarters of an inch thick, purchased at a local hardware store) under the deck, caulking between each strip as well as around the perimeter of the Styrofoam. Directly on top of the deck we laid 18 pieces of treated wood (six inches wide and one-half-inch thick) perpendicular to the deck planking. It looks rustic, is very functional and easy to sweep, and provides additional insulation. We caulked where the greenhouse abuts the house wall and deck floor so that no drafts, bugs, or snakes can get inside.

The nine-foot length of the greenhouse faces south. Its roof vents are screened and span the entire nine feet, but are only about four inches wide and must be manually operated. The all-around screens let us open as many windows on the east, west, and south sides as we like. This provides cross-ventilation so we can take advantage of any prevailing winds and still be completely screened in.

Still it seems that the sun is always pulling tricks on us, so we have several thermometers throughout the greenhouse; all are backed by Styrofoam to keep the readings honest. Lee rigged up a thermometer that faces the kitchen to sound an alarm if the temperature in the greenhouse exceeds or goes below a preset range. He attached a wire to the back of the thermometer and ran it into

the kitchen to a six-volt lantern battery, then to a simple doorbell buzzer hanging on the wall. Once a month we test the system by adjusting the settings on the thermometer.

The alarm has gone off only once. At 2:30 one morning the outside temperature had dropped rapidly to zero, and we had the greenhouse heaters set too low. We have two small electric heaters that are turned on and off by adjustable, built-in thermostats. Normally one is set for about 60 degrees and the back-up at about 55 degrees.

For ventilation, two small fans are set with a coffee timer to go on at 9 a.m. and off at 5 p.m. each day. An oscillating fan is set roughly at plant height, while a second, larger, non-oscillating fan



The author gives her lean-to greenhouse its annual scrubdown, opposite, before refilling it, left. Virginia's brutal 1996 winter, above, made the thriving plants seem especially miraculous.

is angled down from the ceiling toward the tomato plants. (The fans, coffee timer, and heaters all cost less than \$60.)

With room or time to grow only one vegetable, most people plant tomatoes, and we were no different. Cherry and full-size tomatoes were our first crop, planted on September 4, 1994. We began harvesting them in December. In October 1995 they were

still flowering and producing with little sign of slowing when we removed them from the greenhouse to make room for different varieties—over 10 months of tom-*ahb*-to heaven! (Our first actual harvest was a radish, which we immortalized in a photo labeled “the \$4,000 radish.”)

My husband only wanted to try one little pepper seed. His single plant has since expanded to 27 varieties, at least two of each, and he longs to try more. Among our other successes have been potatoes grown in a tub from ones we purchased at the local supermarket, contrary to most of the advice I’ve read and heard.

RECORD KEEPING

We keep a computer diary of all our successes and our few failures. Lee devised a data base that includes everything from the source of the seeds and a control number for each crop (the number of the planting plus the year), observations of the plant from seed to harvest, and “notes,” which include pertinent background information on the plant gleaned from reference books and other resources, along with page citations. We love to compare other people’s experiences to our own.

Keeping a diary is not as tedious as you might think. Researching information on plant varieties usually starts with simply looking up the basic plant—such as “egg-plant”—but invariably that sparks deeper and deeper reading on the subject (I now have 88 books on gardening and still have to visit the library now and then) until we have more information than we could ever want.

The control number is entered both in the diary and, using a plastic stick-on label-maker, on a five-inch white plastic plant stake. We started with craft sticks when plants were in the seedling stage, but they became difficult to read and rotted near the soil line. With these plastic stakes I can be as sloppy as I want when I water, and the labels don’t come off until I peel them off to relabel the stakes for the next crops. They’re also easy to read and make recording in the diary a snap. Lee will walk in from the greenhouse and announce, “I just harvested five peppers from ‘Giant Thai’, number nine.”

We keep a hard copy of the computer Plant File sheet in a loose-leaf notebook, adding relevant information as needed and printing a final copy for future reference after harvest.

This has been both a learning experience and a lot of fun for us. It was especially rewarding to walk into the greenhouse during Virginia’s blizzard of 1996, surrounded by vegetables almost ready to harvest while snow fell all around us. We often end up eating the fruit right off the plants just as though we were in a salad bar line, congratulating ourselves for being so clever.

Although we’re concentrating on vegetables and just a few flowers, a greenhouse of this size would be ideal for the ornamental gardener who wants to get a head start on spring and finds that one grow-light in the basement just isn’t enough any more.

Gardeners never have enough room, and that’s certainly true of every greenhouse grower I’ve ever talked to. I mentioned that Lee, originally the reluctant gardener, wanted to grow more peppers: He’s now measuring our second deck for a greenhouse three times as big as this one. I don’t mind, just as long as he leaves me some space for my herbs.

Master Gardener Linda G. Ballard lives in Stafford, Virginia.

Sources

VEGETABLE FACTORY, INC., Dept. FREE, 495 Post Road East, Westport, CT 06880. Catalog \$2.

SUNGLO SOLAR GREENHOUSES, 4441 26th Avenue West, Seattle, WA 98199, (800) 647-0606. Catalog free.



planting the future

CASTS OF THOUSANDS

by Joseph M. Keyser

Twenty-five years ago, no one would give Mary Appelhof even five minutes to tell them about using worms to teach children about composting, recycling, and soil science. Today, the "Worm Woman" is invited all across the country—and recently to New Zealand and Australia—to share with teachers her special knowledge of worms. "Tens of thousands of teachers," Appelhof says, "and it's not stopping." The worm has definitely turned.

Throughout America there are scores of city and county programs that send agricultural Extension agents, recycling coordinators, naturalists, and other vermiphiles into classrooms with worm boxes, introducing children to the living, squiggling laboratory of the earth itself.

One of the most elaborate initiatives, called VermiLab, was developed in 1995 by the Montgomery County, Maryland, Department of Environmental Protection, in cooperation with the public school system, and integrated into the schools' science and social studies curricula. VermiLab was created to bring the natural act of composting to children, who then serve as irresistible compost emissaries. The program also strives to raise children's awareness and curiosity about the web of life that surrounds them, including the invisible though vital life of the soil.

After its first academic term, VermiLab had provided training for 140 elementary, middle, and high school teachers, who brought that knowledge, along with two-cubic-foot worm boxes holding 1,000 redworms, to more than 60 schools and 120 classrooms. In fact, interest among teachers was so high that a

Even a single worm box in a school can be used to reach a wide audience. David Chia at Georgian Forest Elementary School actually took the show on the road. "After getting my kids worked up for a couple of weeks, I started taking the box into the teachers' lounge. Then I was asked to visit other classrooms." By early March 1996, Chia had visited every classroom



**"The worms are squishy.
Worms are neat and yucky.
Worms are nice. Worms
are cool. Worms are very,
very, very, very slimy."**

—Karen, Christina, and Tanvi
1st grade, Dufief Elementary

waiting list was developed for the following year. William N. McDonald, the school system's elementary science coordinator, marvels that "the program creates converts among the teachers." Not only do they overcome their own fear of worms, "they go out and get other teachers involved. And they're all coming up with far more unique projects than I ever envisioned."

in the school, and he is currently developing a large-scale vermicomposting system in the school's courtyard to handle food scraps from the cafeteria.

Like Chia, teachers in other classes have worked with their students to get the word out. Some have developed worm newsletters, cultivating young journalists who share their experiences with fellow students throughout the school. And at least one worm box has gone digital: Frank Sanford's students at Kensington Parkwood developed a worm site on the Internet to exchange information and digital photos with students at a school in St. Louis.

CREATIVE FEEDBACK

A key element for measuring the success of VermiLab was establishing a requirement for creative feedback from the children—and teachers. Kindergarten-age students were often encouraged to create paintings or drawings of worm ecology. Older children kept journals, wrote research papers, and created slide shows. Each student received a T-shirt with the county's composting logo as a reward for their hard work—and as a

way to turn kids into walking advertisements for composting.

The reports were interdisciplinary and artful. Elementary science classes recorded decomposition rates of various vegetables and fruit, weighed materials, and counted worm populations. Middle school and older science students measured compost pH and tested comparative plant growth rates of potting mixes using worm compost. Maryvale Elementary School, where there is a popular French immersion program, submitted more than 40 colorful folders with essays and poems in French, while other schools stressed mathematics, grammar, and other disciplines in the process of data collection.

Montgomery County, in addition to coordinating the classroom-based program in which children take turns feeding and caring for their growing worm colonies, built a large-scale worm garden behind the cafeteria of the Lathrop E. Smith Environmental Education Center. The center provides several days of training in environmental and natural studies for thousands of sixth-grade students, and its curriculum now includes a healthy dose of composting.



Opposite: Composting emissaries pose in front of Maryvale Elementary School. **Left:** Digger Worm entertains and educates Maryland schoolchildren on the importance of worms to soil health. **Below:** Students at Piney Branch Elementary School delve into worm biology.



Students first visit the center's Compost Discovery Garden featuring more than 20 back-yard composting systems, where they learn to "dissect" a pile and look for compost critters—the fungi and invertebrates that work with bacteria as decomposer organisms. Later, the children are taken to the Worm Garden, where five large worm boxes accommodate the fruit and vegetable scraps from the cafeteria. Students learn they are part of a big cycle: They generate the food scraps, weigh them, and then add them to the worm boxes; the worms create compost that staff and other youngsters will then add to the gardens to grow more food. Lindsey Tschida from Judith Resnik Elementary learned that "you could put food like banana peels, rotten melons, and tea bags in, but no meat." The worms make castings, or compost, and "you put it over your soil and it makes plants and whatever you are growing healthy."

SPOKESWORM

One of the most conspicuous elements in the VermiLab program is Digger Worm, a seven-foot-tall, bright orange and yellow worm mascot, originally developed as a cartoon character to lead kids on imaginative expeditions through their worm boxes. Thanks to high school volunteers, Digger now makes appearances at schools, county fairs, and even the occasional shopping mall. He—or "it"—actually receives fan mail from kids, often asking the character to come visit a particular school. A cuddly introduction to worms for younger children, Digger always travels with a worm box-toting assistant, eager to show kids some of Digger's smaller relations.

The future for VermiLab is looking bright. Another 100 teachers will likely receive training and worm boxes during the next year, and numerous schools are building large, outdoor worm gardens to process cafeteria scraps. A recent *Washington Post* article on the program generated more than 100 calls requesting information—and worms—for indoor composting. Digger Worm has also been invited to participate in the National Science Teachers Association Global Summit on Science and Science Education in San Francisco in late December.

The program to date has brought worm composting to more than 5,000 students, with 1,800 receiving T-shirts in exchange for an amazing range of poems, songs, essays, murals, and science projects. But the appreciation for soil engendered by the worms, large and small, is the greatest payoff for VermiLab. "These worms are good to the world because they eat trash and make rich soil for us to grow plants," observed fourth-grader Brian Shorten, who wisely added, "so if you see a worm don't kill it."

Joseph M. Keyser is an education specialist with the Montgomery County Department of Environmental Protection.

Resources

FOR MORE INFORMATION on the Montgomery County program, write Joseph M. Keyser at the Montgomery County Department of Environmental Protection, 101 Monroe Street, Rockville, MD 20850, or call (301) 217-2361.

WORMS EAT OUR GARBAGE: CLASSROOM ACTIVITIES FOR A BETTER ENVIRONMENT by Mary Appelhof, Mary Frances Fenton, and Barbara Loss Harris, Flower Press, Kalamazoo, Michigan. Published in 1993, this 214-page book contains more than 150 worm-related activities that can be integrated into lessons about gardening, natural sciences, language, and problem-solving. Available through the AHS book program for \$19.75, plus shipping and handling. To order, call Barbara Catherwood at (800) 777-7931 ext. 36, or use the order form on page 57.



natural connections

MUSHROOMS IN MY MULCH

Story and photographs by Rob Simpson

The telephone did little to disguise the urgency of the woman's voice, which was tentative with an air of "you're really not going to believe this." There was this thing that suddenly appeared in her garden. It was orange, fleshy, stinking, and "well, I don't really want to say what it looks like." Her beloved cat had licked this putrid, unearthly cone. She had gotten my name from the local college and hoped I could provide some answers. Would her cat be okay? And the ultimate question: Could it be spawn from another world?

I tried to comfort her, explaining that she had found an armed stinkhorn (*Lysurus mokusini*), a type of mushroom. A member of the Phallales group, this native of Asia is occasionally found near major metropolitan areas on our East and West coasts. These fungi are saprophytes—nature's recyclers—and this one was simply living off the dead wood of her mulch. Even in 1936, long before ecology was a buzzword, Louis Krieger talked about fungi's role in the formation of humus and the importance of this to humans. In *The Mushroom Handbook* he writes that "they, too, serve man, as without humus the whole biological experiment of nature on this planet would soon come to an end."

ODORIFEROUS EDIBLES

There are several other stinkhorn species with a fondness for garden mulch. Your nose may detect them before your eyes do. David Arora, author of *Mushrooms Demystified: A Comprehensive Guide to the Fleshy Fungi*, writes: "They are not common in comparison to other fleshy fungi, but they command a degree of attention far disproportionate to their numbers because of their fantastic shapes and repugnant odors." This cow-pie aroma attracts flies to the mushroom's head. The colorful slimy mass has sticky spores that—if all goes well—will attach to the flies' feet and be transported to your neighbor's garden. The coprophagous—dung-loving—habits of dogs and cats will frequently compel them to lick stinkhorns, sometimes in an apparent state of ecstasy with much slobbering and maybe a good roll. The woman's cat would not die, I assured her, and in fact probably enjoyed the experience.

Despite their attraction for pets, it seems unlikely that these foul fungi would be human fare, but the Chinese consider them delicacies when they are in the "button" or "egg" stage, before they develop the fetid odor. They are sometimes sold under the name "devil's eggs," and the Chinese believe that they have the capacity to better an "insufficient" man. They were also nicknamed "Kansas City truffles" after a chef in that city was found to have unknowingly served them to his customers as French truffles!

It took a mycophilic friend who is also a psychologist to persuade me to try them, during a family foray in search of edible



mushrooms. Our kids thought they were the best fungi of the many we sampled that day, so it's possible that many gardeners could appreciate the multidimensional benefits of these beautiful but odoriferous fungi. Mycelial spawn taken from one garden to the mulch of another would probably get them growing.

DON'T BLAME THE DOG!

Gardeners could definitely use more educating about mushrooms. In 1973 there was a fungal incident in Texas and here, too, extraterrestrial origins were suggested. In his book *Myxomycetes: A Handbook of Slime Molds*, Steve Stephenson recounts the horrifying scenario. Large, slowly creeping "pulsating yellow blobs" were showing up in mulched areas. When blasted with water they broke apart and each broken piece grew bigger. The ensuing panic made national news, and speculation about their identity ran from indestructible aliens from outer space to

menacing mutant bacteria that could take over the earth. A mycologist finally identified the culprits as dog-vomit slime molds, sometimes known as scrambled-egg slime molds (*Fuligo septica*). This slime mold usually starts on mulch or compost, where it engulfs bacteria, soil amoebae, and other small organisms. It will move to the highest point to sporulate, sometimes migrating onto living plants. But it won't harm them and will usually wash away with the first rain (unless the increased moisture causes it to grow larger). These bloblike masses don't last long, they change rapidly in shape and color, and—if you don't mind their resemblance to something a canine has unswallowed—they can make an interesting garden conversation piece.



Top row: Known as destroying angel, far left, this mulch-dweller is a member of the deadly *Amanita* genus.

Our canine companions are not to blame for dog-vomit slime mold, left. **Bottom row:**

Raindrops will propel the spores of bird's-nest fungi out of their cup-shaped receptacles, far left. The armed stinkhorn, left, may look repulsive, but dogs, cats, and flies are attracted by its sewery odor.



Another small but attention-getting fungus is the caterpillar grainy club (*Cordyceps militaris*). This bright orange, pimple-covered sprite is an obligate parasite of moths and butterflies whose larval or pupal stage develops underground. While stinkhorns get their nutrients from dead organic material and help break mulch down into fine soil, grainy clubs grow on living organisms and eventually kill them. Other fungi then convert the pupal remains into humus.

Different grainy clubs grow on different hosts. Some species even grow on underground truffles and could be helpful if you are inclined to search for those delicacies. *C. militaris* often attaches to the buried pupae of sphinx moths. Since sphinx moth larvae find loose garden soil easy to dig into, this particular parasitic fungus is frequently found in flower and vegetable beds. Researchers are looking into the possibility of using *Cordyceps* for biological control of certain insect pests.

Other "what is it?" organisms are bird's-nest fungi, a common name used with members of several genera, including *Crucibulum* spp., *Nidula* spp., and *Cyathus* spp. Many people can't quite figure out where these small cuplike structures fit in the scheme of things. They look like tiny nests with eggs inside. Inside the "eggs," which are called peridioles, are spores. The nests serve as splash cups, and raindrops will propel the eggs up to seven feet away. Depending on the species, either a lasso or sticky globules will help the peridiole attach to whatever it hits. The spores are exposed when the outer wall of the peridiole decays or is eaten by insects. Although many species are found on decaying wood, some are also found on manure. Some of these dung lovers have an intricate reproductive cycle during which they pass through an animal's digestive tract. A closely related species, the cannon or artillery fungus (*Sphaerobolus stellatus*), audibly ejects its solitary egg up to 17 feet away from the nest. Olympians note—this is equivalent to a one-mile discus throw.

In addition to these somewhat bizarre fungi, garden mulch will sprout many others that are clearly mushrooms. Some of these are strikingly large, like the *Lepiota* species. Most of these saprophytes are getting nutrients from the wood chips and won't harm plants. Their tangled mats of mycelium—fibrous rootlike structures—may actually help keep the garden moister. They also help in the decaying process that will produce good rich humus.

Some people fear that merely touching a mushroom could harm them. This isn't the case, of course, but eating them might. The large *Lepiota* species are mostly edible, but lookalikes in the genus *Amanita* are mostly poisonous. *Galerina autumnalis*, an LBM (little brown mushroom) that can grow on wood chips, is deadly poisonous. A good rule of thumb is, if you don't know them by their Latin names, you don't know them intimately enough to invite them over for dinner. But instead of knocking them over or fearing that they are harbingers of the aliens in "Independence Day," consider their interesting ecological relationships and enjoy them.

Resources



Grainy clubs parasitize underground organisms.

The following books are available through the AHS book program. Prices reflect an AHS member discount; a postage and handling fee is additional. To order, call Barbara Catherwood at (800) 777-7931 ext. 36, or use the order form on page 57.

MUSHROOMS: A QUICK REFERENCE GUIDE TO MUSHROOMS OF NORTH AMERICA by Alan Bessette and Walter J. Sundberg, 1987, Macmillan, New York. \$11.50.
MUSHROOMS DEMYSTIFIED by David Arora, 1986, 10 Speed Press, Berkeley. Hardcover, \$35.95; softcover, \$31.50.
NATIONAL AUDUBON SOCIETY FAMILIAR MUSHROOMS OF NORTH AMERICA by Peter Katsaros, 1990, Alfred A. Knopf, New York. Softcover, \$8.
A PETERSON FIELD GUIDE TO MUSHROOMS by K. and V. McKnight, 1987, Houghton Mifflin Company, Boston. Softcover, \$15.25.

A free-lance writer and photographer, Rob Simpson lives and forages for mushrooms in Stephens City, Virginia.



killer

Sometimes even the most ardent tree hugger must choose to kiss one good-bye.

trees

by Richard Dubé

"Killer trees! Killer trees!"

was a running joke of the Reagan administration. Our former president apparently confused harmless nitrous oxide, which comes from plants decaying anaerobically, with polluting nitrogen oxides. Trying to make points against environmentalists, he lost some credibility instead.

Most gardeners are at the other extreme, revering trees not only for their tangible benefits—fruits or nuts to eat or sell, cooling in summer, enhancement of real estate value, a buffer to noise and wind, refuge for wildlife—but for their beauty and longevity. For most of us, losing a large tree is a tragedy, and having one removed is an option of last resort, too painful to consider until a tree is clearly stone dead.

But a tree unhealthy from age or disease can be hazardous to your health or, more likely, to your property and thus your wallet. Even if insurance will pay for the damage, there is the specter of being sued for

injury or property damage to someone else. Most tree cases come under the law of negligence, which asks whether you have taken reasonable care in regard to your property. Case law has established a "duty of care," meaning that homeowners have a responsibility to determine if their trees could be unsafe. As with most of the judicial system, ignorance of the law is no excuse.

In some instances, a tree itself may be structurally sound but create a danger by blocking a view of traffic from a corner, an intersection, or a driveway. In these instances, the decision to remove or trim the tree is less likely to be between homeowner and arborist than between homeowner and local government, which usually assumes the right to remove any tree that is blocking visibility for drivers.

We're going to deal here with those instances when the decision to cut, or not cut, is up to you. Given that removal of a large tree will usually involve a bill in four

Deformed by bad pruning, a Siberian elm, opposite, looms ominously over the landscape. Included bark in the crotch of this limb should have been a warning sign to the property owner that the tree was potentially hazardous.

How Dangerous?

Arborists are just beginning to systematically keep records of what kinds of trees fail under what conditions. Those ill winds known as hurricanes have blown some good by allowing arborists to collect data on the types and conditions of fallen trees.

A survey of Dade County, Florida, residents following Hurricane Andrew in 1992—reported in the January 1996 issue of the *Journal of Arboriculture*—found that of the trees that fell, 18 percent caused property damage. Native trees such as boxleaf stopper, sabal palm, gumbo limbo, and live oak were the best survivors. Of the natives, 66 percent were left standing after the hurricane, compared to 34 percent of the non-natives. Among non-natives, palms were extremely wind resistant, while fruit trees were poor survivors.

These native versus non-native findings do not always hold true, however. In the Pacific Northwest, arborists say, natives tend to be shallow rooted in relation to their towering heights, and are especially prone to blowdowns where there is shallow soil over hardpan or a high water table. This is not a problem in dense forests, where trees tend to hold each other up, but is worsened when construction equipment compacts soil, severs roots, or damages trunks so that they are open to decay.

—Kathleen Fisher, Editor



figures, homeowners need some realistic guidelines. When can you cling to hope, and when is it time to call in the chain saws?

Arborists usually define a hazardous tree as one with both some structural defect or fault and a potential target—people, buildings, or vehicles—if the whole tree or large branches were to fall. Your choices are to remove the tree, to correct the structural defect, or to eliminate the target.

One homeowner I know has a very large Norway maple chock full of indicators of structural defects, exacerbated by the fact that it leans over his driveway and an addition to the house. Will he remove the tree? Despite my recommendations, it doesn't seem likely. Can the structural defects be cured? Certainly not to the extent that they will eliminate the probability of future failure. Can the target be moved? No. The inevitable outcome is a tree that will fail in the near future and, at the very least, cause extensive property damage. The best option in this case is to remove the tree, but because "nothing has happened so far," emotions override logic.

As a tree matures, its mass increases through the addition of leaves and stems and a greater girth of wood on its trunk and limbs. In an already hazardous tree, this steadily increases stress and strain that will inevitably cause problems. It's not a question of whether but when it will happen.

A Few Red Flags

Some signs of hazardous trees are obvious, some take closer inspection, and others require a trained arborist to uncover. This article isn't intended to be a comprehensive training guide in identifying these hazardous conditions, but rather to help raise your awareness of potential concerns.

Location, location, location

Give urgent attention to any trees that could cause substantial harm to people or property if the tree or major branches should fall. Even a healthy tree can create a hazard if it is in the wrong place. Watch out for branches growing over chimneys and, if you live where wildfires are frequent, even touching roofs. If the tree is under power lines, not only is it in danger of a series of bad topping jobs by the local power company, but ice or a strong windstorm can pull lines down on it. If low branches make it tempting to climb, it might allow a child to come into contact with live electrical lines.

Signs of disease

Watch for smaller than normal leaves or leaves that lose fall color earlier than others. Loose bark from a number of causes can indicate poor health, as can an abnormal amount of insect infestations. Use binoculars; if you see woodpeckers working on a tree, it may mean there are a lot of insects under the bark or in the trunk.



Dead or hanging branches

"Widow makers" is what arborists call branches that have broken off and been caught in the canopy. Since we tend not to

look skyward in our day-to-day journey through life, we tend to miss these unless we take a winter inventory. The term “widow makers” is also applied to dead branches that have not broken but hang precariously over walks, drives, or houses.



History of poor pruning or injury

Look for limbs that bend abruptly or multiple trunks beginning at ground level. These may result from pruning that left a weak branch trying to support new growth, or branches that have regrown from roots after a tree was cut to the ground.

Leaning

Pay close attention to a tree that has been vertical and suddenly starts leaning. This is especially crucial if the crown is asymmetrical, with both the direction of the lean and the heavier side of the crown on the side of the tree opposite prevailing winds.

Conks

These hard, horizontal fungal growths, which look like they might serve as perches for squirrels, are a sign of rot throughout that part of the tree. One of the worst scenarios is rot occurring from about four feet off the ground up to the first limb. It indicates that the tree may be hollow throughout that section. (The tree is actually more stable if the rot is near the base. It's like trying to break a strand of dry spaghetti—it breaks most easily in the middle.)

Root decay

This is the biggest cause of tree failure, responsible for the loss of close to 80 percent of softwoods and 60 percent of hardwoods in urban settings, yet it is largely invisible. In some instances you may notice fungus growing on or near the tree's base, but a tree with root rot can look completely healthy on top. Some species, such as hemlocks, are especially prone to root rot.



V-crotches

Branches grow from trunks at different angles, and the most troublesome is the acute or narrow angle sometimes called a “V-crotch.” This branching is part of the normal growth pattern of some trees, such as the extremely popular Bradford pear (*Pyrus calleryana* ‘Bradford’) and the otherwise wonderful yellowwood (*Cladrastis kentukea*). In the case of the ‘Bradford’, other cultivars are available; with the yellowwood, the V-crotches can be eliminated when the tree is young. Recent research at Ohio State University indicates that V-crotches may not necessarily be a problem unless they have included bark—bark that has been squeezed into the living tissue of the crotch. As the trunk and branch grow, they keep applying pressure to each other, and once enough mass has accumulated, the branch lets go. The finale can be hastened by ice, snow, or strong winds. I have sometimes seen branches up to two feet in diameter come down.

Root decay is the biggest cause of tree failure in urban settings, yet it is largely invisible.

Resources

When looking for someone to evaluate your trees, make sure that they are not only licensed by your state, but insured, and preferably a member of either the International Society of Arboriculture (ISA) or the National Arborist Association. If you hire someone who isn't insured, you could be liable for any injury to their employees. Insist on seeing a certificate of insurance, or obtain the name and phone number of their insurance company. Some ISA members are also certified, as the result of taking a lengthy test.

AMERICAN SOCIETY OF CONSULTING ARBORISTS, 15245 Shady Grove Road, Rockville, MD 20850, (301) 947-0483. This group will send a free directory of its members.

INTERNATIONAL SOCIETY OF ARBORICULTURE, P.O. Box GG, Savoy, IL 61874, (217) 355-9411, FAX (217) 355-9516.

NATIONAL ARBORIST ASSOCIATION, Route 101, P.O. Box 1094, Amherst, NH 03031-1094, (603) 673-3311, FAX (603) 672-2613. Those with access to the Internet can find a local member firm of the NAA by visiting their Web site at <http://newwww.com/org/naa>. Click on "Your Local NAA Members" and enter your ZIP code.

PLANTAMNESTY, 906 NW 87th Street, Seattle, WA 98117, (206) 783-9813. This nonprofit organization, whose goals include ending malpruning and improper landscape management of plants, offers a packet of information on hazardous trees for \$5.50. Send them a self-addressed stamped envelope, and they'll send you an order form for all of their informational packets on such topics as pruning and planting.



Trunk cracks and fissures

Natural phenomena such as frost and lightning can leave cracks in bark. These may be harmless, but keep an eye on any that go clear to the ground. Consult an arborist immediately if you can see even the smallest hint of daylight through a crack: These pressure cracks and seams can spiral all the way up a trunk.

An Ounce of Prevention

"An ounce of prevention is worth a pound of cure" definitely applies to avoiding hazardous trees. There are a number of steps you can take to keep your trees from becoming hazards.

Select wisely. Not all trees are created equal. Trees that grow fast, such as silver maple (*Acer saccharinum*), tend to have weak wood that is vulnerable in storms. Poplars (including cottonwood) are also known for brittle branches. Every region has its own worst trees to avoid. You can probably obtain free advice from the nearest arboretum or your city's park department, but given the long-term investment that trees represent, it may be worth paying a landscape professional or consulting arborist to recommend trees for planting on your site.

Plant carefully. Before you dig your planting hole, try to visualize what the tree will look like as it grows and matures. Imagine where the branches will end up growing. Rotating the tree a few degrees or moving it a few feet may prevent a costly

problem down the road. When planting a containerized tree, spread out any roots that have begun to grow in circles around the container's edge. These can become girdling roots that can virtually strangle a tree as it matures.

Prune early and inspect often. Head off problems while trees are small. Eliminate V-crotches, horizontal branching, limbs that cross or rub, and of course, damaged or diseased branches.

Avoid compacting soil. A tree needs oxygen and other gases in order to survive and to grow. When the pore space in the topsoil is compressed, the gas exchange between soil and roots cannot take place. If you're lucky enough to have mature trees left when a new home is constructed, the trees may nevertheless die from suffocation within a few years because the heavy machinery removes the topsoil and compacts what remains. The equipment can also scar the tree or leak oil, or the crew may dump debris around its roots. Before construction starts, have an arborist meet with the site contractor and discuss how to avoid any damage to trees—perhaps with a reminder that the Council of Tree and Landscape Appraisers often values a single large tree at several thousand dollars. A common solution in such instances is to erect snow fencing or string fluorescent flagging at least as far out as the drip lines of the trees.

Be cautious with irrigation. Although irrigation is generally good for trees, it is important to be considerate of their roots when installing underground systems. If major supporting roots are severed, there could be a subsequent dieback in a portion of the tree overhead. A new irrigation system can also cause "changed water condition." Some trees are prone to root rot if there is suddenly more water than they are accustomed to. This is especially true if the soil drains poorly.

You can't always control the factors that make your tree healthy or unhealthy. Given the relative life spans of humans and trees, we generally inherit big trees, and their risk factors, from someone else. And you certainly can't control those "acts of God" that bring down a beloved old specimen. But perhaps these considerations will help you prevent a catastrophe—or reassure you that healthy trees will bring you nothing but joy the rest of your days.

Richard Dubé operates a landscape design firm, Environmental Information & Design, based in Buxton, Maine.

Don't Fall Prey to Tree Terror

by Cass Turnbull

Over the past few years in Seattle, we have experienced three extraordinarily strong windstorms. After each one, local arborists braced themselves for what we call "the second storm." Following newscasts showing homes and cars crushed by Douglas firs, panic sets in, and frightened people pay to remove or top perfectly sound and healthy trees.

Once you become familiar with the signs of hazardous trees, you are apt to overreact, like the medical student who begins experiencing the symptoms of fatal diseases. Evaluating your own tree is like being your own doctor: You may recognize some symptoms, but you are still unqualified to prescribe treatment. Hazardous tree evaluation is not a cut-and-dried affair but a matter of determining relative risk. No tree can be declared "safe" since a strong enough wind can blow anything over. And yet even obvious defects do not necessarily mean we should declare a tree "unsafe." Included bark—bark that becomes "trapped" in a narrow crotch—means that a branch is more *likely* to break, but not that it will.

The presence or absence of targets can also be relative. In the middle of a field, the most defective tree is not a hazard; it's good wildlife habitat. The majority of trees fail during storms when people are indoors, not out walking in the park. A bike trail has a relatively low target rating in that at any given moment there is a good chance that no one will be under the tree. And if a tree falls on a fence—which gets a high target rating since it's always present—it's likely to be covered by insurance.

Of course, not all tree defects are obvious. We have no X-rays for trees. We can't see into the trunk or the roots below the soil. Unlike doctors, we can't ask the patient, "Do you have a history of injuries?" Most trees do not fit comfortably into either the "no obvious defect" or "imminent hazard" categories, but are somewhere in between. Your tree may have a small cavity, a little included bark, or be suffering from compacted soil. In such cases, even a professional arborist will not give a definitive answer to the question "How safe is my tree?" for obvious legal reasons. They may recommend thinning the tree or cabling weak limbs to *reduce*, not eliminate, the risk. At

this point a good question to ask your arborist is, "What would you do if it were your tree?"

If the tree service you've consulted recommends topping the tree, call someone else. Tree topping—the severe cutting back of the top and major limbs—not only makes trees ugly, but often causes them to develop dangerous symptoms that may not be obvious for 20 years. The sprouts that regrow from a topping cut are likely to become large, poorly attached limbs in the future. The tree's trunk begins to rot out from the topping cuts down, causing it to break or to shed limbs. And a tree weakened from topping is more likely

to succumb to root rot or other diseases known to make trees unsafe. Topping is not a cure for hazard trees but one of the causes.

Unfortunately, the tree service industry is unregulated, and most tree services routinely recommend topping or unnecessary removals. Some of these companies are unethical; others are simply ignorant and unaware of the damage they do.

If your trees have any of the problems cited in Richard Dubé's article, don't assume the worst. Your best bet is still to hire a professional to do a hazard tree evaluation. (The cost varies from \$100 to \$250.)

People without access to qualified arborists may have to settle for reading up on the topic and then making an educated guess. It is impossible to eliminate all risks in life. You are much more likely to die in a traffic accident than from a falling tree, yet you don't give up driving. You

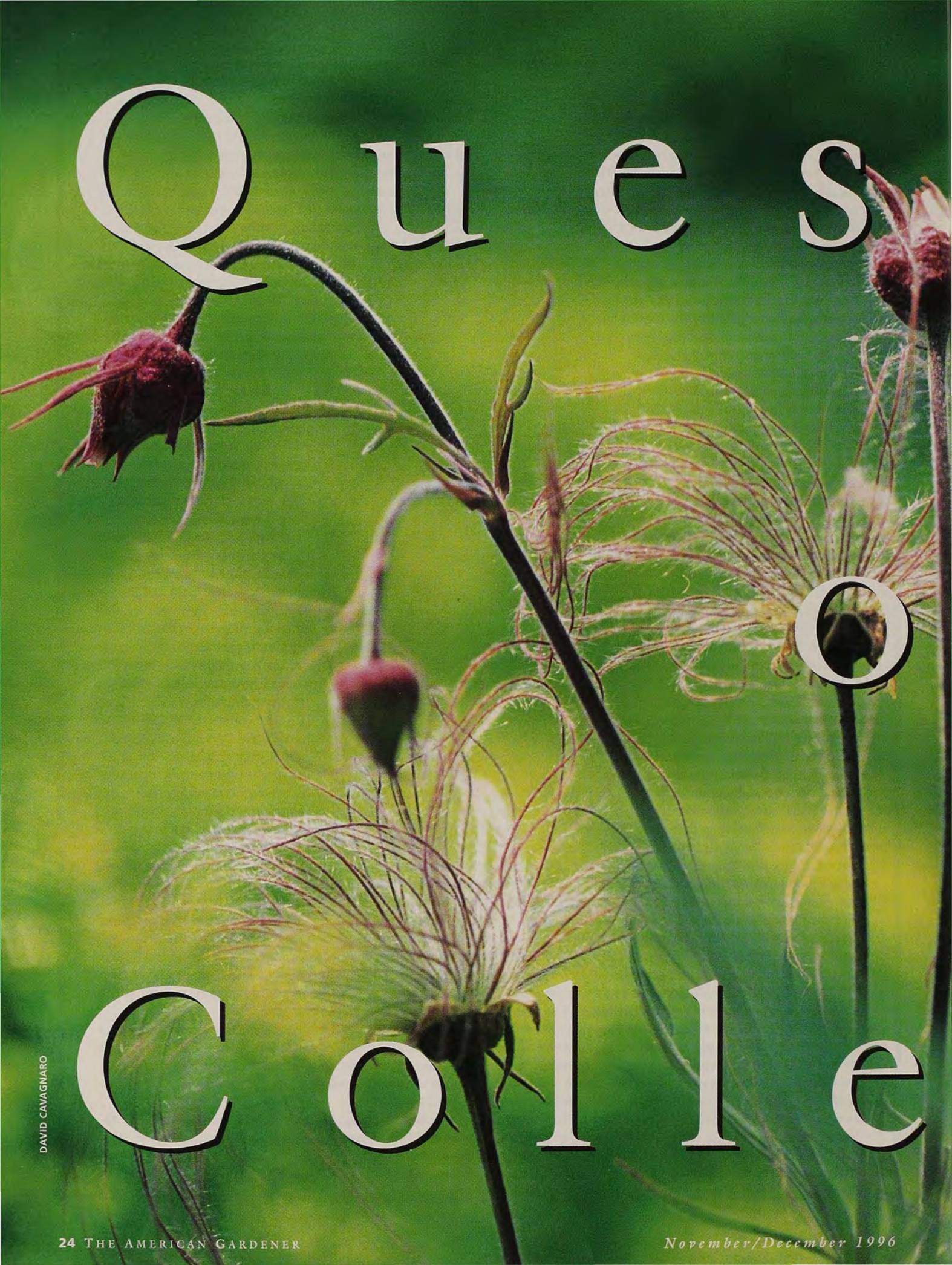
buckle up and drive defensively. The corresponding response to safety concerns about trees is to remove those with obvious defects and targets—the half-dead tree next to the baby's room, the tree with the large cavity at the base and facing the busy street.

Many if not most trees have defects yet pose little or no threat. Like so much of gardening, determining whether a tree is hazardous depends on many different factors, which makes it more interesting if not always easy.

A certified arborist in Seattle, Cass Turnbull is executive director of PlantAmnesty, a nonprofit organization dedicated to promoting better pruning practices.



Included bark makes a branch more likely to fail, but doesn't mean that it will.



Quests of a Collector

DAVID CAVAGNARO



t i o n s

It's wrong to take a rare plant from one place to grow in another. True, false, ... or it depends?

b y S a r a S t e i n

f

What a tedious morning! I've been counting the number of species offered by native seed catalogs: The winner definitely is Southwestern Native Seeds of Tucson, Arizona, with 350 species from Arizona, New Mexico, Colorado, Utah, Idaho, Montana, Wyoming, Texas, Mexico, and California—plus two, unexpectedly, from Ohio.

The owners, Tim and Sally Walker, truly are walkers: They spend five months of the year collecting seeds in the wild. The couple also photographs each species and maintains an herbarium of pressed specimens with records of where and when the plant was found. From the Walkers, Southwesterners can buy seeds collected not only in their

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c t i o n

own state, but in their own county.

Other collectors are equally careful. Bob Ahrenhoerster collects seed for his Prairie Seed Source in southeastern Wisconsin—not in neighboring Minnesota, Illinois, or Iowa; not even in more western or northern portions of Wisconsin. He won't mix grass seed collected from the dry top of a moraine with seed of the same species collected in the moist dip below. He refuses to confuse their genes.

He refuses to select genes either. He is against collecting wild seed by machine the way grain is harvested, all at once and all at the same height on the stalk: What about seeds that ripen later? What about plants that grow shorter? He hand-picks each species high and low and over and over to be sure his collection represents the entire gene pool of that stand. He will not sell in bulk outside his own area for fear that a large new population of a species could genetically swamp a rare or remnant population whose unique adaptations would then be lost.

This attention to preserving the local integrity of genetic information is one form of the collector's obsession. There are others. Some collectors gather seed from many locations expressly to broaden the spectrum of genetic information in their stock. Some are hooked on rarities regardless of geographic origin or ultimate distribution. Others would as soon take seed from a rare plant as bludgeon their grandmother.

These points of view, seemingly at odds and often expressed with considerable crankiness, are all born from the same passion: to preserve the diversity of our native flora. Collectors of rarities are expert propagators trying to cultivate vulnerable species as insurance against the present threat of their extinction in the wild. Those who preserve a specific gene pool wish to bank unique traits that may save a species from disaster in the future. Those who maintain a broad genetic spectrum hope to arm a species to repopulate locations from which it was extirpated in the past.

I take no sides in the matter. I'm from the East. I buy what seeds I can without guilt, knowing that none of them originated hereabouts.

My total of native species this morning, including Southwestern's listing and ones from California, Wisconsin, Missouri, Minnesota, and Oklahoma, came close to a thousand. I didn't count eastern meadow listings because there are none. In contrast to prairie, desert, and mountain grassland

species whose seeds can be stored dry, most of our native flora are woodland sorts whose seeds must be planted fresh. Another reason, though, is that there's hardly a scrap of native grassland left to pick from.

One notable exception is an endangered ecosystem called the Hempstead Plains, situated behind a chain-link fence in the suburbs of Long Island. We have coastal grasslands, too—salt marshes. Other than these, our "meadows" are alien forage crops, escaped ornamentals, household herbs, and agricultural weeds with a smattering of indomitable Americans like common milkweed and rough-stemmed goldenrod. Even those few natives that linger in old fields are routinely mowed before their seeds can ripen. Sometimes tufts of this and that are left—around rock outcrops, along thickets, at the base of road signs. But the idea of Easterners arguing the genetic pitfalls of mechanized collections is absurd.

Mourning Lost Meadows

Yet I am haunted by that ghost of meadow past. I got a glimpse of it on an island in Maine where there had been a blowdown some years before. I had thought I knew the growth on the island—old hayfield and sheep pasture, spruce woods, cranberry bogs, blueberry flats, scrub growth on old quarries, tidal communities around the shore. But here was something new: a sedge and grass meadow made up almost entirely of native species that had been waiting half a century for those spruces to blow down.

It was not lush, but this depauperate sprouting of hair grass and angelica instead of quackgrass and sow thistle was like a wraith from the past, and I reached to catch it before it vanished. Thus the sedge seeds that went home with me that fall, and the beginning of the addiction that must drive seed collectors of whatever stripe.

Back home I began to collect with increasing seriousness: a woodland goldenrod found on a rocky bank, an anise-scented goldenrod discovered near a dismantled fire tower, an annual called blue curls (*Trichostema dichotomum*) that grows in sandy places, and an unusual milkweed that grows with it.

These species, like a northern blazing star said to still exist on New England barrens, are not offered for sale in any catalog. They are the genuine article: direct descendants of the genetic stock that must have grown in native meadows four cen-

Those few eastern meadow species that linger in old fields are routinely mowed before their seeds can ripen.



Striving to preserve the integrity of localized plant gene pools, Bob Ahrenhoerster, above, hand-picks seeds sold through his nursery, Prairie Seed Source in North Lake, Wisconsin.

The author learned she was growing three species listed as endangered in New York State. One was prairie smoke, preceding pages, whose airy plumes have all but disappeared from eastern meadows. Among more common species she collected was blue curls, right, a striking annual rarely seen in nursery catalogs.



turies ago. We will never see the ghost full-face, but some portion of that natural heritage is in the seeds that can still be found, and I never go walking any more without packets to collect them.

Native plant societies and conservation groups warn never to collect in the wild. Native plant nurseries are expected to state that they never do so—and if they do, we are expected to boycott them. Among the plants whose choicest species have been locally collected to extinction for their curious behavior or sheer rarity are sundews and pitcher plants, orchids, ferns, alpiners, and cacti. *Lycopodium obscurum*, a club moss commonly called princess pine, has been pulled to the brink to make Christmas ropes and wreaths. Sea lavender (*Limonium carolinianum*), used in dried arrangements, seems likely to follow. Ginseng has been collected to near oblivion for its reputed medicinal properties; the latest panacea is *Echinacea*, the genus of coneflowers disappearing now from road sides at the hands of collectors who believe its roots cure even the common cold. Commercial mushroom hunters in Northwest forests pluck every salable one they find, leaving none to waft their spores to new locations.

The consequences of unscrupulous greed and ignorant consumption have stained all plant collecting with moral opprobrium. Yet it's hard to see a clear relationship between collection and protection. Ginseng is not protected in my state. Mountain laurel, which clothes oak woods for miles, is protected as an "Exploitably Vulnerable" species, meaning that it could be collected to extinction if only those nursery-grown types weren't so readily available. Nobody protects mushrooms: They're fungi, not plants.

Such seeming irrationality does not sit easy with me, and I set out a winter ago to find some reason in it, driven by a spur of guilt: Thirty-five of the species we grow on our property are on the list of protected plants in New York State. Three of these are accorded the direst classification, "Endangered." Some we grew from seed; some we bought as seedlings of plants collected in the wild; some are the wild-collected plants themselves.

The list of New York State-protected species had arrived the previous summer, brand new and already five years out of date. The first step in understanding this business of protection, it seemed to me, was to get the updated version of that list, as well as the latest list of federally

endangered and threatened species.

The federal list was relatively easy to find. But when I called the New York State Department of Environmental Conservation, Doug Schmid, senior forester in the Division of Lands and Forests, told me that while a revised list had been prepared, DEC didn't have the money to print it. Thus, I dealt with what I had at hand.

Ten federally endangered or threatened species were listed as naturally occurring in New York. Only three were also listed by the state. That might reflect the age of the list, or it might mean that the other seven species were already extinct in New York. None of the 10 was in my field guides. I guess there's no sense describing what one isn't apt to find.

There was no hint in either the state or federal publication of what sorts of habitats extant populations might occupy. The Natural Heritage (in some states, Natural Areas) Program, which maintains a data base of rare species and communities in every state and all the Canadian provinces, does not make its detailed maps available to the public. I heartily agree with that policy: Tell people where the last remaining stand of prairie smoke exists in New York State, and some fool will rush to dig it. But shouldn't novices be taught how, in general, to recognize a rare community?

The three endangered species growing on our property are sideoats grama (*Bouteloua curtipendula*), prairie smoke (*Geum triflorum*), and stiff goldenrod (*Solidago rigida*). Traveling west toward the Ohio River, all three become increasingly common until, at their homeland on the plains, plants can be purchased by the hundred or seed by the pound. I happen to know of a remnant natural stand of stiff goldenrod at a preserve nearby, but who needs to steal a plant that's cheap and can be charged on Visa?

The New York list is intended to educate citizens about the species they should have special respect for. Presumably, such knowledge would prevent foolishness like that of the woman I came upon years ago picking a bouquet of pink lady's-slippers. But how is such a woman to learn anything from a booklet that lists species by botanical and common name, but offers no clue about how to identify them? There was only one illustration, a lady's-slipper on the cover. Even if the woman learned from that picture that the flowers she found were orchids, she still would not have known that she was not allowed to pick them on some-

*Property owners
in New York
State can dig
protected plants
for sale or even
herbicide them;
or they can
allow anyone
else to do so.*



At the site of a blowdown on an island in Maine, Stein found such remnants of bygone meadows as hair grass (above, a cultivar, *Deschampsia caespitosa* 'Goldgehaenge') and angelica (*Angelica atropurpurea*, right).

one else's property (mine, as it happened): The booklet failed even to state the law.

I thought I knew the law—that it was illegal to distribute plants or seeds of plants listed as endangered by the federal or state government. There is no such law in New York, however. It is perfectly legal to distribute both plants and seeds of even the most endangered species. And not just "distribute," as in giving a friend a fern: One may also sell them. The law says one

or even herbicide them; or they can allow anyone else to do so. Even rare plant communities such as those that grow on limestone outcrops in this otherwise granite state can't be protected if they are on private land. The only real protection is through purchase as public parkland or by conservation groups.

Even on lands set aside as preserves, though, no law requires that active measures be taken to save diminishing species.

plants and seeds of federally protected species in one's own state as long as they are taken from private property with the permission of the owner. So, on one's own property, one can destroy at will any federally protected species that grow there.

Cultivating Wildness

At the dark end of our terrace, below a birdbath and in the shade of the oak, grows a collection of alumroots, naturally occur-



may do so from one's own land, or from others' land with the owner's permission. Property rights, not plants, are protected.

Senior Forester Schmid explained to me a fundamental difference in the legal status of plants and animals. Animals move freely across state boundaries, and therefore are under the aegis of the federal government. Plants are rooted in the ground, and therefore are private property. Property owners in our state can dig protected plants for sale

For all its potential genetic uniqueness here at the edge of its natural range, that remnant stand of stiff goldenrod I found at a local nature preserve is rapidly dying under a blanket of alien vines.

I hoped that federal regulations would prove to be more stringent. The U.S. government says one cannot transport endangered or threatened plants or seeds across state lines. Otherwise, the federal law is the same as in New York: One can distribute

ring varieties of *Heuchera* species. The picotee leaves of one are royal purple underneath. Another has pale, almost papery leaves, more starry in shape. The foliage of a third is meat red. A few are mottled; on others only the veins are picked out in color. They all come from the Great Smoky Mountains of North Carolina where their parents were collected.

When I was traveling in the South I visited We-Du Nurseries, where the alum-



No plant community is forever. Conditions change, and the species must move on to the next opportunity.



Sea lavender, above, commonly used in dried flower arrangements, and princess pine, left, a club moss used to make Christmas ropes and wreaths, have been collected to near-extinction in some locations.

roots were grown. The nursery's founders, Dick Weaver and René Duval, have explored the surrounding mountains, searchers for the variegated leaf, the uncommon color, the dwarf, the sport, and the species seldom offered by other growers. Their catalog spilled jewels: a copper-red iris, a bell-flowered clematis, marsh pink, hoary skullcap, and starry campion. The Appalachians are said to contain a greater diversity of forest species than anywhere outside the tropics. I listened to their tales of discovery with wonder but, like a child living the *Arabian Nights*, in full knowledge that my world has no such magic. The *Heuchera americana* that grows on my terrace—those alumroots of the mottled and vein-struck leaves—is native here. Yet I could search our forested hills and rocky gorges for years and never spot a glint of red or purple, or even the plain green foliage of the common sort. Local amateur naturalists last saw an alumroot growing in the wild in 1986.

The plight of that last alumroot is indicative of what really is threatening our native species. The county park where it was sighted is Marshland, a nature preserve bounded by Long Island Sound on one side and by highway, shopping malls, and residential neighborhoods on the others. A lone persimmon grows there at the limit of its northern distribution. Its sweet gums are separated from similar woodlands farther south by many miles of city streets and suburbs. Marshland is a "preserve" in the sense that it is a fossilized habitat that is slowly eroding, immobilized by the matrix of inhospitable land around it.

Regardless of the government's insistence that plants are rooted, and therefore permanent attributes of "property," mobility is critical to their survival. This need explains the astonishing ingenuity by which plants disperse their seeds by wind and water; by ants, mice, birds, and bison. No plant community is forever. Conditions change—hepaticas are overshadowed by hemlocks, wood lilies overgrazed by deer, trilliums overrun by the wild and aggressive leek called ramps (*Allium tricoccum*)—and the species must move on to the next opportunity. Potential mobility is still intact. It's just that there's no place to go.

The alumroot's actual existence in the wild has become theoretical here, and this is true of most of the species I've purchased from We-Du Nurseries and from other sources of woodland plants. I look up catalog offerings in the Dover reprint of Brit-

ton and Brown's three-volume set, *An Illustrated Flora of the Northern United States and Canada*, last updated in 1913. Its venerable age, combined with 20 years of notations by local naturalists, gives me strong clues: If the natural distribution of *Heuchera americana* extended to southern New York fourscore years ago, and it was found in just one location a decade ago, chances are it's sequestered too far up the mountains to return except via UPS.

But the morality of moving woodland plants makes me more uneasy than trucking meadow species. No one covets or collects native grasses or goldenrods; anyway, anyone can raise them from seed. Of our state-protected Exploitably Vulnerable species, most are woodland plants, including all club mosses, all orchids, all trilliums, and all but two ferns. These are notoriously difficult to raise from seed or spore, or to grow to salable size in cultivation—or, in the case of orchids, to propagate at all. One result has been that most commercial offerings are of wild-collected plants, the ones you're morally prohibited from buying because they can't be certified "nursery propagated."

The prohibition did not arise in genera like *Heuchera*, which is easily raised from seed and as easily cloned by division. If the last alumroot at Marshland had been collected, a hundred plants could soon have been returned. This is the service that collectors like Weaver and Duval provide.

They don't even try, though, to raise trilliums from seed. The seed must be fresh. Germination outdoors in flats takes four years or more. Few seeds sprout at all. Those that do behave in the most desultory manner, each year putting out a single leaflet until, by the third year at a minimum, the plant has stored enough nutrition in its root to produce the typical three-part trillium leaf. Time from germination to flowering is at least four years and often six, making the total from seed to salable plant 10 years. Using growth hormone, Ohio seed expert Norman Deno has managed to cut that time in half. But a plant that has been tended for five years costs five times as much as one collected in the wild and still is not a feasible proposition for growers whose plants usually require no more than one year from seed to shipment.

Weaver and Duval take a middle road. They grow collected trilliums in a natural woodland setting. The oldest plants, which develop several buds at the crown, can be

JOHN A. LYNCH: PHOTONATS (FAR LEFT); JESSIE M. HARRIS (LEFT)

cloned by careful dissection of the rootstock. As these older plants are harvested for propagation, young seedlings fill the excavated gaps, and eventually the open-pollinated youngsters also reach salable size.

All the trilliums that now grow in my woods, and most of their woodland companions, were shipped from growers who can't state in their catalogs that their stock is "nursery propagated." The plants propagate themselves by seed or rhizome in woodland managed by the grower. The grower crops the stands—digs individual plants or plugs of spreading species—and lets the gaps refill before cropping the same stand again. Growers may reseed gaps, flood marshes, burn clearings, thin trees, cull deer, weed ramps. Certainly they do not let vines smother their flowers, or mow their income down before the seed is ripe. Wild-cultivated collection is perfectly legal: All applicable state or federal permits and inspections are duly noted on the plants' shipping cartons.

One New England source I use has been cropping his 40-acre woodland for three decades now. He thins and sells the oldest specimens from his trillium colonies at intervals of several years. The gaps meanwhile fill with seedlings that would otherwise not have found space to germinate. Germination and growth are better than in cultivation because the woodland soil naturally harbors the necessary fungi: The seedlings mature to salable flowering plants in about four years. The method may seem unconventional to those who think of "growing" as something done in pots or beds, but this "collector" is propagating trilliums much as We-Du does, although on a larger scale and thus at a lower cost.

Of course there are still those who rape the wilderness, who deserve whatever shunning we dish out. But my suggestion to conservation moralists is to hone their language: The woodland plants I buy from this source are properly described as wild-cultivated. The person who grows them is properly described as a plant disperser.

Saving Plants from Development

This year I flew south three times over our skinned land. I flew west, too—over the Central Plains and the deserts and mountains beyond the Continental Divide—but that was not as painful as flying south over the eastern forests. One knows, of course, that the prairies were peeled away by plows, but Nebraska, Iowa, and Kansas look simply green from such a height, and one can't

tell whether the uniformity of color is grain or grass. The western mountains or deserts may appear ravaged from the ground, but from an airplane they look like a geophysical map, suitably green, tan, gray, or white according to their elevation. In the East the land looks flayed.

It was my misfortune, I suppose, to survey this side of the continent first from the air in late winter, when plowland is bare dirt and the pale membrane of grass over fields and lawns seems a flimsy tissue compared to the thick forest hide that once covered the East, and now is cut to pieces. The pieces, richly textured even from the air but oddly shaped, reflect the luck of their topography. Rounded fragments are tops of hills too steep to cultivate or live on; sinuous strips run along rocky ridges. The largest pieces—whole mountains dark with conifers among the hardwoods—are skirted by square fields cut into their easier slopes, or irregularly notched and gouged as though whittled by a child feeling for the soft spots. I felt in my own skin the scalping of the land as though I were a burn victim aware that what remained of my hide might never stretch to cover the thin, bare expanse of my terrible injury.

On the first of these trips I met Jeane Reeves, a surgeon of sorts who was involved in a grafting operation. The work sounds ghoulish: Reeves had collected in the wild some 100,000 native plants of 104 species including just about every eastern rarity a woodland gardener might covet. She had, in fact, cleaned out acre after acre of unspoiled forest, taking ferns, orchids, club mosses, even flowering shrubs, chestnut trees, and the aquatic green dragon that I long to find someday growing in a wild and forgotten marsh. She did so morally, legally, wisely, and successfully—though the operation was futile in a way.

Reeves collected from 5,000 acres in the foothills of the Smoky Mountains: densely wooded, strewn with mossy slabs of granite, washed by creeks, cut by deep ravines—and about to be peeled for development.

The land is in a Georgia county within commuting distance of Atlanta. The county sold the forest tract to a large corporation, which in turn parceled out to smaller development companies portions planned for subdivisions. The hills have since been graded to fill ravines; the creeks run underground in pipes; the valleys are paved roads; the forest soil is scraped to clay. The entire area is now a planned community of shopping centers, municipal buildings, schools,



Jeane Reeves, right in top photo with Germaine Baxter, organized a rescue of native plants near Atlanta. Some went to a nearby Montessori school, above. Wildflower gems such as marsh pink (*Sabatia angularis*), center, and hoary skullcap (*Scutellaria incana*), right, are preserved through the offerings of nurseries such as We-Du in South Carolina.



and churches that serve vast residential tracts of large houses on small lots.

The same thing is happening here in New York—is happening everywhere, I guess—and it had never occurred to me that one could do anything about it but get mad, write letters to county officials, vent steam at zoning board meetings—and learn how little one's feelings matter

to commerce. I had never imagined you could just pick up the telephone, as Reeves did, and assemble crews of volunteer diggers that eventually included grounds crews from college campuses, nature centers, and botanical gardens; Master Gardeners; garden clubs; horticulture students; conservation organizations; schoolchildren; and even the unlikely North Georgia Bonsai Study Group. Nor had it occurred to me that a plant rescue project on

successful, though of course the patient from which the grafts were taken died.

I traveled south again later to see the dead development and a woods that had received many of its rescued plants. In the meantime, I had sent for and received an interesting document: a master's thesis by a graduate student in landscape architecture at the University of Georgia who attempted to measure in monetary terms the loss of forest to development. Calculating at current retail prices the replacement cost of canopy trees, understory species, and a sample of ferns and wildflowers, she had come up with a figure just short of a quarter of a million dollars per quarter-acre. This figure is wildly underestimated, and not just for the obvious reason that large canopy trees aren't replaceable at any price. Dollars can't be assigned to unknown quantities and qualities of soil, seed, pollinators, dispersers, diversity, or age. The value of an ecosystem is inestimable. The master's student knew that; so does Jeane Reeves and so do I. We are all groping for a guiding ethic.

On this visit a good deal of my surveying of the countryside was by car. I found it difficult to recapture the pain I felt viewing the forest from the air. Things are bigger at ground level—or one can imagine that they are: The wooded ridges that appear as slivers from an airplane seem from the road to be the edge of a forest that might extend beyond the horizon and all the way to grassland on the plains. Surely the little woodlot I visited would not have been visible from the air. Driving by on the road could not have revealed its singularity. Even a morning's moseying around barely hinted at the richness of a woodland ecology in which children can be counted among the indigenous fauna.

The site was a Montessori school on a narrow lot "landscaped" (if that's the right word) by Reeves' fellow collector Paula Refi. It didn't look landscaped; it didn't look like a school. Azaleas were in bloom when I arrived. Seedlings of beech, tulip-tree, and maple leafing out in the little woodland showed that here in this suburban oasis the forest ecosystem was renewing itself as it is failing to do on less loved and nurtured tracts. Above the brook, which once had been a drainage ditch, phantom crane flies appeared like bits of lace in spots of sunlight, and as quickly disappeared in shade. The children came and went in much the same way, first weeding among young vegetables, then climbing a

rock or down on hands and knees searching a pool for tadpoles.

The children were neither excited nor subdued as they explored, but somewhere in between: engrossed, but easy; not indifferent to the woods—not awed either—but rather awaiting the small adventures that came their way. This is what is missing in most children's lives, this lifting of stones and poking at soil to see what goes on in the real and living world. The children of the Montessori woods will not lay waste the land. Andrew, cradling a baby cornsnake in his open palms, will not grow up to bash it with a shovel.

Yet this half-acre woods had barely escaped demolition. The area had been cordoned off for years while school and town battled over the raw ditch whose roaring floods and crumbling banks were hazardous to children. The town wanted the waterway contained within a buried culvert, no matter that the trees would also have been removed in the regrading. It had taken the school and Paula years to convince the town that natural woodland vegetation had held waterways against erosion in the past and could do so again. When permission to restore finally was granted, it had taken plenty of rocks and rescues, too, and months of the parents' work.

Or I should say, that's all it took: no powerful machines, no grandiose engineering—nothing approaching the half-million-dollar price tag the graduate student had placed on such an ecosystem—to bring back frogs and phantom crane flies, to have bellworts and mayflowers bloom, to open the doors and let the children out into their natural habitat.

I can't find as many answers to questions of collection as I can raise. But between the two perspectives, the brutal aerial view and the ground-hugged intimacy of the Montessori woods, I sense an ethic growing.

I like my Smoky Mountain alumroot; I like my New England trillium and my Wisconsin goldenrod. I think it is both important and moral to rescue, collect, propagate, distribute, transplant, and in every other possible way give back to our native vegetation the mobility that has been lost on this skinned and butchered land. But I think the purpose of these endeavors ought to be to reassemble plant communities, not merely to collect plants.

Sara Stein's previous books include My Weeds and Noah's Garden.

Sources

PRAIRIE SEED SOURCE, P.O. Box 83, North Lake, WI 53064-0083. Catalog \$1.
SOUTHWESTERN NATIVE SEEDS, P.O. Box 50503, Tucson, AZ 85703. Catalog \$1.
WE-DU NURSERIES, Route 5, Box 724, Marion, NC 28752, (704) 738-8300, fax 738-8131. Catalog \$2. We-Du Nurseries is being sold and its owners are retiring from the nursery business. The transition is expected to be complete in December, and selection and policies may be changing. The information above was current as of this fall.

such a scale could be activated by a common citizen, without official sanction, under no auspices, belonging to no group, and lacking any training in botany, ecology, conservation, or law.

Refurnishing an Ecosystem

The law was as simple as I've said: Reeves had only to get the developers' permission to dig all the species on their property, regardless of the plants' state or federal status. She was able to get permission to collect on about 1,250 acres. She scouted each area ahead of time (in order not to lose diggers in the forest). Plants were collected in the morning and transplanted the same afternoon into habitats similar to those where they had grown. The grafts took well in other woodlands: The rescue operation was

Sculptural Willow Shrubs

Once scorned, these smaller willows offer four-season interest in today's more natural gardens.



by A d e l e K l e i n e

With their tactile catkins and romantic branches swaying against a cloudless sky, willows seem determined to make their presence known to gardeners and nongardeners alike. So the first tree a new homeowner plants in a barren subdivision is often the rapidly growing weeping willow, a tree that drops leaves monthly, whose branches crack in the slightest breeze, whose roots devour sewer pipes in a relentless search for water. The once-smitten homeowner lives to regret a lack of arboreal knowledge.

But Salicaceae—which also includes poplars—is a big family. The genus *Salix* has about 400 species and 200 hybrids. The generic name is derived from a Celtic word meaning “near water,” which indicates their preferred habitat. For centuries they’ve been a valuable source of flexible branches for making baskets and wattle fences. The sap of young stems contains salicin, a bitter-tasting glucoside once extracted to relieve fevers and now supplanted by synthetic salicylic acid, the active component in aspirin. Like most fast-growing trees, willows are soft-wooded; their most salient fea-

ture is the catkins that on individual plants are either staminate (male) or pistillate (female).

The owner of a small garden will find the pussy willow, dragon’s-claw willow, and fantail willow to be well-mannered shrubs without the bad habits of their larger relatives. When these are deftly sited, their sculptural branches justify a featured role in the landscape, and cutting their branches for indoor bouquets actually helps maintain their shape. With the growing popularity of water gardens, these willows’ moisture-loving nature suggests additional possibilities.

The soft silvery catkins that give pussy willows their enchanting common name, with their texture like kitten fur, have made them endlessly fascinating to generations of children. To adults, the sight of a few branches in the florist shop brings assurance that spring will indeed eventually return. Yet in gardens they are often rele-

Goat willow, above, is also known by the more melodic “French pussy willow.”



Downy catkins adorn the weeping branches of 'Pendula', above, a cultivar of goat willow often listed as the Kilmarnock willow. Prized for red stems whose color is intensified by frost, *Salix* 'Scarcuzam', above right, trademarked Scarlet Curles, is believed to be a hybrid between *S. alba* 'Britzensis' and the dragon's-claw willow (*S. matsudana* 'Tortuosa'), opposite.



gated to the backs of borders where, after the spring fling, they are all but invisible among ostentatious summer flowers. Sited correctly elsewhere, they can serve as workmanlike hedges, windbreaks, and screens in summer, and their strong roots help reduce soil erosion all year long. But some will do much more.

Planted near a door, *Salix caprea*, the goat willow or, as I prefer, French pussy willow, can be one of the best indicators of the changing seasons. In full sun its catkins can grow to three inches long, turning pink as they develop and giving a rosy glow to the shrub in early spring. Its soft green, elliptical leaves add a cool note to stronger summer colors. And as its leaves drop in autumn, the branches darken, lightening again as days lengthen.

The graceful form of *S. caprea* 'Weeping Sally' is an ideal accent for a Japanese garden, rock garden, or pond side. This shrub is the female form of *S. caprea* 'Pendula'—sometimes known as the Kilmarnock willow—which has less flexible branches. A formal planting might center 'Weeping

Sally' in a bed underplanted with dwarf azaleas and summer annuals, while a more natural setting would be a water garden with grasses, irises, and ground covers.

These cultivars have arching, pendulous branches—they can even be used as ground covers if not grafted onto straight rootstock to give them additional height. Even so, they will remain at six to eight feet high with a full, graceful top that can spread to four or five feet wide. (Any lateral branches that arise from the trunk should be removed to preserve the weeping habit.) Winter hardy to USDA Zone 5, they do best in full sun and medium to wet soil.

S. gracilistyla var. *melanostachys* (sometimes listed as *S. melanostachys*) is the very striking black pussy willow, with deep black catkins and red anthers that turn yellow as they are fully exposed. Christopher News-holme, in his book *Willows: The Genus Salix*, writes that "the appearance of the black male catkins on the naked stems in March, with the subsequent revelation of the anthers, is spectacular." The catkins are smaller than those of the French pussy wil-



Propagating Willow Shrubs

A most valuable characteristic of willows is the ease with which they can be propagated from cuttings. A French pussy willow cutting that I rooted as a beginning gardener launched my interest in shrubs, and I have rooted many dragon's-claw and fantail willows since.

Choose tip cuttings at least eight inches long, on which you can see several leaf axils. When the ground is wet in spring, a willow cutting will sometimes root on its own in moist clay soil. I start mine in water, where they root easily, but when feeder roots develop off the main roots, I put them in a coarse mix of sand and peat moss or in sterilized potting mix, until they make strong root and top growth. Keep them moist by covering them with a plastic bag, and feed them with a weak solution of balanced fertilizer.

When the weather is warm enough, harden them off and plant them in your desired location. The secret to keeping them alive at this point is constant attention to their water needs for the rest of their first season. If they dry out, they will quickly wither.

If the willow is to play a major role in your landscape, it's probably best to buy a plant and practice taking cuttings from it to create more for yourself or your friends.

—A.K.

low and closer to those of the true pussy willow, *S. discolor*, common to wet areas throughout eastern North America. But its delicate cut stems are works of art, especially in a floral design that allows its unusual color to be admired up close. In fall, its oblong green leaves turn yellow.

Site this tree where its rich purple-black stems can stand out in winter against the snow. Try underplanting it with the moisture-loving ground cover *Houttuynia cordata* 'Chameleon', whose leaves of scarlet, cream, gold, and green add excitement to the willow's summer foliage.

Dragon's-claw willow, *Salix matsudana* 'Tortuosa', makes an arresting sculpture with zigzag lines that follow their own genetic road map. Other common names include curly willow or corkscrew willow. Its smooth, catkinless, green and tan branches vary in thickness and grow upward with an exotic twist. These sinuously contorted branches have been appreciated for many years by flower arrangers, who passed them to each other for rooting. Now it seems that florists poke a branch into almost every

bouquet to lend airy height and eye-catching lines to flowers.

Dragon's-claw willow will reach 20 or 30 feet if left unpruned. It is winter hardy to Zone 5. In Zone 4 it is often winter-killed to the ground, but will quickly grow back. Its heat tolerance is also limited, according to Michael Dirr, who notes in his *Manual of Woody Landscape Plants* that it is particularly short-lived in Zone 8. Because of its rapid growth, you can cut branches for indoor decoration at any time, although in summer you'll want to strip off the leaves because they don't absorb water well and will simply dry up.

A dragon's-claw willow dominates one side of my wild garden, where it waves nonchalantly among liriopé, lily-of-the-valley, and European ginger (*Asarum europaeum*). In spring they are joined by woodland wildflowers, while in summer gooseneck loosestrife (*Lysimachia clethroides*) bobs its white flowers in a rhythmic counterpoint to the willow's wayward branches.

Two colorful dragon's-claw hybrids are

Sources

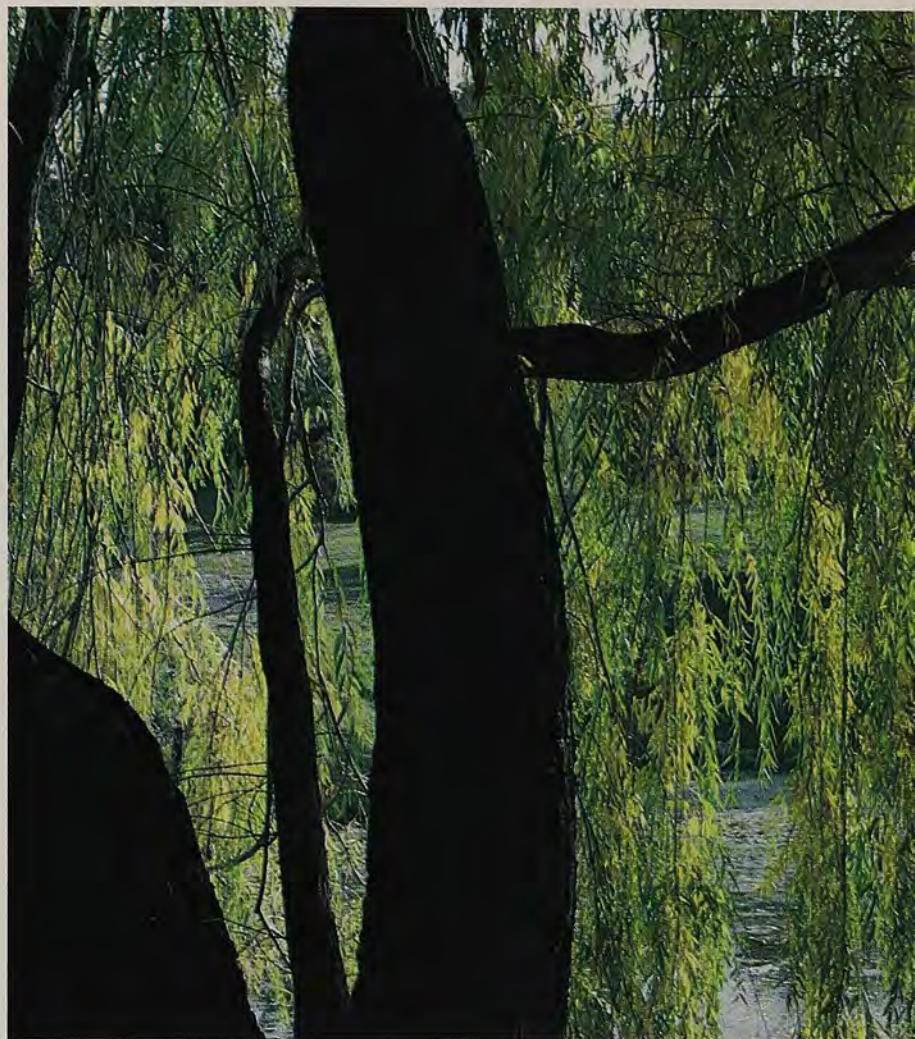
APPALACHIAN GARDENS, Box 82, Waynesboro, PA 17268-0082, (717) 762-4312. Catalog free. *Salix matsudana* 'Tortuosa', *S.* 'Golden Curls', *S.* 'Scarcuzam' (Scarlet Curls), *S. udensis* 'Sekka'.

FORESTFARM, 990 Tetherow Road, Williams OR 97544-9599, (541) 846-7269. Catalog \$3. *Salix* 'Golden Curls', *S.* 'Scarcuzam', *S.* 'Snake', *S. caprea*, *S. caprea* 'Pendula', *S. gracilistyla* var. *melanostachys*, *S. udensis* 'Sekka'.

GREER GARDENS, 1280 Goodpasture Island Road, Eugene, OR 97401-1794, (541) 686-8266. Catalog \$3. *Salix* 'Golden Curls', *S. caprea* 'Pendula'.

MELLINGER'S, INC., 2310 West South Range Road, North Lima, OH 44452-9731, (800) 321-7444. Catalog free. *Salix gracilistyla* var. *melanostachys*, *S. matsudana* 'Tortuosa', *S.* 'Snake', *S. udensis* 'Sekka'.

ROSLYN NURSERY, 211 Burrs Lane, Dix Hills, NY 11746, (516) 643-9347. Catalog \$3. *Salix caprea* 'Weeping Sally', *S. gracilistyla* var. *melanostachys*.



becoming more widely available. *Salix* 'Golden Curls', whose other parent is the golden weeping willow, *S. alba* 'Tristis', is golden barked with curly leaves and the dragon's-claw's zigzag branches. *S.* 'Scarcuzam', apparently the result of a cross with *S. alba* 'Britzensis' and trademarked as Scarlet Curls, has red stems emerging from its golden branches. The scarlet becomes more intense after frost but, like the dragon's-claw willow, Scarlet Curls can be killed to the ground north of Zone 5.

Either of these cultivars can be focal points in a landscape. Dragon's-claw willow hybrids tolerate drier soil than pussy willows, and because they like full sun they can be underplanted with a wider range of plants. Nevertheless, they will need some watering during drought or extreme heat.

Another eye-catcher, even more contorted than the dragon's-claw and these relatives, is the somewhat unfortunately named *S.* 'Snake'. It is variously listed as a cultivar of *S. alba* or of *S. matsudana*. Newsholme indicates that the truth is somewhere in between—that it is a hybrid

between the dragon's-claw willow and *S. alba* var. *argentea*. The most cold hardy of this group, to Zone 2, it is a pyramidal shrub or tree that grows to 12 feet tall, with fine hairy leaves that give it a silvery white aura. The catkins appear when the leaves do.

The most curious and sculptural of the willow shrubs is the fantail willow, *S. sachalinensis*—now listed more often as *S. udensis*—'Sekka', a male clone of a species native to Japan. This wide shrub has broadly rounded and recurved stems that are flat, or fasciated, at the tips. It seems to change directions at will, occasionally throwing short, straight stems like antlers off its curving, paddle-shaped tips while spreading its one-and-a-half-inch-wide, flattened mahogany branches. In fall, the fantail willow's glossy green, lance-shaped leaves turn a rich, buttery yellow.

The time to cut its branches for indoor use is spring, when it sports small silvery catkins. If left out of water, the catkins will dry and remain on the branch.

Hardy to Zone 4, the fantail willow



grows quickly to 10 to 15 feet with an equal spread. Mine was small when I bought it, and I misjudged its growth rate so that after two years it was threatening to take over my hosta bed—a typical case of right plant, wrong place. A friend who started hers from a cutting has grown it in full sun in a bed surrounded by walkways for 25 years. Each spring she cuts it down to six inches to encourage new growth—saving the fasciated cuttings for indoor display—and has maintained it at six feet.

Since the cause of this plant's fasciation is obscure, it is always propagated vegetatively to keep that quality. Still, plants can vary, so if you're going to buy one, pick the plant with the most heavily fasciated branches. Fasciation can also vary from year to year; it may be encouraged by mild summers and unusually rapid growth. Fantail willows make choice plants for a Japanese garden or near a window where their curving lines can best be appreciated.

In most gardens, the informal growth of willow shrubs can use a bit of taming by ground covers that appreciate moist condi-

tions: ajuga cultivars, *Euonymus fortunei* 'Coloratus', *Lamium maculatum* 'Beacon Silver', *Brunnera*, or *Aegopodium podagraria* 'Variegatum' (bishop's-weed, which can become invasive). For additional spring interest, depending on light conditions, you can underplant with early small bulbs such as scillas, winter aconites, and fritillarias. Other good companions for shade include ferns, hellebores, astilbes, tiarellas, epimediums, and bleeding-hearts.

Sculptural willow shrubs can play a dual role in your landscape and indoors. Although frequently scorned by landscape architects, their reputation and viability as "pass-along plants" has kept these curiosities in demand. Now, with the advent of new cultivars and the emphasis on natural gardens, interest in them has broadened. Winter, spring, summer, and fall they will draw your eye as living sculptures that can't be matched.

Adele Kleine is a free-lance writer living in Winnetka, Illinois, who teaches flower arranging at the Chicago Botanic Garden.

In fall, the dangling foliage of golden weeping willow, *Salix alba* 'Tristis', forms a gilded curtain at water's edge, above left. In addition to black catkins with red anthers, *S. gracilistyla* var. *melanostachys*, above, features purple-black stems in winter.



When Timber Press came up for sale, Bob Conklin, above, jumped at the chance to leave his corporate law practice and pursue a career connected with gardening. Opposite: Timber Press founder Richard Abel. (Photo courtesy of Richard Abel.)

Tim-



Everything is falling into place for America's premier publisher of gardening books.

When you talk to people at Timber Press, the leading garden-book publisher in this country, you talk to people who love what they do. The book, not the bottom line, is critical. Money is not unimportant, owner Bob Conklin emphasizes, but "our real concern is quality. We want every Timber book to be the best, to be authoritative, to be definitive."

That commitment to serious horticultural writing has characterized Timber Press since it was founded by bookseller/supplier Richard Abel in 1976. Failing to find a good book on timber management, he spent 11 years wading through journal articles, symposia papers, and government documents to learn how to manage his 160 acres of forest. His mission was to create thoughtful, systematic books for people who, as he put it, "are prepared to spend perfectly good money on books when most people want to spend it on everything else under the sun."

If consumers were problematic, Abel believed publishers were committing the real sins, that they were downgrading the books themselves. Most, he observed in 1991, were interested solely in formulated garden books written on a beginner's level.

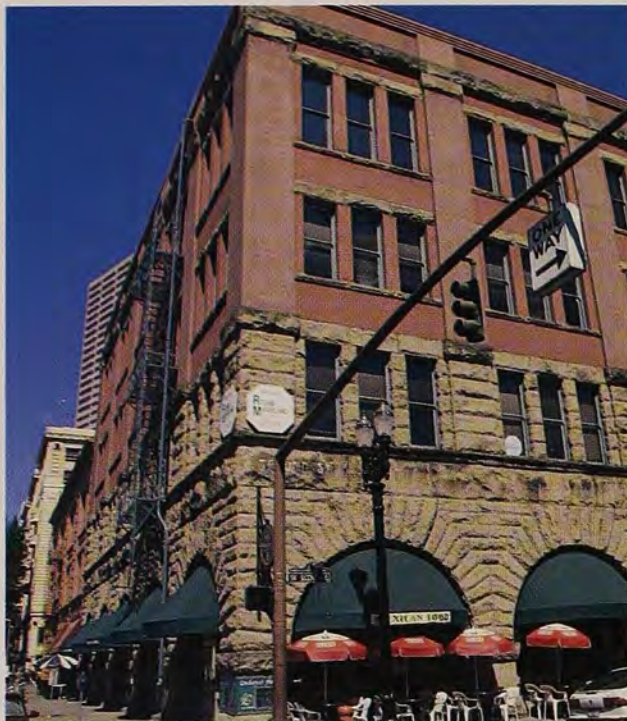
"A designer and an editor sit down together and say, 'Hey, we're going to have a 96-page book.... It will have X-number of color photographs,... Y-number of black-and-white photographs....' When they get all that done, they go to some hack and say, 'We want precisely 33,750 words on the subject of how to grow plants.' If there's a word more, it gets chopped out."

Refusing to follow that blueprint, Abel might have been a publishing flash-in-the-pan if it weren't for Japanese maples. More

by Karan Davis Cutler
photos by Owen Carey

ber!





Left: The building housing Timber Press is a rehabbed warehouse built in 1893. Right: Timber staff (left to right) Neal Maillet, acquisitions editor; Jackie Thompson, sales manager; Conklin; Michael Fox, marketing director; Debby Garman, publicity manager; and Dale Johnson, editorial director. Maillet and Thompson, Fox and Garman are two of the company's three married couples.

specifically, for entomologist J. D. Vertrees' book on Japanese maples, Timber's first book. Released in 1978 and priced at a hefty \$40, it sold. And it's kept selling. Now in a second edition—and still \$40—more than 28,000 copies of *Japanese Maples* have gone out the door, making it the company's best money-maker.

The success of Vertrees' monograph—which had been rejected by a dozen other publishers before Timber accepted it—convinced Abel that there was an audience for specialized horticultural books and that he could turn an avocation into a business. In his words, "Enough people could be found to buy enough copies of a really first-rate book to sustain Timber Press from a financial point of view."

Grist for the Cognoscenti

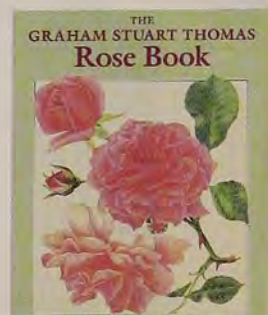
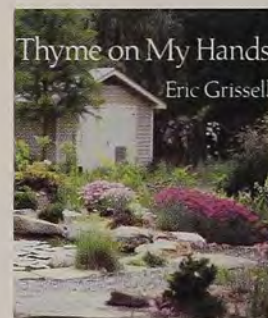
While Timber's approach hasn't been imitated by other publishers, it hasn't gone unnoticed. Steve Frowine, vice president of horticulture at White Flower Farm, is one of many professionals who laud Timber books. "They're invaluable references, unlike the fluffy volumes published by the popular press. The books on primulas and orchids are my personal favorites, but we have most of their titles here at the Farm." Anne Raver, garden columnist for *The New York Times*, is even more succinct: "For a good book on a particular plant, I turn to Timber Press."

In a nice bit of horticultural serendipity, Abel's publishing vision coincided with the increased popularity of gardening in the Unit-

ed States. By 1990, an average of 75 million households were participating in lawn and garden activities annually, making gardening the most popular leisure-time activity in the country. Moreover, Timber's start-up coincided with the growth of more sophisticated gardening—an interest in perennial borders, rock gardens, heirloom roses, ornamental grasses, and dwarf conifers.

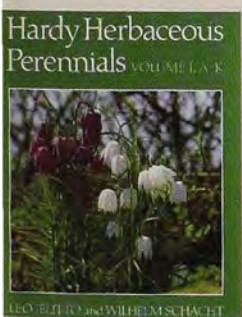
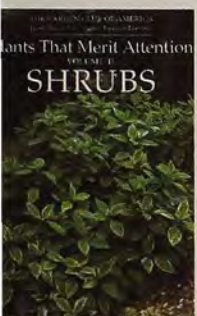
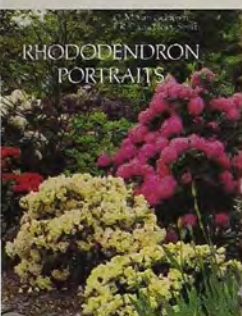
Conklin, who bought the company in 1989 after Abel's health declined, was one of those sophisticated gardeners. His large perennial gardens had been featured in a special issue of *Better Homes & Gardens*, and he maintained two greenhouses filled with 600 orchids. Over six feet tall with blond-gray hair, Conklin still dresses like the early-1960s Dartmouth undergraduate he once was: khakis, button-down shirt and crewneck sweater, loafers. Half-frame glasses hang around his neck, giving him a bookish air that conceals his previous life as a corporate lawyer.

"When I turned 50, I realized I wasn't happy practicing law. I wanted a real change," Conklin recalls. He toyed with





Left: Maillet reviews slides for inclusion in an upcoming book with Susan Applegate, art director. Right: Johnson consults with James Eckenwalder, author of a forthcoming manual on conifers. Timber is rare among publishers in keeping its now almost 300 titles in print indefinitely. Those books in the middle row below are new this year.



buying a nursery. "Frankly, I didn't know enough to start one, and the nurseries I could afford weren't going to make a profit, and the ones that made a profit I couldn't afford." When he learned that Timber Press was for sale, he didn't hesitate. "It gave me a

change, and it provided me with a business that had a connection with gardening. It's the best decision I ever made, a perfect opportunity," he says.

The word "perfect" comes to mind as you look out any one of the five 10-foot windows in Conklin's office. In the distance, snow-topped Mount Hood stretches two miles into the sky. In the foreground are the Willamette River, where sternwheelers compete with small boats, log traffic, and Navy vessels; and the lively streets of Portland, where fountains and outdoor sculptures nearly outnumber parking meters, and innovative restaurants and brew pubs appear to outnumber everything. Portland's amenities include a mild climate and plentiful rainfall that make it a paradise for gardeners.

Timber Press is on the fourth floor of an historic building, part of Portland's hurly-burly frontier past. The structure, originally

a shipping warehouse, was built in 1893 by merchant-politician James Haseltine. The neighborhood—Portland's "Old Town"—is currently undergoing gentrification. Trendy restaurants serving salmon and cilantro, art galleries, and white-collar businesses like Timber fill the turn-of-the-century structures as quickly as they are rehabbed.

Inside the Haseltine Building, brick walls and old-growth Douglas fir beams have been exposed. The 16-foot ceilings make the 10-by-12-foot half-walled offices seem expansive. The atmosphere is subdued and efficient but not cold. "We're really a family company," Conklin says with pleasure, pointing to three husband-and-wife teams, a pair of sisters, and his daughter Christy, manager of international sales, as proof. "We're nothing if not nepotistic."

Nepotism hasn't hurt business. Under Conklin's direction, Timber has grown from six to 24 full-time employees (a handful of free-lancers work off-site) and increased the number of books published each year from 15 to 35 or more. 1995 was an especially fertile year, with 48 new titles; annual sales total nearly \$5 million, up from \$1.5 million in 1989. Among the new books in 1996 are *The Gardener's Guide to Growing Ivies*; the long-awaited second volume (on shrubs) in the Garden Club of America's series *Plants That Merit Attention*; the monumental two-volume *Conifers: The Illustrated Encyclopedia*; and *Plants for the Future*, subtitled "A Gardener's Wishbook," by Jerome Malitz, a professor of mathematics.

When he bought Timber, Conklin took a hard look at the

company's editorial direction. "If Abel became fascinated with some project, however arcane, he'd pursue it," Conklin says. "I thought it vital to sharpen our focus to ornamental horticulture while retaining his commitment to quality and seriousness. We didn't want to compete with large publishers doing coffee-table or watered-down books."

Timber's bimonthly book catalogs reflect that honing, though its listings are sufficiently broad to justify its slogan, "Better Books

Whatever the topic, Timber approaches gardening as an intellectual activity, not a lifestyle.

for Gardeners, Horticulturists and Botanists." In addition to mainstream garden topics, such as roses and garden design, there are books about micropropagation, the orchids of Kenya, pollination, forestry ethics, medicinal plants of the Amazon, and botanical Latin. There are 22 books on orchids, an equal number on trees and shrubs, and twice that number on perennials—290 titles in all.

Whatever the topic, Timber approaches gardening as an intellectual activity, not a lifestyle. The editorial quality is due not only

to Abel's influence and Conklin's focused hand, but to the current owner's collaborative management style. "I guess I have a veto," he says, "but I can't imagine using it. We have a highly competent group of people, and they have more experience in publishing than I do. I have complete confidence in their judgment."

Most crucial are Neal Maillet, acquisitions editor, and Dale Johnson, editorial director. Johnson, age 47, is the in-house scholar, having earned a Ph.D. in botany at the University of California at Berkeley in 1978. Unassuming and soft-spoken, he's been at Timber the longer of the two, arriving in 1991 after stints at the Hunt Institute for Botanical Documentation and the Missouri Botanical Garden.

His editorial bailiwick includes the more scientific titles and reference works; he also supervises project editors as they work on individual books. Under his direction, Timber takes on the same subjects that a university press might publish—topics as specific as South African gasterias, for instance—but handles them in a more approachable and attractive way. "I especially like monographs, books about specific plants," he says. "These books show that what one person grows is only a tiny segment of what he or she could grow. The books are missionaries for the plant."

Johnson, who often serves as plant consultant for gardening colleagues, is modest about his own woodland garden. "Much of my time is spent hacking out English ivy, which is a menace here," he says. "I'm interested in reestablishing native plants, things that

Anatomy of a Book

The road from idea to finished book is a long, arduous one, usually four years or more. This chronology of *The Year in Trees*, finished in less than three years, suggests how complicated even a "quick" project can be.

June 1993

A query letter is received from J.C. Raulston of the North Carolina State University Arboretum about several "plant profiles" written by Kim Tripp, then a post-doctoral fellow at the arboretum. Might they make a book?

July 1993

Editorial Director Dale Johnson passes the letter to Acquisitions Editor Neal Maillet.

August 1993

Maillet catches up with Raulston and Tripp, just back from a plant-collecting trip to Mexico, and asks for a formal book proposal. They agree on a "best plants" approach. Maillet then rethinks the project and asks the authors to organize the book by seasons.

September 1993

The authors submit a formal proposal. Publisher Bob Conklin approves the project; a contract is sent to the authors with a February 1994 due date.

February 1994

Timber receives the manuscript.

April 1994

Maillet finishes editing the manuscript, which is sent to a free-lance copy editor.

June-August 1994

Portions of the manuscript are returned to the authors for revisions.

August 1994

The authors submit several hundred photographs, which an assistant editor catalogs. Photographs are matched to text; additional photographs are requested. Raulston submits an introduction that Maillet reviews and returns for more information.

September 1994

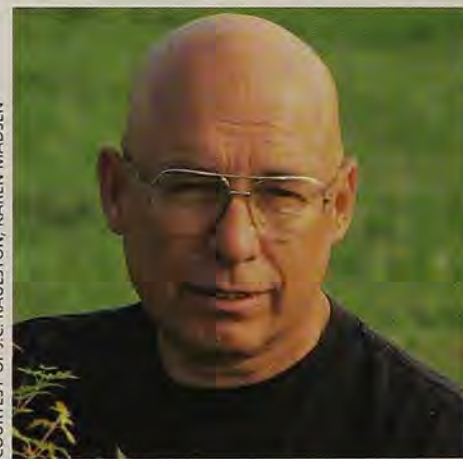
Photographs are selected at Timber and sent to the authors for caption writing. Additional photographs are requested.

October 1994

Captioned photographs and corrected manuscript are received from authors.

November 1994

Final draft of manuscript and captioned photographs are sent to copy editor.



COURTESY OF J.C. RAULSTON; KAREN MADSEN

were here 200 years ago. But I can only grow a small number. The fact is," he smiles, "the very best gardens are always in books."

If Johnson is the primary keeper of Abel's flame, Neal Maillet, 32, lights the way to the future. An English major at Columbia University, he graduated in 1986, then joined a New York publishing company. "I was happy to drop out of the New York scene," he says. "It was increasingly clear to me that the mass marketing of books meant the dumbing-down of books."

Branching Out

Hired in 1993, Maillet hasn't done any dumbing-down at Timber, but he has helped to expand its editorial scope. "Abel always insisted on doing the biggest, weightiest book he could," he says. "We still do comprehensive reference works, like the new 1,234-page *Index of Garden Plants*, but we also offer books on two other levels: the midlevel gardener's guide and the short treatment." Today, only about 20 percent of Timber's books are the "heavy-duty" sort; at least 60 percent fall in the midlevel category.

The Hosta Book, now in its second edition and one of Timber's best sellers, is a good example of a midlevel title. Generously illustrated, it includes basic information about cultivation, design, even using hostas in flower arrangements, but doesn't scrimp on more technical subjects, such as nomenclatural tangles and hybridization. *The Gardener's Guide to Growing* series—there are titles on hellebores, lilies, ivies, and hardy geraniums, and more are

coming—is another example of Timber's midlevel books.

New are what Maillet calls "beginner's books"—short, liberally illustrated introductions to gardening and plants. Subtitled "Practical Gardening Guides," each will run around 100 pages, with an equal number of color photographs, be published in paperback, and be priced at \$20. The first three books in the series—on irises, Vireya rhododendrons, and the succulent garden—debut in 1997.

No one appreciates these practical titles more than Maillet, who never gardened before he came to work at Timber. His pride is a 50-foot-long south-facing rock garden. "I lifted every rock—two tons of locally quarried basalt—and then planted with a trowel in one hand and H. Lincoln Foster's *Rock Gardening*, which we reprinted in 1982, in the other." Maillet's wall now contains more than 100 taxa, and he's moved on to designing his front yard. "Its purpose is to screen, so it will include a grove of paperbark maples and many broadleaf evergreens, such as *Magnolia grandiflora*, which do well here."

Maillet is also enthusiastic about Timber's foray into publishing classic garden literature, such as its reissue of Gertrude Jekyll's *Colour in the Flower Garden* and the quirky *We Made a Garden* by Margery Fish. He's looking for more titles to reprint. E.A. Bowles' *My Garden in Spring* is tentatively planned for 1997, as are volumes by that epitome of British misogyny Beverley Nichols.

These changes have helped curb a long-time view that a Timber Press book is like *The New Yorker* magazine: People buy it but



The Year in Trees by J.C. Raulston, far left, and Kim Tripp, left, was considered a quick project at 28 months from proposal to printing.

December 1994

Timber editors, publisher, and marketing staff wrestle with a subtitle, finally choosing "Suberb Woody Plants for Four-Season Gardens." Edited manuscript is received from copy editor and forwarded to Timber's production manager. Tentative printing date set for August 1995.

January 1995

Book design completed. Edited manuscript sent to typesetter.

February 1995

Dust-jacket design approved.

March 1995

Page proofs received from typesetter; copies sent to authors for review and proofreading. Bids solicited from printers.

April 1995

Page proofs sent to authors for final approval. Authors prepare index. Timber accepts bid from Hong Kong printer.

May 1995

Authors return page proofs and index. Typesetter makes final corrections. Text and photographs are sent to Hong Kong. Timber publicity director sends page proofs to book reviewers.

June 1995

Printer's proofs arrive from Hong Kong for checking by Timber production department. Color proofs of the 206 photographs are sent to authors for checking. All corrections, including misplaced captions and faulty color, are sent to printer.

July 1995

Revised plates arrive from printer and are forwarded to the authors. More errors are discovered.

August 1995

Final revisions made and sent to printer. Printer informs Timber that it will be unable to print book until early September.

September 1995

Books printed. Six hundred copies air freighted to Raleigh, North Carolina, for authors' signing and launch at local bookstore.

October 1995

Books arrive in Portland warehouse and are offered for sale.

—K.D.C.

don't read it. The company's sally into less technical titles has given gardeners plenty of well-turned prose for bedtime reading. Graham Stuart Thomas is in top form in *The Graham Stuart Thomas Rose Book*, where he writes, "A visit to the Royal National Rose Society's Gardens... is almost painful to the eye: the blatancy and vividness of the dazzling scarlet, orange and flame tones predominate to an overwhelming degree. Surely the rose has become bright enough?" And in the wings is Nichols, famous for such views as, "The seed of a blue lupine will usually produce a blue lupine. But the seed of a blue-eyed man may produce a brown-eyed bore... especially if his wife has a taste for gigolos."

Nurturing the Authorities

Whether a book is encyclopedic or more informal in approach, Timber insists that all its authors be authorities. "Not all of them are superior writers," Conklin admits, "but all of them are experts." That, too, is a legacy from Abel, who lamented that the real horticultural experts—scholars—had abandoned writing books for writing narrow, technical articles for academic journals. His solution was to seek out authorities and give them substantial help in getting their knowledge into print.

"Experts often don't realize how valuable what they know is," Maillet says. "My role is to find and nurture them. We've always given as much assistance as is necessary, but rather than wait for a completed manuscript, which happened in the past, now we work actively with authors from the start. We want to avoid having to rewrite entire books." In some cases, authors approach Timber; in others, Timber seeks out an author for topics it would like to do (the genera *Viburnum*, *Prunus*, and *Cornus* top Maillet's current list). In either case, producing a book is a slow process, four or five years on average (see "Anatomy of a Book," page 44).

Timber attracts experts, Maillet says, because it is the only market for their information. "No one else publishes these books because the one-year sales aren't large enough." While its advances to authors are smaller than those from trade publishers, Timber gives standard royalties—and keeps books in print indefinitely.

Keeping books in print—which is not standard practice among major publishers—is one way Timber makes money. *Botany for Gardeners*, published in 1990, is one example of a title that sells

"Experts often don't realize how valuable what they know is," Maillet says. "My role is to find and nurture them."

well year after year. "Selling well" at Timber means 5,000 copies over two years, compared to a large publishing house, which would consider 10,000 copies in one year a modest success. Only about 35 percent of Timber's sales are from its frontlist (books published in the current year); 65 to 70 percent of business comes from its 290-title backlist.

How else does Timber keep the bottom line black? By reprinting books that other publishers have permitted to go out of print—*The Pruning of Trees, Shrubs and Conifers*; *Gray's Manual of Botany*; *Gardening in the Shade*; and Beth Chatto's *The Damp Garden* and *The Dry Garden* are five—which is less expensive than starting from scratch. It has published translations, such as the two-



volume German classic *Hardy Herbaceous Perennials*, and done revised editions of its own books; for instance, a second edition of Father John Fiala's definitive *Lilacs* is planned for 1998. Publishing paperback editions of hardcover titles, such as Rosemary Verey's *The Garden in Winter* or Eric Grissell's *Thyme on My Hands*, is another good-for-business tactic.

The company has made some concessions to costs—clustering color photographs rather than spreading them through a book, for example, and using printers in Hong Kong, who do first-rate work for less money. And the staff works hard to choose subjects with broad appeal and durability. Some topics, such as orchids, sell "no matter what," Conklin says. "Both our books on hostas are doing very well. We did books on water gardening, Siberian iris, and flower arranging this year, and we expect good things from all three."

Top-selling Subjects

Unlike most trade publishers, Timber emphasizes direct, or retail, sales, which means it receives the full \$35 or \$40, the average cost of a Timber Press book. (Prices range from \$17.95 to \$150; the latter is the price tag for *Japonica Magnifica*, a collection of Raymond Booth's exquisite paintings, followed closely by *The Grevillea Book* at \$149.85.) Selling wholesale, the usual publishing practice, means selling more copies but receiving as little as half the price of the book.

While its wholesale business has been increasing, Timber continues an aggressive mail-order business, sending free catalogs six



An avid gardener, Conklin enjoys maintaining the smallest, but "most challenging," garden he's ever had.

times a year to a list that numbers more than 140,000. And the company is now on-line. Readers can order books by e-mail or through the company's home page, which features the complete catalog plus excerpts from its books (see "Sources").

Crucial, too, are Timber's alliances with other organizations and companies, such as Kew Gardens and the German publisher Ulmer. These cooperative arrangements make it possible to take on large expensive projects, such as *Color Encyclopedia of Garden Plants and Habitats* with its 1,160 color photographs; *Rhododendron Portraits*, billed as "the ultimate picture book for rhodie lovers" and priced at \$75; and William Robinson's *Gravetye Manor, or Twenty Years' Work Round an Old Manor House*, which was copublished with Sagapress, a small New York publisher specializing in landscape history.

Finally, the company is frugal. Compared with larger publishers, the size of the staff is modest, and the staff members themselves are modest—brown-bag lunches are standard. Living in Portland is less costly than in New York City, and salaries are correspondingly smaller; moreover, overhead is low—\$10 a square foot, about one-fourth of what a similar space would cost in Manhattan.

There have been some missteps, Conklin admits. "We did a book on indoor plants, and it bombed. Our book on purpleleaf plums is excellent, but the subject is so narrow that it isn't going to sell many copies. Roses, oddly enough, have been weak for us. Except for the Graham Stuart Thomas book, our rose books

haven't done especially well. Nor has the series for professional growers, so next year's volume on pot roses is the last."

As publisher, Conklin is always thinking ahead, though he isn't fixated on growth. "This is a business where there are advantages to being small. I'd like to sustain growth at

15 percent annually." At the same time, Timber wants to increase library sales and convince bookstores, even chain stores, that there are buyers for substantial and substantially priced garden books. "And we've got to keep rethinking our focus," Conklin says. "We may take a serious look at field guides and textbooks, and we'll have to think about electronic publishing at some point." For the time being, the company is concentrating on the 40-plus titles scheduled for 1997, which include books about salvias, moss gardens, perennial ground covers, trilliums, hollies, ornamental herbs, and carnations.

As for Bob Conklin, gardener, he moved a couple of years ago. "It's all new. It's the smallest garden I've ever had but the most challenging." In gardening, as in publishing, bigger is not always better. And in both, it's fortuitous to love what you do.

Karan Davis Cutler is a former magazine editor currently writing a book on vegetable gardening.

Sources

Readers can order Timber Press books by e-mail (orders@timberpress.com) or through the company's home page (<http://www.timberpress.com/>). Traditionalists can write to 133 S.W. Second Avenue, Suite 450, Portland, OR 97204, or call (800) 327-5680.

focus november/december caught on the web

IT'S A WILD, WILD WEB

OUT THERE, as those of you who have browsed the garden and horticulture sites on the Internet already know.

Hundreds of World Wide Web sites offer information ranging from mail-order nursery catalogs to plant lists to complex mapping features that allow you to explore the natural distribution of a given plant.

Here are some pointers on how and where to find gardening information. In making our choices, we looked beyond the reams of basic information and sought resources that would help the more advanced gardener. We also searched for more than just a pretty face: Behind all those fancy graphics, there had to be some substantive information.

The sites described here should help you get started—or send you in a new direction. Don't be afraid to stray from the path and explore on your own. That's half the fun.



flowering plant gateway: the next Hortus Third?

One of the most powerful and innovative sites for horticulturists and gardeners is the Flowering Plant Gateway at Texas A & M University in College Station (<http://www.isc.tamu.edu/FLORA/cronang.html>). A joint project of the university's herbarium and its Bioinformatics Working Group, this site offers access to an interdisciplinary blend of information on nomenclature, phytogeography (geographic distribution of plants), biodiversity, and ethnobotany.

Although the site is still under development, it contains a medley of selection options that—among other things—provide county-level data on individual taxa in Texas, Arkansas, and Utah. As information is added and search techniques refined, this site could develop into an updated, more

detailed, and more versatile on-line version of *Hortus Third*.

"The 'gateway' site brings together information from diverse Internet sources and places this within a taxonomic framework by using automated systems," says Hugh Wilson, a professor in the biology department at Texas A & M and one of three principal investigators on the Web project. "It currently draws from 17 data bases to produce 2,586 links for 389 flowering plant families, and these numbers increase with each update."

"I think this is going to be the site for nomenclature, taxonomy, and phytogeography in the future," says John T. Kartesz, author of *A Synonymized Checklist of the Vascular Flora of the United States, Canada, and Greenland*. The

gateway uses Kartesz's data base, originally developed as part of the Biota of North America Program (BONAP) of the North Carolina Botanical Garden, to fuel several of its mapping and nomenclature features.

QUICK CLICKS

Browsing in the gateway involves clicking the mouse on highlighted words. Wilson explains, "What we've focused on is indexed searching, which allows you to move through the files fairly quickly without intervention of data base software."

The gateway's organization is based on the plant classification in Arthur Cronquist's *Evolution and Classification of Flowering Plants*. Users may be intimidated by having to begin their browse through the plant kingdom at the class and subclass levels, where the choice is between Magnoliopsida (dicots, or plants with two seed leaves) and Liliopsida (monocots, or plants with one seed leaf). Once you click on a subclass, however, the data base breaks down to the more familiar family level.

The gateway can also be entered through the university herbarium's home page (<http://www.csd.tamu.edu/FLORA/biolherb/tamuhome.htm>), where a more user-friendly alphabetical search feature is available. Wilson says this feature, which allows searches by both common and scientific family name, will soon be available at all entrances to the site. "What we're looking at now is setting up a system that will include all vascular plant families, other taxonomic 'frameworks' or systems of classification, and methods that allow entry by users with varying experience."

Each family listing includes the number of genera and species—if any—found in Texas. Listings of the resources available are posted under each family name. For example, complete family descriptions derived from DELTA (Description Language for Taxonomy), generated at the University of Kansas, are available, as are scanned images of plants from the botany department at the University of Wisconsin. Other resources available for certain families include complete taxonomic checklists from BONAP data; scanned plant images in the Vascular Plant Gallery; endangered and threatened species listed by the U.S. Fish and Wildlife Service; ethnobotanical data from the Agriculture Genome Information Service data base maintained by the U.S. Department of Agriculture; and accessions from the floras of Costa Rica and China in the collection of the Missouri Botanical Garden.



COURTESY OF TEXAS A & M UNIVERSITY



Movement through the various sites is generally swift, although image files can be slow to download—some of the images from the University of Wisconsin took up to two minutes to appear on screen.

FORMATIVE STAGES

Wilson acknowledges that the site continues to be upgraded and errors corrected, and he encourages users to report errors to project staff. E-mail links to Wilson and other project staffers are available by clicking the mouse on underlined e-mail addresses. For sites such as Texas Endemics, taxonomic specialists are invited to apply to become registered authorities who can amend and update information.

"I don't think there is anything out there comparable to the gateway," says Wilson, who believes the site is underused at only about 40 "hits" a day.

Another useful gateway, created by the herbarium staff as an aid for botany stu-

The Flowering Plant Gateway maintained by Texas A & M University features a Vascular Plant Gallery of images. Included are *Liatris cymosa* (top), *Arbutus texana* (above left), and *Sabatia campestris* (above right).

dents, is Plant Systematics and Evolution Links (<http://www.isc.tamu.edu/FLORA/tfplinks.html>). This innovative site links to more than 90 wide-ranging home pages and Web sites of interest to botanists and to keen horticulturists and gardeners. Subgroups within this site include Texas floras; North American floras; international floras, including Peru, China, and Madagascar; national and international botanical gardens and museums; U.S. government agencies; and biodiversity and conservation groups. Also available are three botanical search engines Wilson says provide access to "broader, more extensive realms."

new frontiers

For the adventurous browser, a happy hour or week can be spent exploring the many-faceted realms opened up through a Web site called "What is New in Botany" (WNB) (<http://herb.biol.uregina.ca/liu/bio/bot-new.html>).

Maintained by Anthony R. Brach of Harvard University, the WNB site links to botany- and horticulture-related information and Web sites around the world. Listings are organized by the date they were added to the Web site, with the most recent at the top. Current postings go back about three months, but older listings can be accessed at the bottom of the page. The site also updates uniform resource locator addresses (see "Definitions") for botanical Web sites.

"What is New in Botany" is actually a derivation of the Internet Directory for Botany (IDB) (<http://herb.biol.uregina.ca/liu/bio/idb.html>), a collaboration between Brach, Shunguo Liu of the University of Regina, Canada, and Raino Lampinen at the University of Helsinki, Finland. The IDB site offers the convenience of searching for information alphabetically or by subject.

Among the hundreds of links available through both these sites are botanical gardens in Japan and South Africa, mail-order nursery catalogs, a checklist of sustainable trees and shrubs for southern New England, the flora of Mount Rainier National Park in Washington State, the home page of the Unofficial World Class Giant Pumpkins, the Horticultural Society of New York, and images of wildflowers from western Australia.

definitions

The Internet and World Wide Web have spawned their own vocabularies, and even computer books have a hard time keeping up with new terms. Here are some basics.

Browsers: Programs designed to make the Internet more accessible (examples include Mosaic and Netscape). Those who are comfortable with the Macintosh operating system or Microsoft Windows will find World Wide Web browsers fairly intuitive.

Gopher: A system for retrieving information using menus or directories. Favored by many universities, this approach is useful for cataloging large amounts of information but lacks the graphic appeal of the World Wide Web.

LISTSERV: Programs designed to handle large mailing lists of subscribers interested in a specific topic. Subscribing to a list involves sending a message that reads "subscribe [list name your name]." (Leave out the punctuation.) Most users spend some time becoming familiar with the group before sending messages that will be distributed to all subscribers. Some gardening LISTSERVS include listserv@ukcc.uky.edu (for general gardening; send message "subscribe Gardens & Gardening"), listserv@wsuvm1.bitnet (for Master Gardeners and Extension agents; send message "subscribe MGarden"), and listproc@opus.hpl.hp.com (for cactus lovers; send message "subscribe cacti_etc.>").

Newsgroups: Bulletin boards for posting and viewing messages from other users on specific topics. Rather than receiving information at your e-mail address as with LISTSERVS, newsgroups are found through newsreader programs where you can easily subscribe and then point and click on messages of interest. One of the most popular for gardeners to ask questions and post information is rec.gardens. Some users felt the high volume of messages and responses (hundreds of new ones a day) made the group unwieldy, and they broke off into more specialized groups (rec.gardens.orchids, rec.gardens.roses). Other gardening newsgroups include alt.landscap.architecture, rec.arts.bonsai, and rec.ponds.

Search engines: Programs that search for Internet sites on a specific topic (examples include Yahoo, Magellan, and LYCOS). They vary in their abilities, so experiment until you find one that works well for you.

Uniform resource locators (URLs): Basically, addresses of Web sites—those strings of characters starting with <http://>. Fortunately, you don't have to understand how these addresses work or even what they stand for to use the Web.

World Wide Web: An area of the Internet explored or navigated using browsers. The Web popularized use of the vast resources of the Internet by average users.

pointers for surfers

Despite all the media hype, the Internet remains an unfamiliar, intimidating place for many computer users. Here are a few pointers to help alleviate some common frustrations.

➤ Keep in mind that the Internet thrives on a sort of friendly anarchy. Many sites are maintained entirely by volunteers driven to share their passion for wildflowers or palms, and a site that is "up" one day may be gone or rerouted the next. Site locations can be frustrating in their lack of hierarchy. For example, the umbrella site of the American Association of Botanical Gardens and Arboreta is actually part of one of its member's sites.

➤ While a uniform resource locator address (see "Definitions") will get you directly to a site, it's often more useful to keep track of addresses to broader sites and "point and click" your way to more specific sites. Of course, just about all the browsing programs let you save "bookmarks" or hot addresses so you can quickly get to your favorites sites without retyping the often cryptic address.

➤ If you're traveling far and wide over the Internet and want to backtrack, check the pull-down menus for something like "recent items" that will give you the option of returning to a site you've already visited.

➤ A few years ago, a modem with a 9,600 bps (bits per second) speed was considered adequate. Now many on-line services recommend speeds of 28,800 or faster for optimum performance. Slower modems will naturally take longer to log onto sites and download screen images—frustrating seconds that can feel like hours.

➤ Other factors that can slow down your access to a site include the complexity of the graphics and how many other users are trying to reach the same site. Midday is often the busiest time, with people on both coasts competing for precious bit space.

Other Web Sites of Interest to Gardeners

BOTANICAL GARDENS AND ARBORETA

American Association of Botanical Gardens and Arboreta
(<http://cissus.mobot.org/AABGA/aabga1.html>)

This site contains a list of member organizations with information on hours and directions, as well as links to more comprehensive sites. Many botanical gardens and arboreta can also be visited through Texas A & M University's site, described in the article on page 48.

GENERAL GARDENING

The Complete Guide to Garden Stuff
(http://www.btw.com/garden_archive/toc.html)

Created by the computer software company Books That Work, this site contains brief summaries and explanations of garden terms and concepts ranging from fertilizers and mulches to tools and seed starting.

GardenWeb (<http://www.gardenweb.com>)

This site offers gardening discussion groups, garden tips, a page for posting seed requests, links to international botanical gardens, and an online magazine called *The Cyber-Plantsman*, compiled by nurseryman Barry Glick.

Horticulture In the Virtual Perspective

(<http://hortwww-2.ag.ohio-state.edu/hvp/HVP1.html>)
Maintained by Ohio State University, this site includes the WebGarden, a searchable data base of more than 3,000 gardening fact sheets.

The Horticultural Web (<http://www.horticulture.com/>)

This is a more commercialized site, but it offers links to other horticulturally oriented sites, as well as information about new horticultural and gardening products.

PLANTS AND PLANT SOCIETIES

The American Gloxinia and Gesneriad Society
(<http://aggs.org/>)

This site includes information about the society, cultural instructions, and a reference list.

American Iris Society

(<http://www.ismedia.com/homes/AIS/>)
Information on the society and its local chapters, growing advice, iris classification, and descriptions of the most popular irises are offered here.

The Arisaema Page

(<http://www.mdc.net/~rrh/arisaema.html>)
Devoted to the exotic looking members of the genus *Arisaema*, this colorful site includes images, plant descriptions, mail-order sources, and organizations for other aroid enthusiasts.

Butterfly Web Site (<http://mgfx.com/butterfly/>)

Maintained by a butterfly enthusiast, this colorful site includes information about butterfly gardening, a listing of butterfly-related events, and a discussion page.

HerbNet (<http://www.herbnet.com>)

This site mainly features retail and wholesale sources for herbs and herbal products, but it also has articles on particular herbs, a resource list, and links to other herbal sites on the Net.

Orchid Web (<http://pathfinder.com/vg/Gardens/AOS>)

Maintained by the American Orchid Society, this site includes articles from the society's magazine, a calendar of events, orchid sources and references, and a question-and-answer area.

Perennial Plant Association
(<http://Garden.cas.psu.edu/PPA.html>)

This site includes information about the association, an index of recent articles in the association's journal, and descriptions of the association's past and present "plants of the year."

Rhododendron Page

(<http://haven.ios.com/~mckenzie/rhodo05.html>)
This site contains descriptions and images of rhododendrons, cultural tips, and information about the American Rhododendron Society.

The Seed Guild (<http://www.gardenweb.com/seedgd/>)

This site describes how to join the Seed Guild, an organization that offers members access to unusual seeds from botanical gardens around the world, with a list of recent offerings.

Wildflowers

(<http://rampages.onramp.net/~garylpe/index.htm>)
A menu of wildflowers by state, wildflower identification, mail-order sources, and listings of wildflower and native plant events are available here.

RESEARCH AND UNIVERSITY SITES

Biological Control: A Guide to Natural Enemies in North America (<http://www.nysaes.cornell.edu/ent/biocontrol>)

This Cornell University site provides information about beneficial organisms for use by growers and home gardeners.



millaria hemisphaerica (now *Mammillaria beyderi* var. *hemisphaerica*), first published in *The Cactaceae* by Britton and Rose.

National Museum of Natural History, Department of Botany
(<http://www.nmnh.si.edu/botart/>)

Here you can find 500 botanical illustrations in the Smithsonian collection, including information on the artists. Above is *Neomammillaria hemisphaerica* (now *Mammillaria beyderi* var. *hemisphaerica*), first published in *The Cactaceae* by Britton and Rose.

U.S. Forest Service (<http://www.fs.fed.us/>)

An information-packed site that includes lists of Forest Service publications, research, and data bases; a clickable map of national forests; and links to other Forest Service sites.



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book reviews

🌿 *wildlife gardening*

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GARDENING FOR WILDLIFE

Craig Tufts and Peter Loewer. Rodale Press, Emmaus, Pennsylvania, 1995. 192 pages. 7 3/4 x 9 7/8". Publisher's price: hardcover, \$29.95. AHS member price: \$26.95.

THE WILDLIFE GARDEN: PLANNING BACKYARD HABITATS

Charlotte Seidenberg. University Press of Mississippi, 1995. 322 pages. 6 x 8". Publisher's price: hardcover, \$30; softcover, \$15.95. AHS member price: hardcover, \$27; softcover, \$14.35.

NATURAL GARDENING

Jim Knopf, Sally Wasowski, John Kadel Boring, Glenn Keator, Jane Scott, and Erica Glasener. A Nature Company Guide published by Time-Life Books, Alexandria, Virginia, 1995. 288 pages. 6 3/4 x 11 1/4". Publisher's price: hardcover, \$29.95. AHS member price: \$26.95.

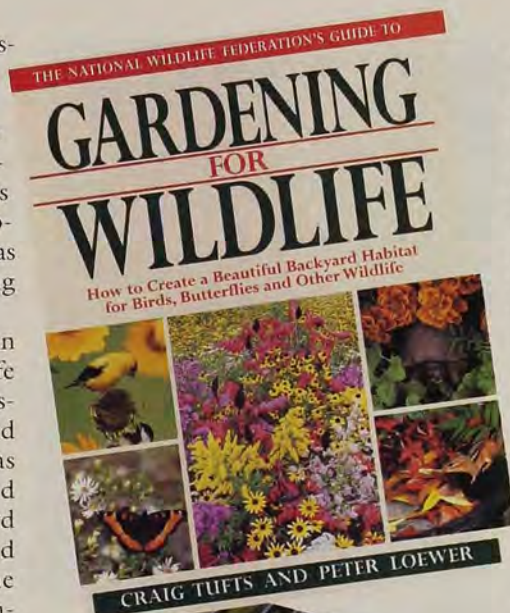
These books relate as well to "landscaping" as they do to "gardening." Historically, landscaping in North America has tended to follow the English tradition of intensively managed and tidy formal plantings of mostly exotic species and close-mown grass. Since the 1970s, however, there has been increasing interest in more natural landscaping, pioneered in the Netherlands as "ecological landscapes." Ecological processes such as plant succession, and concepts such as the linking of diversity and stability, are adopted as bases of design. Increased use

of native species and reduced use of pesticides are emphasized. The result is a less formal, more natural appearance. Such ecological landscapes better assist in conserving plants and wildlife. Evidenced in part by these three books, this trend seems to be gaining wider acceptance in North America, although it has certainly not replaced formal landscaping or gardening.

Gardening for Wildlife is overall an excellent guide to considering wildlife habitat needs in home gardening. It discusses woodland gardens, meadow and prairie gardens, and water gardens, as well as focusing on birds, butterflies, and creatures of the night. Fifteen back-yard habitats are profiled with sketches and color photographs. Almost half of the more than 150 color photographs include wildlife, but there are no tips for dealing with overly abundant, damaging wildlife.

There are a number of instances where the authors present an incomplete message that I believe is a disservice to the reader. For example, they state that "cats chase birds." In reality, cats kill birds in large numbers. Research in England estimates that some 70 million birds and small mammals are killed by cats each year. The authors also say that rock gardens will attract many harmless garden snakes, but no mention is made of poisonous copperheads, rattlesnakes, or others, which are common in some areas of the country. Likewise, in discussing water features, they state, "Even beautiful snakes like the rough green snake will be drawn to the water's edge...." Such partial images may cause readers to develop an unrealistic sense of nature (and security). These less appealing aspects of nature do not, however, diminish the need for its conservation and management.

The Wildlife Garden focuses on native flora and fauna and the restoration of their original communities. The author stresses the detrimental effects of exotic plants, including their frequent tendency to replace native plant communities. As a foundation for wildlife gardening, the book presents a firm scientific base through discussion of food webs and ecological balances. It includes extensive lists of native plants and native plant communities, and discusses soil and soil-dwelling organisms such as earthworms. Black-and-white illustrations and diagrams are used instead of color photographs but the information is solid, and there is an extensive list of resources—a



good reference for the wildlife gardener.

Natural Gardening emphasizes planting to attract wildlife, suggesting, for instance, that a more natural look can be achieved by using odd numbers of plants of different sizes and spacing them irregularly when they are planted in small groups. For six regions of the United States and Canada (West Coast, Mountains and Basins, Desert Southwest, Prairies, Northeast, and Southeast), 144 native plants with wildlife value are highlighted. The book also discusses the wildlife value of some non-native plants, but limits those mentioned to ones the authors consider "well-behaved."

This book covers a great diversity of animal wildlife, both vertebrate and invertebrate. "Wildlife Mischief Management" addresses those that cause damage or create a nuisance, discussing such options as fences, plant cages, and repellents. It treats natural processes like predation in a nonsentimental manner and calls for a balanced community of plants and animals.

Sometimes multi-authored books, while they bring together considerable expertise, drive the reader to distraction with varied writing styles and levels of coverage. I did not find that the case here, which reflects a combination of disciplined writing and good editing. The inclusion of fine color photography makes this book an excellent value for the price.

—Lowell W. Adams

An urban wildlife biologist, Dr. Lowell W. Adams is the author of *Urban Wildlife Habitats: A Landscape Perspective*, published in 1994 by the University of Minnesota Press.

CONIFERS: THE ILLUSTRATED ENCYCLOPEDIA

D.M. van Gelderen and J.R.P. van Hoey Smith. Timber Press, Inc., Portland, Oregon, 1996. Two volumes; 706 pages. 8 3/4 x 11 1/4". Publisher's price: hardcover, \$125. AHS member price: \$112.50.

Opening the new two-volume edition of this classic reference is akin to opening a box full of many multifaceted jewels—each more fascinating and spectacular than the one before. This feast for the eyes is a must for anyone remotely interested in conifers, as it goes well beyond the confines of what one would expect from a pictorial dictionary.

More than twice the size of the first edition, published in 1986, the new edition includes a more diverse offering of nonhardy



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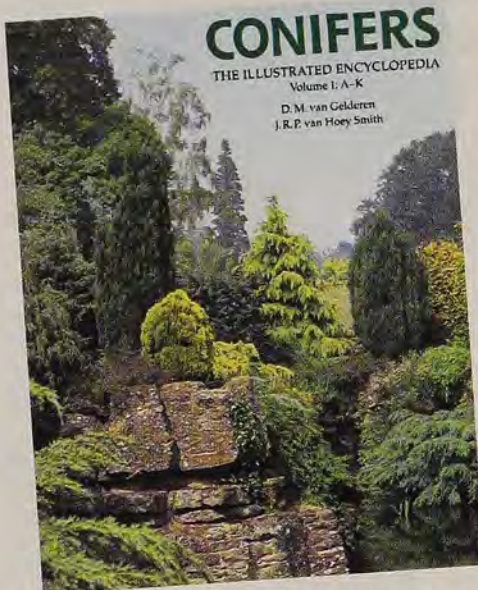
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and lesser-known genera, as well as many new cultivar selections that have been introduced into the nursery trade in the intervening years.

The photographs, numbering well over 2,000, were taken by J.R.P. van Hoey Smith, director of the Trompenburg Arboretum in Rotterdam and president of the International Dendrology Society. His wife, Reit, is a great sport, standing in many of the photographs to provide the necessary scale. Her husband's lifelong love of and dedication to photographing conifers is clearly evident in the exceptionally high quality of the photographs. My only complaint is that occasionally the subject appears too small.

The text, compiled by D.M. van Gelderen, a well-known nurseryman and an officer of the Dutch Royal Boskoop Horticultural Society, has also been expanded. A list of individual genera appears at the beginning of volume one, followed by descriptions of natural distribution ranges, economic importance, cultural tips, and landscape uses. These write-ups are accompanied by spectacular photographs of the plants in their native habitats.

From these general descriptions the book moves into a pictorial display, "the jewels" of most, although certainly not all, of the many, many conifer cultivars that exist. Each photograph has a caption identifying the plant and highlighting its outstanding characteristics.

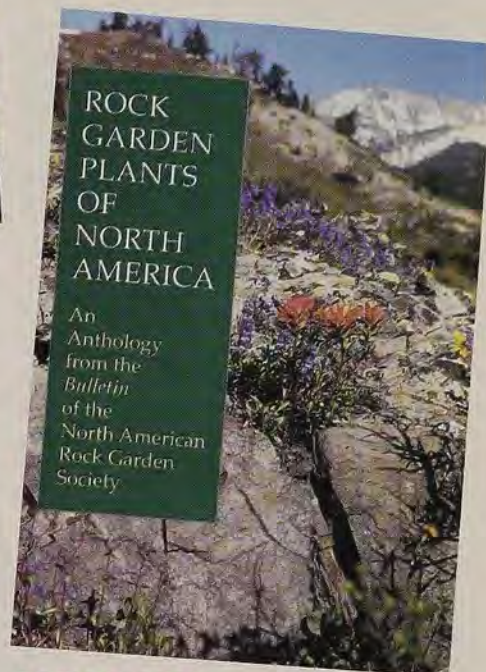
Rounding out the book are hardiness maps, a suggested reading list, and two useful new indices, one of common names and the other of synonyms.

For those not familiar with the variety of colors, forms, and textures found in this diverse group of plants, prepare yourself for a feast! In the course of my teaching, I have

often found that many people, however knowledgeable, have preconceived notions about conifers or shy away from them because they are unfamiliar with them. I feel strongly that this publication will shatter those notions and become a daily reference for anyone who works with or loves plants.

—Susan Martin

Susan Martin is curator of the Gotelli Conifer Collection at the U.S. National Arboretum in Washington, D.C.



ROCK GARDEN PLANTS OF NORTH AMERICA

Edited by Jane McGary. Timber Press, Inc., Portland, Oregon, 1996. 459 pages. 6 1/2 x 9 1/4". Publisher's price, hardcover: \$49.95. AHS member price: \$45.

In 1990 a compilation of articles on rock gardening in the East by Linc and Timmy Foster was published as *Cuttings from a Rock Garden*. Taken from the quarterly *Bulletin* of the North American Rock Garden Society, the articles in the book left many captivated readers wondering what other jewels lay hidden in back issues of the *Bulletin*, which last year was renamed *Rock Garden Quarterly*.

Happily, a partial answer to that question has appeared in this wonderful new anthology from the *Bulletin's* first 50 years of publication. Edited by Jane McGary, this book focuses on the native rock garden plants of North America and their cultivation. Not surprisingly—since you rarely find alpine below 5,000 feet—three-quarters of the articles describe species found from the Rockies to the West Coast. The articles are supplemented by 59 color photographs and

numerous line drawings of select rock garden plant species.

The authors of the articles are the cognoscenti of the American rock gardening scene, including such luminaries as Wayne Roderick (California wildflowers and liliaceous bulbs), Edith Dusek (western trilliums), Margaret Williams (plants of the Sierra Nevada and Northern California), B. Leroy Davidson (West Coast irises, lewisias, penstemons, *Eriogonum*, and *Synthyris*), Panayoti Kelaidis (sandstone barrens, dryland bunnies, physarias, and western phlox), Claude A. Barr (*Astragalus*, *Oxytropis*, and asters), Edgar T. Wherry (eastern phlox), Frederick W. Case Jr. (eastern trilliums), and last but not least H. Lincoln Foster, who is represented by his fascinating tale of the elusive *Shortia*.

If there is a shortcoming to the anthology, it is the paucity of articles on the eastern flora of North America, although there are two interesting articles on the New Jersey pine barrens by G.G. Nearing and Rick Darke. Written some 40 years apart and from different points of view, the two articles provide a thoroughly rounded picture of that important eastern ecosystem. There are also articles on the Virginia shale barrens, on the granitic flat rocks of the Southeast, and on plants native to the Carolinas.

Eastern readers should also be warned that most of the plants described are the *crème de la crème* of the western mountains and require exacting cultural conditions. It takes years of experience and an appropriately salubrious climate and setting to grow and keep western rock garden plants east of the Mississippi.

The anthology will be helpful, however, to those in search of western wildflower habitats as well as to those seeking to broaden their knowledge of North American native plants in general. For the aspiring rock gardener, there is no better way to be exposed to the wisdom embodied in the specialist growers, or to the exquisite beauty of these unusual plants, than to sample the best articles from the *Bulletin*.

For those eager to read more about eastern rock gardening, the good news is that *Cuttings from a Rock Garden* is to be republished by Timber Press in 1997. Together, the two books will give readers a comprehensive view of these exciting North American natives.

—Francis H. Cabot

An avid rock gardener and former treasurer of the North American Rock Garden Society, Francis H. Cabot is founder and chairman of the Garden Conservancy.

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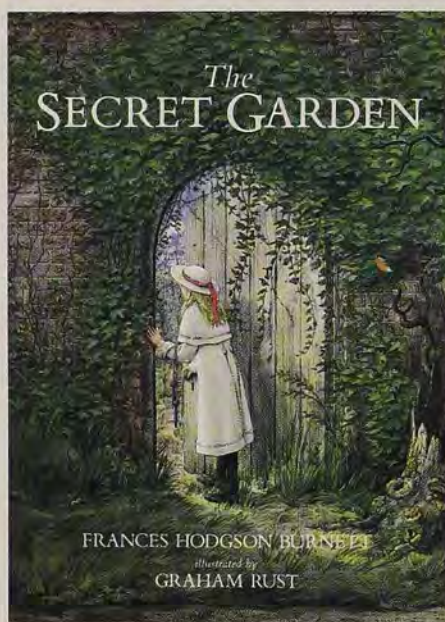


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gardeners' books

Books are chosen for the AHS Horticultural Book Service based on perceived reader interest, unusual subject matter, or substantive content. The following descriptions are not intended to be critical reviews, but are written to give an overview of the books' contents. For further information about these or other gardening books—or to order books—please call Barbara Catherwood at (800) 777-7931 ext. 36.

FOR CHILDREN OF ALL AGES



THE SECRET GARDEN

Frances Hodgson Burnett. Illustrated by Graham Rust. 1987. 224 pages. Publisher's price: hardcover, \$18.95. AHS member price: \$17.

A truly exquisite edition of the classic story of children discovering a garden and life's potential on the English moors. This edition is beautifully illustrated by Graham Rust and would be a welcome addition to a child's bookshelf or to any book and garden lover's collection.

Book code: DRG 003

THE SECRET GARDEN NOTEBOOK: A FIRST GARDENING BOOK

Text by Breslich and Foss. Illustrated by Graham Rust. 1991. 57 pages. Publisher's price: hardcover, \$12.95. AHS member price: \$11.50.

Together with the novel, or on its own, this

is a perfect child's introduction to the garden. It describes many child-size projects from planting bulbs and tidying the spring garden to creating a windowsill herb garden. The text and charming illustrations leave room for notes. This book is enchanting enough to keep in mind for the teachers, parents, and journal writers on your holiday gift list. Book code: DRG 004

FOR BEGINNING GARDENERS

THE FIRST-TIME GARDENER

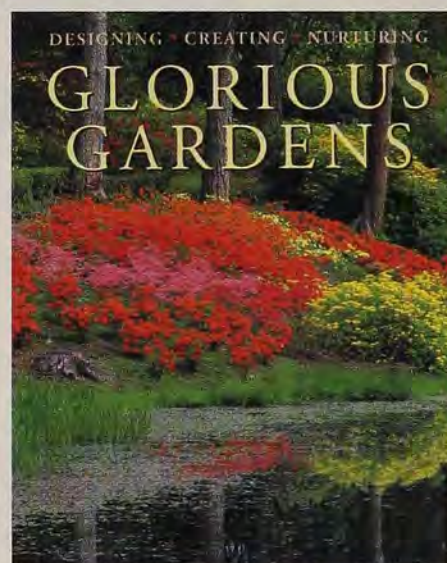
NEW

Pattie Barron. 1996. 144 pages. Publisher's price: softcover, \$20. AHS member price: \$18.

The subtitle reads: "An inspirational and instructional guide to every aspect of gardening for the neophyte gardener." This is a charming and useful book for friends or relatives who have been threatening to get their hands dirty. It contains guidance on selecting plants and how-to's on everything from preparing beds to planting containers, growing edibles, and pruning, as well as common problems. The book is full of color photographs, but even better are the delightful color illustrations.

Book code: CRN 005

FOR TRAVELERS & DREAMERS



GLORIOUS GARDENS

NEW

Jacqueline Hériteau. 1996. 248 pages. Publisher's price: hardcover, \$50. AHS member price: \$45.

From small gardens to hillside gardens, kitchen, water, xeriscape gardens, and more, Hériteau chooses the finest gardens in the world to illustrate the philosophy and reality of different types of gardening. The book contains 250

brehtaking photographs by some of the most renowned garden photographers, as well as techniques for creating and nurturing each type of garden.

Book code: STC 002

A PHOTOGRAPHIC GARDEN HISTORY

NEW

Roger Phillips and Nicky Foy. 1996. 320 pages. Publisher's price: hardcover, \$55. AHS member price: \$49.

Roger Phillips, co-author of *The 3,000 Mile Garden*, traces the history of gardening from ancient Rome and China to 20th-century California. This is a grand tour of the world's most beautiful, innovative, and influential gardens. Visually stunning, with more than 900 color photographs.

Book code: RAN 016



OTHER PEOPLE'S GARDENS

Christopher Lloyd. 1995. 211 pages. Publisher's price: hardcover, \$40. AHS member price: \$36.

This well-known British gardener and writer chronicles his visits to gardens all over Great Britain and the rest of the world. With an impeccable eye for detail and a sharp wit, he tells the stories of the plants, the gardens, and the gardeners he finds most stimulating. Includes more than 150 superb photographs.

Book code: VIK 002

THE GARDEN TOURIST 1997

Lois G. Rosenfeld. 1996. 224 pages. Publisher's price: softcover, \$15.95. AHS member price: \$14.25.

Plan your vacation in advance using this handy guide to garden tours in the United States and Canada. Listed by state and date are garden days, shows, and special events.

Book code: GTP 001



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MID-ATLANTIC

NOV. 2 ■ How to Prepare Your Garden for Winter. Workshop. Hillwood Museum and Gardens, Washington, D.C. (202) 686-8500.

NOV. 15-DEC. 31 ■ Children's Art Exhibit. AHS's River Farm, Alexandria, Virginia. (703) 768-5700.

NORTHEAST

THROUGH NOV. 24 ■ The Wonderful Garden of Oz. Chrysanthemum festival. Longwood Gardens, Kennett Square, Pennsylvania. (610) 388-1000.

NOV. 1-3 ■ Herbal Christmas Dreams. A weekend of Christmas workshops, revelry, food, and stories. Blueberry Hill Inn, Goshen, Vermont. (800) 448-0707.

NOV. 2 ■ The Arboretum in Late Fall. Guided tour. Scott Arboretum of Swarthmore College, Swarthmore, Pennsylvania. (610) 328-8025.

NOV. 7 ■ Blooming Where You Are. Greenhouse grower meeting and trade show. Cook College Campus, New Brunswick, New Jersey. (908) 932-9271.

NOV. 17 ■ Fall Open House. Tower Hill Botanic Garden, Boylston, Massachusetts. (508) 869-6111.

NOV. 23 ■ Constructing a Grapevine Arbor. Workshop. Rhode Island Wild Plant Society. Usquepaug, Rhode Island. (401) 949-0195.

NOV 28-JAN. 5 ■ Time for Christmas.

New Plant Research Sites

Two new plant research facilities affiliated with the USDA Agricultural Research Service (ARS) and the U.S. National Arboretum have been opened at the University of Missouri and at Tennessee State University.

The U.S. National Arboretum Midwest Plant Research and Education Site was established at the University of Missouri Horticulture and Agroforestry Research Center in New Franklin. The principal role of the facility, which currently occupies two acres but will be expanded over the next several years, is to identify and evaluate selected plants hardy in USDA Zone 5. The site will also be home to a germplasm repository and national evaluation plots.

In McMinnville, Tennessee, the Otis T. Floyd Nursery Crops Research Station was opened on 87 acres at the university. The facility is the latest "center of excellence" supported by USDA and 16 historically black land-grant universities. The station will initially be staffed by two ARS scientists and two university researchers, who will concentrate on breeding new varieties of landscape trees and shrubs, developing biocontrols for insect pests, and testing new techniques for propagating, irrigating, and storing nursery crops. According to Thomas S. Elias, director of the U.S. National Arboretum, one research project will involve evaluating dogwood trees cross-bred for resistance to anthracnose, a fungal disease that is devastating both cultivated and wild dogwood trees through much of the East and Midwest.

Help from Holden Arboretum

The Holden Arboretum in Kirtland, Ohio, is now offering a landscape consulting program designed to help individuals, communities, organizations, and commercial enterprises preserve the natural integrity of sites where construction is planned.

Services offered by the arboretum staff include plant health evaluations, plant identification and inventories, horticultural recommendations, landscaping assessments, site analyses, master plan consultations, on-site tree protection, and educational workshops and training sessions.

For more information or to receive a fee schedule, call Roger L. Gettig at (216) 946-4400 or write to him at the Holden Arboretum, 9500 Sperry Road, Kirtland, OH 44094-5172.

SOUTH CENTRAL

NOV. 9 ■ Butterflyingcaping. Seminar. Rio Grande Valley Birding Festival, Harlingen, Texas. (800) 531-7346.

NOV. 28-JAN. 1 ■ Crystal Bridge Holiday Display. Myriad Botanical Gardens, Oklahoma City, Oklahoma. (405) 297-3995.

SOUTHEAST

NOV. 2 ■ Louisville Perennial Plant Symposium. Sponsored by Botanica and the Perennial Plant Association. Executive West Hotel, Louisville, Kentucky. (502) 222-5791 or 267-5074.

NOV. 6 ■ Totally Trees. Brown bag lecture series. Memphis Botanic Garden, Memphis, Tennessee. (901) 685-1566 ext. 106.

NOV. 10 ■ Water Gardens Tour. Crosby Arboretum, Picayune, Mississippi. (601) 799-2311, ext. 0.

NOV. 13 ■ Decorating for the

Display. Longwood Gardens, Kennett Square, Pennsylvania. (610) 388-1000.

DEC. 6-8 ■ Festival of Trees. Tower Hill Botanic Garden, Boylston, Massachusetts. (508) 869-6111.

DEC. 7 ■ Open House and Orientation Day. Conway School of Landscape Design, Conway, Massachusetts. (413) 369-4044.

NORTH CENTRAL

NOV. 3 ■ Types of Botanical and Horticultural Literature. Class. The Holden Arboretum, Kirtland, Ohio. (216) 256-1110.

NOV. 17-21 ■ Green Industry Expo. Cincinnati Convention Center, Cincinnati, Ohio. (800) 395-2522.

NOV. 28-DEC. 31 ■ Christmas Around the World. Display. Frederik Meijer Gardens, Grand Rapids, Michigan. (616) 957-1580.

DEC. 6-31 ■ Holiday Flower and Train Show. Olbrich Botanical Gardens, Madison, Wisconsin. (608) 246-4551.

Nebraska Penstemon Restoration

Nursery-propagated seedlings of the blowout penstemon (*Penstemon haydenii*)—the only Nebraska wildflower on the federal endangered species list—are being transplanted back into the wild by conservationists from the University of Nebraska at Lincoln. The penstemon is known for showy heads of fragrant blue, lavender, or rarely, white tubular flowers on 18-inch-tall stems.



Blowout penstemon returned to the wild.

As part of a three-year restoration effort by the university's Institute of Agriculture and Natural Resources, more than 20,000 seedlings are being transplanted into suitable habitat in the Nebraska sandhills. Blowout penstemon's principal habitat is bare, rounded depressions in dunes that have been scooped out by wind erosion. Ironically, it was erosion heightened by intensive grazing, wildfires, and droughts—all factors that usually have a negative effect on plants—that increased the penstemon's habitat earlier this century. Since then, however, better range management has reduced erosion to the point that fewer than 7,000 plants survive in seven main population centers.

The species is also plagued by finicky seed germination. The presence of chemical inhibitors means that seeds require extremely wet spring weather. Because the plants grow in almost pure sand, well-timed rains are critical to survival.

"Our goal is to reach 15,000 plants," says James Stubbendieck, a range ecologist with the university. "If we can get that many it would move the blowout penstemon from endangered status to threatened status." The researchers also plan to extend the range of the species by transplanting seedlings to widely separated locations each year.

Holidays. Wing Haven Gardens, Charlotte, North Carolina. (704) 331-0664.

NOV. 16-17 ■ New Plant Medicines from Old Cultures. Symposium. Atlanta Botanical Garden, Atlanta, Georgia. (404) 876-5859 ext. 226.

DEC. 7 ■ Holiday Decoration Workshop with Kathleen Thompson. North Carolina State University Arboretum, Raleigh, North Carolina. (919) 515-7641.

DEC. 8-MAR. 1997 ■ Splendor Under Glass. Orchid display. Atlanta Botanical Garden, Atlanta, Georgia. (404) 876-5859.

SOUTHWEST

NOV. 8-9 ■ Old City, New Adventure. Intermountain Regional Meeting, American Association of Botanical Gardens and Arboreta. Rio Grande Botanic Garden, Albuquerque, New Mexico. (505) 764-6200.

WEST COAST

NOV. 4 ■ Dividing Perennials. First Saturday talk by Mary Brosius. Descanso Gardens, La Cañada Flintridge, California. (818) 952-4401.

NOV. 7-10 ■ Fall Plant Festival. The Huntington, San Marino, California. (818) 405-2141.

NOV. 30 ■ Children's Gardens. Lecture. The Huntington, San Marino, California. (818) 405-2141.

DEC. 5 ■ The Living Wreath. Garden talk and sale featuring Teddy Colbert. The Huntington, San Marino, California. (818) 405-2141.

DEC. 7 ■ Holidays in the Garden. Herbal crafts demonstrations. The Arboretum of Los Angeles County, Arcadia, California. (818) 447-8207.

DEC. 7-15 ■ And Heaven and Nature Sing. Annual Christmas show. Descanso Gardens, La Cañada Flintridge, California. (818) 952-4401.

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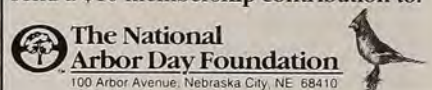
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pronunciations

a simple speaking guide to plants found in this issue

Acer saccharinum

AY-sur sak-uh-RYE-num

Aegopodium podagraria

ee-go-PO-dee-um

po-duh-GRAR-ee-uh

Allium tricoccum

AL-ee-um tri-KOK-um

Alternanthera

al-tur-NAN-thur-uh

Angelica atropurpurea

an-JEL-ih-kuh

at-ro-per-PER-ee-uh

Asarum europaeum

uh-SAR-um yew-ro-PEE-um

Araucaria araucana

ah-raw-KAIR-ee-uh ah-raw-KAN-uh

Beaucarnea

bo-KAR-nee-uh

Bouteloua curtipendula

boo-teh-LOO-uh

kur-tih-PEN-dyew-luh

Cladrastis kentukea

kla-DRAS-tis ken-TUK-ee-uh

Deschampsia caespitosa

deh-SHAMP-see-uh

sez-pih-TOH-suh

Euonymus fortunei

yew-ON-ih-mus for-TEW-nee-ey

Gardenia augusta

gar-DEEN-yuh aw-GUS-tuh

G. jasminoides var. *fortuniana*

G. jaz-mih-NOY-deez

var. for-tew-nee-AN-uh

Geum triflorum

JEE-um try-FLOR-um

Heuchera americana

HYEW-ker-uh uh-mair-ih-KAN-uh

Lamium maculatum

LAM-ee-um mak-yew-LAY-tum

Limonium carolinianum

lih-MO-nee-um

keh-ro-lin-ee-AN-num

Lycopodium obscurum

ly-ko-PO-dee-um ob-SKYUR-um

Lysimachia clethroides

liss-ih-MAHK-ee-uh

kleth-ROY-deez

Pachypodium

pak-ih-PO-dee-um

Pycnanthemum virginianum

pik-NAN-thuh-mum

vir-jin-ee-AN-um

Pyrus calleryana

PY-rus kal-lur-ee-AN-uh

Sabatia angularis

suh-BAY-shuh ang-yew-LAIR-iss

Salix alba var. *argentea*

SAY-likes AL-buh var. ar-JEN-tee-uh

S. caprea

S. KAP-ree-uh

S. discolor

S. DIS-kul-ur

S. gracilistyla var. *melanostachys*

S. gruh-sil-ih-STY-luh

var. mel-an-o-STAY-kiss

S. matsudana

S. maht-soo-DAH-nuh

S. sachalinensis

S. sah-kah-lih-NEN-sis

S. udensis

S. YEW-den-sis

Scutellaria incana

skoo-tuh-LAIR-ee-uh in-KAN-uh

Solidago rigida

sol-ih-DAY-go RIJ-ih-duh

Strongylodon macrobotrys

stron-GEE-lo-don mak-ro-BOT-ris

Theobroma cacao

thee-o-BRO-muh kuh-KAY-o

Trichostema dichotomum

try-ko-STEE-muh dy-KOT-o-mum



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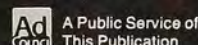
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- New York:** "The Bear, the Beans, the Compost Queen," July/Aug., 26.
- North Carolina:** "Stowe Botanical Garden Implements Master Plan," Jan., 34.
- Palms:** "Palms," Feb., 32.
- Pennsylvania:** "By Plants Possessed," Feb., 37.
- Penstemons:** "Nebraska Penstemon Restoration," Nov./Dec., 59. "Penstemon Cultivar 'Plant of the Year,'" Jan., 40.
- Permaculture:** "High Desert Permacul-ture," May/June, 16.
- Pollination:** "Pollinators at the National Zoo," July/Aug., 60. "The Yucca Moths," July/Aug., 11.
- Private Gardens:** "By Plants Possessed," Feb., 37.
- Seeds:** "From Seed to Shining Seed," Sept./Oct., 34. "Guides to Germination," Jan., 9.
- Shadow, Don:** "Don Shadow Knows," Sept./Oct., 44.
- Shrubs:** "Before the Joneses Get One," July/Aug., 61. "Life Beyond the Leyland Cypress," May/June, 29. "Sculptural Willow Shrubs," Nov./Dec., 35.
- Tradescantias:** "Tradescantias Unbound," July/Aug., 44.
- Trees:** "Biodiversity in the Orchard," Jan., 40. "Construction Spreads Oak Wilt," Jan., 34. "Crabapples," Feb., 19. "Hornet Bite is Bad for Bark," Feb., 13. "Killer Trees," Nov./Dec., 18. "Ladew Battles Woolly Adelgid," Jan., 33. "Life Beyond the Leyland Cypress," May/June, 29. "New Elms Show Promise," July/Aug., 15. "Outlawing Sneeze Trees," Sept./Oct., 11. "Palms," Feb., 32. "Quirky Galls," May/June, 10.
- Vegetables:** "Vegetables Under Glass," Nov./Dec., 12.
- Violets:** "Violets," Feb., 29.
- Western Gardening:** "Cactus Chroni-cles," Sept./Oct., 24. "Firescaping," July/Aug., 17. "High Desert Perma-culture," May/June, 16.

*Gardens of the**February 8-15, 1997**Leeward and Windward
Islands of the Caribbean*

WE HAVE ENGAGED THE INTIMATE M/V *Yorktown Clipper* for a voyage in the Caribbean to explore out-of-the-way places in such ports of call as St. Kitts, Nevis, St. Lucia, Bequia, Union, and Dominica, whose tropical rain forests are world-renowned among botanists. We will visit exceptional private gardens, such as Monkey Rock at River Pass, owned by U.S. Supreme Court Justice Stephen Breyer and his wife, Joanna, and the Walwyns' Lodge Estate, one of the oldest plantations on St. Kitts. Ample free time has been allotted for snorkeling and swimming along some of the finest beaches in the Caribbean. AHS President Dr. H. Marc Cathey and his wife, Mary, will lead the program, along with former AHS Board member Roy Thomas and his wife, Margaret.

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