American Horticulturist

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TREES OF GOLD
DROUGHT-FLOUTING PENSTEMONS
AN OZARK VENTURE
PARK PLANTS UNDER SIEGE

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American Horticulturist

Volume 73, Number 10 October 1994

ARTICLES

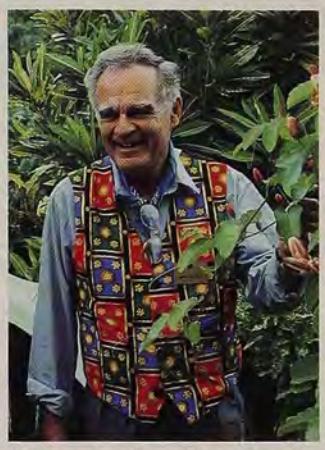
DEPARTMENTS

OCTOBER'S COVER

Photographed by David Cavagnaro

"Against the Indian summer sky, a tree lifts up its hands and testifies to glory, the glory of a blue October day." As usual, *Natural History of Trees* author Donald Culross Peattie has just the right words, in this case in his entry for the sassafras tree (*Sassafras albidum*). Found from Maine to Florida, Michigan to Texas, its root bark was once considered a powerful curative. Now its magical effects are limited to the yellow-orange glow of its leaves in fall, when it's also decked with dark blue fruit on red stalks. Beginning on page 25, Molly Dean offers a paean to trees that glow golden throughout the year.

COMMENTARY



"Let's give it a name!" That desire separates people who are content merely to grow plants from those who truly want to *know* plants—all of their specialized parts, their botanical names and the histories behind their common names, their light and water requirements, pests and potential diseases. The challenge is virtually infinite, since there are 250,000 species recognized in *Hortus Third!*

I thought about the importance of names recently when our two-year-old granddaughter, Elizabeth ("Miss Emerald" to the family) charmingly asked me to remove the hat on her strawberry because, she explained, "You never eat with the hat on." Soon I will tell her that the "hat" is the plant's five sepals. Later, she will learn that the fruit is not a true berry, but a fleshy receptacle bearing achenes, or one-seeded fruit.

Although the structures she was eating with such enthusiasm are very complex, she has already learned "the inside story" of many plants from her father, and the discovery of each new name is greeted with joyful enthusiasm. From *Fruit: A First Discovery Book,* she has learned the names of apple cultivars such as 'Granny Smith', 'Golden Delicious', and 'Russet'. She pronounces each new name with shining eyes and all the animation of Eliza Doolittle in "My Fair Lady" discovering the rain in Spain. Learning is such fun!

These family experiences send me back to the American Horticultural Society with a clear resolve to make sure our educational programs reach their full potential. Our children's gardening symposia—our third will be June 27 to 30 next year in Pasadena, California—are a big step. We must make sure our programs continue to evolve as we work toward making ours a more environmentally sane society in this time of rapidly changing modes of communication. We are constantly seeking new ideas for ways to accomplish this, and we always welcome yours.

One big step toward more environmentally responsible gardening is learning to get by using less water, especially in semi-arid regions. In this issue Robert Nold, a gardener in a Denver suburb, offers some unconventional gardening advice for fellow dryland residents in the course of describing one of his favorite low-water plants, penstemons.

City slickers visiting our national parks may be tempted to try a bit of plant rustling when a pretty specimen tempts the eye. In another article writer Yvette La Pierre reminds us why such collecting is *verboten* in describing the wholesale damage being caused by both professional and amateur poachers. We also celebrate yellow trees—of fall as well as other seasons; take a look at "rustic adornments" that go back to colonial times but also complement today's natural gardens; and spotlight the Eureka Springs Gardens in Arkansas, an unusual for-profit enterprise in a unique setting.

We always welcome your ideas for topics you would like covered in our publications. Within our families, and throughout our extended AHS family, we all have much to teach and learn, plant by plant, season by season. We want that learning to make a difference to our environment *and* we want it to be fun!

H. Marc Cathey, President

MEMBERS' FORUM

Praise and Please

I have just read the July issue concerning children and gardening. Although this is not my primary interest, I think it is wonderful to bring children into gardening early (I wish this had happened to me!).

While I am writing, I may as well request more pieces in the magazine concerned with country gardens. I (and numbers of friend-gardeners) have places of five acres or so that we care for ourselves, and we would really enjoy and profit from examples and advice. We don't want statues and neat brick paths and wooden structures—we just want nice country gardens with trees well placed as well as mixed borders and small shrubs. *Annette Folsom*
Tallahassee, Florida

We're glad you liked the July issue and we appreciate the suggestion. We also hear the opposite a great deal: "Will you please stop writing about large estate gardens and give me more ideas for my quarter-acre suburban lot!" We hope the article on rustic garden adornments, beginning on page 30, will suggest garden structures that can give your garden a focal point, or its gardener a place to rest, while remaining true to its "country" nature.

His Nose Knows

Great article on *Agastache* (August)! I was surprised to read, however, that the odor of *A. foeniculum* is due to anisaldehyde and pulegone. According to original scientific reports, the principal constituent of the essential oil of *A. foeniculum* is usually 56 to 97 percent estragole (methyl chavicol), modified by three to 20 percent germacrene D and two to nine percent (E)-ocimene, providing a scent reminiscent of French tarragon or basil. One form has been reported with 29 percent gamma-cadinene, 16 percent alpha-cadinol, 12 percent beta-caryophyllene, and 11 percent spathulenol, providing a woody-floral odor, while another form has been reported with 50 percent spathulenol and 18 percent bornyl acetate, providing a balsamic odor. For *A. rugosa*, as in anise hyssop, the principal constituent of the essential oil from the foliage is commonly 56 to 96 percent estragole but a variant has been reported to contain 84 to 92 percent methyl eugenol and only two to six percent estragole. This latter variant is somewhat clove-scented in contrast to the French tarragon odor of the normal plant. The scent of the foliar oil of *A. mexicana* is due to 47 to 73 percent menthone and 14 to 40 percent pulegone, providing a peppermint-pennyroyal odor.

The Herb Society of America is proud to have provided a grant to Dr. Lester Wilson at Iowa State University to research *Agastache*. *Arthur Tucker*
Dover, Delaware

Whew! We're always glad to hear from you, Art, and pleased that you read the magazine so carefully. (Dr. Tucker is a research professor at Delaware State University and a leading expert on plant chemicals.)

Repeat

I appreciated Chris Bright's article on peat ("Is Peat P.C.?," December), but I do not agree that environmental issues are a matter of mere political correctness.

Composting began in the United States in the 1930s and was a private sector effort until the late '80s. My company has made and sold this panacea for many woes since 1971. It is more valuable than peat by far. As founder of the North Carolina Composting Council, I wish to see more articles to promote not only compost use but also waste reduction, without the environmental insults of landfills, peat mining, and fertilizer mining and production.

If the "green industry," including gardeners, would claim real improvements in the environment, we must all become aware of the impact of products we use in the landscape. (P.S. Thank you for years of enjoyable, edifying articles.) *Tom Glendinning*
Pittsboro, North Carolina

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OFFSHOOTS

BILL FIRESTONE

One Jump Ahead

By Art Ode

I lost another frog last night. Unlike the fish in my little pond, they all look alike to me. But it evidently met a quick and terrible demise between sundown, when all was peaceful, and my early morning inspection. The evidence of the deed is a string of tendon and a leg bone left upon the bank, and farther away a bit of olive frog skin, shriveling in the morning sun.

This may represent a terrible tragedy to the pond's froggy populace. For me it's another lesson to ponder, courtesy of this mini-ecosystem, on the constantly shifting balance of nature. I know it wasn't Kermit, and I seem to have an overabundance of amphibians at the moment. But that wasn't always the case. Two years ago I not only didn't have any frogs, I didn't even have a pond.

I have often imagined owning a real pond, complete with water lilies, cattails, some panfish and bass; a stopping place for mallards and teal, maybe even an occasional great blue heron. When we moved from suburbs to city several years ago, instead of the other direction, I put the idea to rest. Until, that is, the clean-up of an outrageously overgrown back yard revealed a curious pile of rocks of the "itinerant" type, one collected from every state. "Aha!" I thought, "A 1950s attempt at rock gardening on the prairies." Not so.

Further investigation revealed that the rock pile surrounded, and through time and gravity had filled in, a rectangular cement pool, five feet by nine feet by 30 inches deep. I laboriously cleared the rocks from the pool, brought out the garden hose, and filled it up. It held water overnight, and the next morning's sun glinting on its placid little surface was quite pleasant. Now, what to do with it? "Formal reflecting pool, with statuary," said my wife. "Hot tub," said the girls. "Frog pond," said my son. "Lily pond," said I, thinking of a long-lost horticultural opportunity.

What it has turned out to be after two years of thought and work is all of the above except the hot tub.

Our first step was a formal one, recognizing the symmetry of the pool and its axial alignment. We poured an aggregate concrete pad around the pool to accommodate a bench, and segmented the concrete into squares with redwood dividers. A year's search for a reasonably priced garden bench ended in a cast concrete compromise, inexpensive but very formal, backed by a hedge of columnar yews, with Grecian pots on each side. A massive red cedar overhanging the pool was thinned out, and the combination of formality and idealized naturalism was very pleasing. That was the reflecting pool stage of the pond's evolution.

It's asking too much of any plain dirt gardener to be quite that starkly formal, and I quietly began the subversion of reflecting pool into lily pond. The first thing I did was install a papyrus that had been in a Chinese pot in the living room. It needed to be outside for the summer, I said. That looked good, and the atmosphere was still very formal, but wouldn't a white water lily be a charming addition? And by using up excess nutrients in the water, it would help allay the algae problem that was developing.

That agreed upon, I planted a yellow water lily next to the white one. It was needed for symmetry and the yellow would add a flash of color under the cedar limbs. Now the pool was no longer primarily reflecting, so I might as well add some goldfish, just little ones. By midseason I had made the fateful transition from passive landscape feature to an increasingly diverse aquatic ecosystem, and there seemed to be no turning back. Besides, it was fun. Until I added the koi.

I began with a gold and white specimen of these oriental carp, then I became enamored of a pink-gold-white, and a black-and-white. I couldn't pass the fish store without stopping in. The fish grew, the water lilies bloomed. Then the trouble started.

I noticed the koi were chasing and biting the other fish, most of whom now had ragged tails and dorsal fins. One morning a pretty fantail goldfish, a favorite, was floating belly-up, obviously dead from a koi attack. And instead of getting clearer, the water was getting more and more murky with algae and scum. I also noticed little white parasites on the fish. My pond was obviously out of ecological balance. The answer? Add yet other life forms, such as snails as scavengers, perhaps some frogs, maybe a painted turtle. I would make things more natural, more diverse. But not until spring. With winter approaching, and the pond likely to freeze solid, things had to be moved inside.

Moving the water lilies to the basement cold room was not too difficult, and the papyrus went back to the living room. For the fish, I purchased a steel stock tank. This also seemed like an ideal time to treat the fish for their parasites, so I bought a "foolproof treatment" recommended by the fish store owner, read the directions carefully, and added the potion to the tank.

As soon as the powder began to diffuse through the water, I had misgivings. The maroon purple color told me it was potassium permanganate, a powerful oxidizer. When the fish began gasping and turning over on the surface of the water, I removed them as quickly as I could, filling pails with fresh water with one hand and grasping weakly flopping fish with the other. When it was over, my three koi and half my gold fish were dead. Undaunted, I cleaned and refilled the tank, and an embarrassed fish store proprietor gave me two new, larger koi as compensation. Through the balance of winter my fish, though fewer in number, grew larger by the day, and water garden catalogs began arriving along with the bulb and perennial offerings. I succumbed to temptation and ordered a dozen and a half snails, as bottom scavengers, and as many tadpoles, adding two more links to the lengthening ecological chain. I signed up for a blue tropical day-blooming water lily and five yellow water irises.

In early May the snails and tadpoles arrived from the water-garden nursery. The snails were the diameter of a quarter, pudgy as any escargot in a French restaurant; they should be able to eat their weight in bottom sludge every day, I happily mused, visualizing a pond, sparkling like Perrier, full of clean, happy fish and plants. The tadpoles were another matter.

I had expected itty-bitty tadpoles, but these suckers were big, fat, and ugly, and looked like they could go one-on-one with my koi any day. Envisioning a plague of frogs worthy of a pharaoh, I reluctantly dumped them into the pond.

The tropical water lily and the irises arrived several weeks later, and I planted them in opposite corners of the pool, adding a big flat quartz rock in another corner for my future frogs to sit upon. My pond now had beauty and diversity, and was a model of back yard ecology; or so I thought.

As the tadpoles developed from bug-eyed, deformed eels into hardly more beautiful frogs their need to breathe air made them suddenly vulnerable to predation from land and sky, and they went through what is evidently a learning period. It seems there was good reason to start out with 18 wanna-be frogs.

Soon little frogs and big not-quite-frogs took to sitting among my growing irises for protection, and some creature of the

night—raccoon, possum, alley cat—repeatedly pulled up my irises to get at them, with enough success to keep it coming back nightly. Giving up and removing the irises didn't solve the problem, for then the froglings moved to the tropical water lily, which suffered the same fate. I finally moved the water lilies around so they all were out of predator-reach from shore. (I wish the frogs would sit on the rock, but they won't. I got the turtle because I hope it will.)

Summer is almost over and I'm starting to worry about winter. I have experience with the fish, and the turtle can sit on a rock in the stock tank. But I don't think I can train the frogs, which show no signs of becoming any smarter, to stay in the tank.

Sinister thoughts have crossed my mind, like a freezer full of frog legs, or somehow encouraging the current nightly carnage. But I imagine I'll end up providing for the survivors, now quite large and actually doing their job of critter catching rather admirably. I'm going to look into an electric stock-tank heater to keep the pool just warm enough to assure cold-blooded animal survival. Or maybe they could go in a box in the refrigerator, in a state of near-hibernation, in enough of a torpor that they will neither jump nor croak, just stare blankly when the light goes on.

Reflecting on my water gardening experience I sometimes wonder if it is all worth it. Maybe the previous owner of our house went the same route and finally filled the pond in with the rocks, one-by-one, each from a different state of the Union, with purposeful, albeit misguided, patriotic zeal. But I really don't want a rock garden, which I have heard is even more trouble.

I know I'll keep my reflecting pool-cum-frog pond, now more than horticulture, if less than wildlife preserve. It adds concern for animal life to my gardening interests, and gives me cause to contemplate the workings of ecosystems real and artificial.

I like to think the experience is helping me relate a little better to oil spills and fish kills, habitat destruction, even problems like over-population. It is sobering to think that if it is difficult for me to intelligently manage my five-by-nine aquatic ecosystem, how difficult it is for mankind to understand and manage the resources of an increasingly fragile planet.

Will we fare better than my frogs, staying a jump ahead of disaster? Or will we and our civilization end up in tatters on some unknown shore of the cosmos?

Dr. Arthur H. Ode Jr. is president of Quercus Associates, Inc., fund-raising and planning consultants for environmental institutions and historic sites.

NATURAL CONNECTIONS

Mesic Counterparts

The natural beauty of American beech (*Fagus grandifolia*) and sugar maple (*Acer saccharum*) has made them long-time favorites with artists, photographers, writers, poets, and nature lovers in general, especially in their autumn glory. The sugar maple is admired for the yellow to crimson hues of its incandescent fall foliage, as well as for its sweet sap; the beech for its earth tones of yellow to leathery brown that evoke a stately contrast with its silvery gray bark.

But the two trees have more in common than frequent inclusion in coffee-table books and nature calendars. They are associated by a shared ecology and heritage in the limy, organic-rich soils of the mesic deciduous forests in northeastern North America.

Often found together in large stands without appreciable numbers of other species, beech and maple are often referred to as climax or cover vegetation because they are long-lived, shade-tolerant trees that establish themselves slowly. To become dominant, they require forested areas that lie long undisturbed by disruptions such as fire, severe storms, or clear-cutting. They have shallow, wide-spreading root systems and are partial to north-facing upland sites that are moist but well aerated, with deep fertile soil. Their ranges are similar: beech is found from southern Ontario and Quebec south as far as northern Florida, and from the Atlantic Coast west to a line running from northern Michigan to eastern Texas; maple extends north to Nova Scotia and west to the southeastern tip of Manitoba and into Minnesota, but disappears along the Atlantic Coast south of Maryland. Its extreme southern range is northern Georgia and Alabama.

Beech forests were more common in Great Lakes states such as Michigan, Wisconsin, and Minnesota in the early 19th century. But the trees were divining rods of their own downfall, their roots pointing the way to fertile soils coveted by farmers. Later in the century both beech and maple fell prey to a hardwood logging boom in the Midwest.

Scientists believe beech and maple coexisted in the transitional and deciduous forests of North America prior to the Pleistocene epoch, which lasted from two million years ago until 11,000 years ago. During much of the Pleistocene, glaciers scoured the landscape as they advanced and retreated across northern North America, and existing flora and fauna either moved or perished. In North America, the last glacial advance peaked about 18,000 to 20,000 years ago and began a final retreat, leaving a harsh, cold environment behind.

While it is not known exactly where deciduous trees like beech and maple survived during the glacial period, scientists suspect they either found refuge in isolated pockets protected from the ice, or spread south to friendlier climates through a complex succession of seed dispersions. Beech fossils and pollen dated from about 15,000 years ago have been found in the lower Mississippi Valley, but it is believed that beech primarily remained east of the Appalachian Mountains before slowly moving back north and west, reaching Georgia by about 13,000 years ago and its present northern border in Canada about 4,000 years ago. Edible beechnuts were carried north by birds, animals, and Native Americans.

Maple, which may have found refuge farther south than beech and on both sides of the Appalachians, moved more quickly by virtue of its light, wind-borne seeds and reached its northern limit in Canada about 6,000 years ago.

Beech and maple establish themselves by growing up beneath other canopy trees and eventually dominating, often alternating in

the roles of canopy and understory trees in the deciduous forest environment. They are sometimes associated with birches and hemlocks, but those trees tend to favor slightly wetter soils.

Both trees are monoecious and produce seed on a cyclical basis—every two to five years for maple and every three to five years for beech. Beech trees produce pairs of triangular nuts encased in a prickly bur; these, collectively with other fruits or nuts that fall to the ground and are used as fodder for domestic animals, are called "mast." Maple produces its characteristic two-winged seeds that helicopter gracefully to earth.

The trees share an important role in the forest ecology and also in the lives and lore of both Native Americans and the colonists.

Beechnuts provide a staple food of many forest denizens, including birds, squirrels, and chipmunks. The loss of beech forests cut by settlers and loggers is blamed in part for the extinction of the passenger pigeon, which relied on beechnuts as a major part of its diet. As with other mast-producing trees, a poor year for beech mast production often correlates to the population of squirrels and chipmunks that feed on the mast. Beechnuts were also gathered as a food by Native Americans, including the Iroquois, and were used by colonists as fodder for pigs and other livestock.

Maple seeds supplement the diets of a variety of wildlife, including squirrels, mice, and songbirds such as red-breasted nuthatches, purple finches, and grosbeaks. Animals and birds also tap into the sweet sap that rises through the tree in the spring, a practice mimicked by Native Americans and, in turn, colonists, for the production of maple sugar and syrup. Sugar maples were sacred to the Iroquois, who celebrated the rising of sap each spring. The Chippewas also tapped maples to produce a variety of sugar and syrup products.

Beech trees are also heavily steeped in the folklore and mythology of Western Civilization, appearing as favored trees in fairy tale and romance from writers as varied as Virgil, the Grimm brothers, Shakespeare, and Tolkien.

So when you are next walking in the autumn woods, look for the association of beech and maple. The combination of the maple's bright foliage and the beech's majestic form and bark is not to be missed. In his book *Winter Visitors,* Henry David Thoreau wrote, "I frequently tramped eight or ten miles through the deepest snow to keep an appointment with a beech tree. . . ."

—David Ellis
Assistant Editor

THE URBAN GARDENER

Tippy of the Jungle

By Martha Bright

If you were to walk by our house, you would see two large bay windows crowded with plants. If you were then to pause and look a little more closely, you might discover that you were being similarly regarded by one or more pairs of slightly malevolent yellow eyes. Beneath the delicate fronds of areca palm and the waxy leaves of philodendron lurk the beasts of the indoor jungle—three overfed house cats.

These cats feel the atavistic urge to conceal themselves in thick undergrowth; in their dreams they twitch with the tense movements of predators in the tall grass. But the urban realities of traffic, big dogs, and other hazards prohibit them from exploring the tortured shrubbery of yews and arborvitae that adorn the neighborhood. Theirs is an inner landscape of jade plants and Norfolk Island pines, with an occasional opportunity for bringing down a housefly or a spider.

It might seem as though I keep house plants simply for my cats' amusement. Not so. I enjoy them through the drab winters and I believe the researchers who claim they make the indoor air more fit to breathe. But my pleasure in the plants does not extend to eating them. One of my current cats, Tippy, is an incorrigible plant eater. His two companions eat catnip and sample other greens from time to time. More often than not, however, these salad snacks don't agree with them and I find the results on my Turkish carpet. In all the years that I've had both cats and plants, I've struggled to protect the latter from defoliation by the former. In this struggle I have learned a few things that may help other people who like both felines and flora.

I've noticed that Tippy seems to dine on plants for the same reason that pets persist in other undesirable habits: they've learned that we find them annoying and use them to punish us for what they view as our own transgressions. Tippy, for instance, is a super-affectionate, 20-pound Himalayan. When he wants to sleep on my chest or on my face I sometimes rebel, if I can still move. My husband or I will evict him from the bedroom and shut the door. But we have to pay. When I get up I will find that my bonsai has been severely pruned and its branchlets regurgitated on the rug. Tippy also likes flowers in vases; these have the added allure of spillage and breakage. If I try to shoo him off the kitchen counter or we give him a bath or lock him in the basement, plants will suffer.

Over the years I have noted plants that Tippy and others with a vegetarian bent seem to like best. At the top of the list would be begonias. Even cats who don't normally eat plants can't seem to resist them. Tippy can chew a large begonia to a pitiful stump in just a few days. Other tasty morsels include gardenias, jasmine, fuschias, and Persian violets (*Exacum affine*). Perhaps it's because they're the showiest in my collection. But I've noticed that all of them have rather tender, succulent-looking leaves, and I guess if I were going to make a meal of my indoor landscape, I'd pick these myself.

Some plants are never bothered by pets. I find that jade plants, philodendrons, poinsettias, corn plants, and Norfolk Island pines have little appeal to the feline appetite. The kinds of plants you find in dentists' offices and dark bars will probably be okay. Geraniums, perhaps because of their strong odor, do not tempt. I would predict that anything prickly or spiny would be safe as well, although a friend from Tucson insists she's seen a cat eat a cactus.

I've never worried about cats poisoning themselves with toxic house plants. My

LOOK AT YOUR LABEL

There's useful information on the mailing labels on your *American Horticulturist* magazine and news edition. Just above your name on the mailing label is a string of numbers: The first five digits are your Membership ID or Account number. Please have this number handy when contacting the American Horticultural Society. The next group of numbers consists of four digits that represent the year and date of your membership's expiration. This information is on the label so you can easily track your membership's expiration date—and plan accordingly!

cats seem to know which ones shouldn't be ingested; maybe this is one reason they have nine lives. Tippy once ate a daffodil, which, along with other members of the *Narcissus* genus, is known to be toxic, but he threw it up almost as fast as I could call for advice.

What if you have a cat like Tippy, but still are determined to have begonias and Persian violets? Are there ways to prevent cats from razing your indoor garden? I have tried a few strategies, with varying degrees of success. One technique consists of rendering the plants unpalatable. A pepper solution sprayed on the leaves didn't work, so I bought a product called bitter apple and another known as "Habit Breaker." These were supposed to cure both dogs and cats of chewing on plants and furniture, but their unpleasant odors merely served to pique the cats' curiosity. All three came running to see what I was doing. Orange peel or orange peel oil placed in the pot seemed to have an effect, however. Cats dislike the volatile oils of citrus, and this remedy also kept the big digger of my trio from tossing dirt all over the floor.

Sometimes just moving the plant works. If you can move it to a place that cats find inaccessible (probably not the bedroom closet, though, unless you're growing mushrooms), well and good. But even just switching the plant to another location can be effective because the cat seems to forget about it. (While they may not notice an old plant in a new place, however, cats seem to know immediately when a new plant has moved in and will investigate even things they probably wouldn't like.)

One of the best ways to manage cats and house plants may be to set aside one or two plants that you allow them to eat. This may contradict the notion that you ought to punish them when you catch them at it, but I've found that punishment rarely produces the desired result. When I tried a water gun as negative reinforcement, Tippy made it a game. He'd slyly ooze over towards the begonia while I read the morning paper and take just one bite of a leaf, and then watch while I cursed and fumbled for my plastic pistol. By the time I took aim, he took off. Then the game began anew.

Maybe some of these ideas will work for other cat-owning house plant growers, and maybe they won't. But in the meantime they'll be able to recapture the spirit of the wild by matching their wits against one of the world's most cunning predators. It will be a household experiment in survival of the fittest. And I think I know who's going to win.

Martha Bright is a free-lance writer living in State College, Pennsylvania.

NATIVES AT RISK

MARYL

Sebastopol Meadow Foam

Paradise seekers have always been attracted to southern California. The Mediterranean climate that lures them with sunny skies and mild weather also creates the right atmosphere for a unique environment called vernal pools. These seasonal wetlands form in shallow depressions during fall and winter rains. Layers of clay or hardpan under the pools' surface prevent the water from draining.

Vernal pools are abundant in California's Great Central Valley, the coastal terraces of San Diego County, and the northwest part of Baja California, Mexico. Similar seasonal wetlands occur in other parts of the world, but the California pools are well-known for their unusual flora.

Plants that thrive in the vernal pools are distinctively adapted to their amphibious environment. The pools are too wet in winter and spring for upland plants and the seasonal drying prevents marsh and aquatic plants from growing there. Vernal pool plants usually germinate during the flooded period and flower as the pool dries.

One of these plants is *Limnanthes vinculans,* an annual herb that was listed as endangered by the U.S. Fish and Wildlife Service in January 1992. *Limnanthes* is one of two genuses in Limnanthaceae, the meadow foam or false mermaid family. *L. vinculans,* the Sebastopol meadow foam, was first collected by a Mrs. A. E. Alexander in April 1946. The meadow foam's first leaves, which are narrow and undivided, are followed by feathery divided leaves joined by three to five undivided leaflets. The mature leaves distinguish *L. vinculans* from other *Limnanthes* species. The plant produces attractive white flowers at the ends of its stems.

All of the *Limnanthes* species, including *L. vinculans,* have potential as agricultural crops. Their seeds contain an oil, similar to that produced by sperm whales, which keeps its lubricating properties under high temperature and pressure. Two *Limnanthes* species native to Oregon are candidates for the federal list; another is rare.

Two other vernal pool plants were federally listed as endangered in the same ruling—the Sonoma sunshine or Baker's stickyseed (*Blennosperma bakeri*) and Burke's goldfields (*Lasthenia burkei*).

The three rare wildflowers were once distributed over 16 miles in the Cotati Valley. The area is threatened by urbanization, agricultural land conversion, and overgrazing by livestock. About 40 percent of the Cotati Valley has already been urbanized, and 50 percent of the land is irrigated for agricultural purposes.

Habitat loss isn't limited to direct destruction. Vernal pool plants are dependent on a specific hydraulic system—flooding during wet winters followed by spring and summer drying. If the subsurface clay or hardpan is broken during construction or plowing, water drains from the pool during the winter rains, paving the way for the spread of invasive dryland plants. On the other hand, if water from urban or agricultural run-off continues into the summer months, the area can become overgrown with invasive water plants. —*Mary Beth Wiesner*
Managing Editor

PLANTING THE FUTURE

A Rose in Harlem

To design a garden based on the elegant curves of an old piano might be considered a little different, and to attempt creating a garden in the heart of Harlem could be called a madman's folly. But if the garden was at the Children's Storefront School—a unique, tuition-free private elementary school in the middle of one of New York's toughest neighborhoods—then it could be classified as a visionary's dream.

The school's founder, Ned O'Gorman, and the garden's designer, Keith Corlett, thought to create a calm retreat for inner-city children when they created this "healing garden" in an area originally intended to be a playground. Dense plantings completely isolate the retreat from the streets that surround it, while a barbed-wire fence ensures that the city's influence will not come back in.

Corlett's first inspiration for the garden was an old piano frame that had been abandoned on the lot. Its harmonic curves suggested the plan for beds and paths. Corlett decided to keep the piano frame to use as a sculptural piece in the finished garden, but when he proposed his plan he found that the frame had been hauled away as junk. After finding a replacement frame, Corlett placed it in a corner of the garden with the inscription "Music may soothe the troubled breast but the garden nourishes the soul." Corlett and O'Gorman both felt that the new retreat should be filled with lots of things to interest young minds, such as twisting paths, a finial-style fountain, a checkerboard table, games, and covered reading benches.

Even the best plans have problems to overcome, however, and in this case it was the land itself. According to Corlett the soil was almost concrete and littered with car batteries, crack cocaine pipes, and other reminders of its urban origins. Says Corlett: "We had to hand pick through every square inch of the lot to get all the debris. That was back-breaking work." Even after a whole ton of new soil had been added along with peat moss, lime, and fertilizer, and the pH level had been balanced, the problems weren't over. Corlett lost a few plantings because pollution from car batteries had seeped in and become trapped in the hard ground, and needed time to leach out.

PHOTOS COURTESY OF KEITH CORLETT

The benches and finial-style fountain, top, provide a quiet, healing retreat for Storefront School students. An aerial view, above, shows the effective use of space in the small oasis.

Corlett chose to leave several 30- to 40-foot tall "Bronx palm trees" (*Ailanthus altissima*) to give the garden a mature look and then covered everything with vines, climbing roses, and wisteria. The rest of the garden is made up of a variety of perennial and annual flowers that seem to delight the children. They often ask their teachers if they can take home one of the flowers—all common to most gardeners but rare in Harlem. Says Kate Ostrow, assistant development director for the school, "If Ned gives one of the children a flower to take home, they treat it like a prize, carrying it carefully and showing anyone who'll look."

Those involved with the project say that the reaction from the children has made all the hard work worthwhile. "The children are in complete awe of the garden because it's something they've never seen before," Ostrow says. In fact, most of the students at the Storefront School have hardly ever seen grass, let alone a real garden, she says.

The school's teachers and students have found that there are more uses for the garden than just a place for recess. Art teachers take the primary classes out to let nature inspire would-be Rembrandts, and science teachers stretch their imaginations to turn a walk through the garden into a lesson in botany. The garden has also become an ideal location for "time outs," which give unruly children a chance to calm down and talk to a teacher or counselor about their problems in a nonthreatening environment.

The Children's Storefront School was opened in 1966 by O'Gorman, a poet, and operated 15 years as a preschool before becoming a full elementary school. In 1989 the Storefront graduated its first class of eighth graders. The school currently has 130 students enrolled and in addition to the regular curriculum offers a summer camp, a counseling program, an after-school program, a remedial reading program, art, drama, and science. The school and the new garden serve as reminders that people can make a difference in the lives of inner-city children. —*Nikole Williamson*
Editorial Assistant

GARDENERS' INFORMATION SERVICE

Q: ***We recently bought an older home with a row of what appear to be very old boxwoods, but they are blocking part of a walkway. How severely can I prune them?*** ***—N. P., Norfolk, Virginia***

A: Even very large, old specimens of boxwood (*Buxus* spp.) can be cut back quite severely, to within six to 12 inches of the branches and trunk. But such drastic pruning should be done over a period of a couple of years. Prune in mid to late spring, just before active seasonal growth begins. Remember that box is slow growing, so an initial hard pruning can result in some funny looking shrubs for several years until foliage "fluffs" out the plants again.

Q: ***I love the delicately colored berries of the porcelain vine and planted one about three years ago. But it's just sitting there. What can I do to make it grow more vigorously?*** ***—F. P., DeKalb, Illinois***

A: Porcelain vine, *Ampelopsis brevipedunculata,* needs full sun and doesn't like soil that stays too wet. If you have poorly drained clay soil or the plant is in a depression where water collects, you need to improve the drainage or transplant the vine to a drier location. Being in clay will also restrict the vine's roots, as will being too close to a foundation or competing with nearby roots of shallow-rooted trees and shrubs. This vine doesn't mind being moved, as long as it's carefully dug up and properly replanted. Make the new planting hole two to three times as large as the vine's rootball and amend the soil with some organic matter to give it better drainage.

If your garden soil is generally poor, you may also want to add a balanced slow-release fertilizer in spring or early summer. Japanese beetles can be a problem, so take measures to control them if you see signs of their damage on the foliage.

Q: ***I will be pruning some evergreens this fall. Can I add the branches to my compost pile?*** ***—M. L., Norristown, Pennsylvania***

A: Evergreen branches decompose very slowly because the needles have a waxy covering that takes a while to break down. Especially if the branches are thick, they should be run through a chipper/shredder before being incorporated into a compost pile.

Follow this procedure by adding lots of nitrogen-rich ingredients like grass clippings to help speed decomposition, and if you don't already turn the pile frequently, try to turn it at least once a week for the first couple of months after adding the evergreens. And of course you will want to keep the pile from getting waterlogged, especially over the winter, by covering it with a tarp or black plastic.

If you don't have access to a chipper/shredder, you could make a separate compost pile for the branches until they break down a bit. Bear in mind, this could take a year or more.

Don't forget that evergreen branches make excellent winter windbreaks for tender perennials and, like other mulches, keep the ground from thawing and heaving around them when the ground freezes and there is little snow cover.

Q: ***Can I grow the katsura tree where I live?*** ***—H. L., Spokane, Washington***

A: The katsura tree, *Cercidiphyllum japonicum,* is hardy in USDA Zones 4 through 8, so you should be able to grow it there on the southern edge of Zone 5. It should be planted early next spring in rich, moisture-retentive but well-aerated soil, where it will receive full sun. It is adaptable to a wide pH range, and has no serious disease or insect problems.

This native of China will grow fairly quickly to 40 to 60 feet tall and 20 to 30 feet wide. The shaggy brown bark is ornamental in its own right, but the leaves are the tree's most striking feature. They emerge reddish purple in spring, turn blue-green in summer, and in fall become yellow-orange to apricot. Michael Dirr, in his *Manual of Woody Landscape Plants,* says that as the fall leaves age, they give off a warm, spicy fragrance. *—Maureen Heffernan*
Education Director

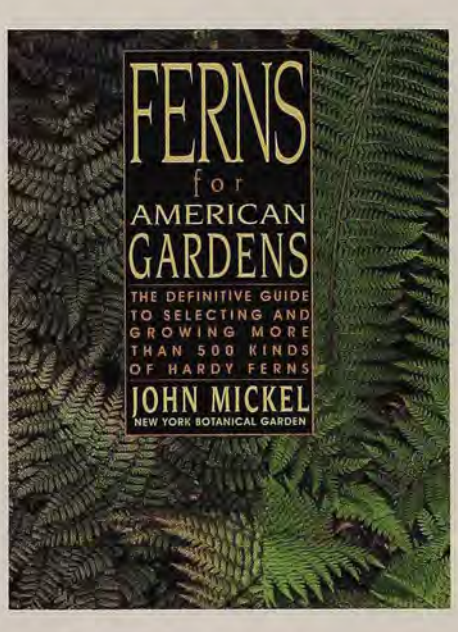
IT'S SEED-COLLECTING TIME!

All members of the American Horticultural Society are encouraged to collect seeds from their plants—from annuals, perennials, wildflowers, vegetables, herbs, ornamental grasses, trees, shrubs, or tropicals—for our Annual Free Seed Exchange. We ask that you send in as much seed as necessary to fill 100 orders with a healthy pinch of seed, but we will accept smaller donations. Along with your seed please send its common name, botanical name (if known), flower color, height, where it was collected, and any information you can add about growing it or using it. To meet the deadline for our Seed Catalog, we need to know what kind of seed we will be receiving by **November 1**. Please call or write us by that date with the above information. The seed itself must be received no later than December 1. Make sure it is fully dry before packing. If using an envelope rather than a box, mark it "hand cancel." Mail to AHS Seed Program, 7931 East Boulevard Drive, Alexandria, VA 22308-1300.

BOOK REVIEWS

Ferns for American Gardens

John Mickel. Macmillan Publishing Company, New York, 1994. 370 pages. 7¼" × 9½". Color photographs. Publisher's price: hardcover, $60. AHS member price: $54.



Why is it that ferns, which surely exceed the number of species, varieties, and cultivars of hostas, and certainly have a greater diversity in form, texture, and growth habit, are not yet at the same crest of popularity? A new book by the New York Botanical Garden's John Mickel illustrates the great diversity of ferns—from 60-foot tree ferns like *Cyathea princeps* to the minute floating mosquito fern (*Azolla filiculoides*), from those that climb to those that colonize or clamber out of rock crevices—and explains why they are finally receiving the attention they deserve.

Mickel gives us all the right incentives to grow some of the 500-plus ferns from 50 genera he describes in this authoritative and thorough guide. Ferns did have their day "in the shade" during the Victorian fern craze, which reached its zenith in the late 1800s in Great Britain, and Mickel says fern interest and use are once again on the rise. Perhaps this has been stimulated by a maturation of gardening in America or by the number of unusual varieties now available to the everyday gardener through tissue culture propagation.

Although the book will be prized by fern collectors and specialty gardeners, it should also inspire the novice to try ferns. The author includes a list of suggested ferns for beginners, and each description outlines the availability, ease of culture, hardiness, height and growth habit, and specialized needs of each plant. Mickel also dispels the myth that ferns are too fragile or fussy to grow. One need only look at an aggressive bed of ostrich ferns (*Matteuccia* spp.), or the robust fronds of Christmas fern (*Polystichum acrostichoides*) to appreciate their durability and hardiness.

Mickel's personal experience in the culture of different species and forms is evident throughout. He includes interesting facts about many ferns, such as his tip that Himalayan maidenhair (*Adiantum venustum*) keeps well in a vase with flowers and makes a good house plant. He also shares his observation that members of the *Osmunda* genus are a favorite of hummingbirds, which use the soft downy hairs on the leaf stipe (stalk) to line their nests.

Plant descriptions, liberally sprinkled with color photographs of many of the ferns, take up nearly two-thirds of the book, accompanied by chapters on fern structure, growth requirements, and propagation. A section on shade-loving plants with flowers and textures that complement ferns is especially welcome. Indices include separate common and botanical name listings, as well as a comprehensive bibliography and a glossary of terms. Since little on this level has been published about ferns in recent years, this will become an excellent reference for home gardeners, fern collectors, and propagators alike. —*Stan Beikmann*

Former director of Fernwood Gardens in Niles, Michigan, Stan Beikmann is an adjunct professor of landscape architecture at Andrews University, Berrien Springs, Michigan, and is vice president of the Garden Writers Association of America.

The Book of Apples

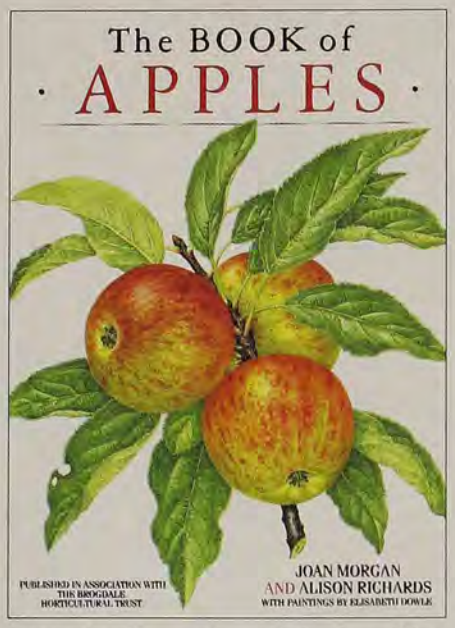
Joan Morgan and Alison Richards. Illustrated by Elisabeth Dowle. Ebury Press, London, England, 1993. 304 pages. 8" × 10¼". Watercolor plates and black-and-white drawings and photographs. Distributed by Trafalgar Square, North Pomfret, Vermont. Publisher's price: hardcover, $29.95. AHS member price: $26.50.

Although it will be of special delight to the many people who consider themselves apple connoisseurs, the insightful historical and practical information included in this definitive book makes it accessible to anyone with an interest in apples for growing, cooking, or eating.

Joan Morgan, a fruit expert and the first woman invited to be a member of the Royal Horticultural Society's Fruit and Vegetable Committee, and Alison Richards, an award-winning radio producer and writer, blend their skills to produce an informative and interesting text highlighted by 32 detailed watercolors by botanical artist Elisabeth Dowle.

The first half of the book provides a comprehensive and fascinating history of the apple, tracking its development and mythology from its origin in what is now Kazakhstan and its well-known role in the Garden of Eden, through the mistrust with which the raw fruit was viewed in the Middle Ages, its distribution during the Roman conquests, its prominent place in 16th-century Italian and French cookbooks, and its eventual arrival and establishment in North America and other continents.

Morgan and Richards follow the progress of the apple in North America from the first orchard, planted around 1625 by William Blaxton on Bunker Hill in Massachusetts, to the first nursery on the West Coast, established in Oregon in about 1847. The exploits of Jonathan Chapman, better known as Johnny Appleseed, who spent 46



years planting apple seeds in the wilderness, are also carefully chronicled.

In the latter half of the book, Morgan, who has personally tasted all of the 2,000 varieties of apples grown in the orchards of the Brogdale Historical Trust in Kent, England, describes each variety in an exhaustive directory that includes a historical, geographical, and botanical profile for each apple, and a brief description of individual tree and fruit characteristics. A separate section describes 72 astringent-flavored apple varieties that are used in England and France for the manufacture of cider. Information about how to grow apples and cook with them is included in appendices.

This book is comparable to two earlier, superb books about apples written by Brogdale researchers—*National Apple Register* by M. W. G. Smith, and *Apples: Identification of Varieties* by J. Bultitude—in covering its topic thoroughly.

Every apple lover will wish to read this new and informative book. —*Roger D. Way*

Roger D. Way is Emeritus Professor of Pomology with the New York State Agricultural Experiment Station, Cornell University, Geneva, New York, and is the developer of the 'Empire' and 'Jonagold' apple varieties. He spent a portion of a sabbatical leave studying apples at Brogdale—then known as the National Fruit Trials—under the guidance of Smith and Bultitude.

Water-wise Gardening: America's Backyard Revolution

Thomas Christopher. Simon & Schuster, New York, 1994. 271 pages. 6¼" × 9½". Publisher's price: hardcover, $29.95. AHS member price: $22.50.

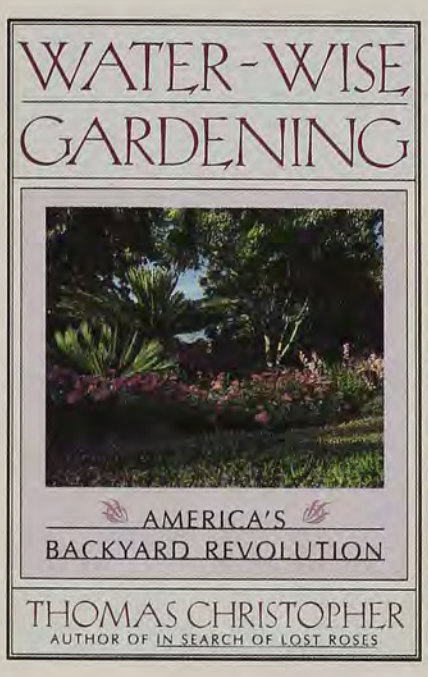
Water quality is one of the great challenges facing all Americans today. Widespread pollution and increasing demands on a resource once thought inexhaustible have created shortages of clean water that are projected to increase in frequency as we move into the 21st century.

In this book, Thomas Christopher travels throughout the country, meeting with both amateur and professional gardeners and gleaning tips and techniques for putting together landscapes with minimal water needs. He employs a personable and entertaining style that allows a glimpse into the background and personalities that move each gardener to create landscapes perfectly suited to their local climates. The lessons learned are all about commonsense gardening techniques.

It all starts with the need to know your soil: Without understanding how rapidly your soil absorbs water, you cannot water accurately. Christopher even challenges the traditional rule of thumb that gardens need an inch of water every week. This may be true for a bluegrass lawn growing in New England, but is likely to be gross excess for a Southwestern desertscape. He recommends the use of a soil sampler, a tool that can be used to determine both the actual root depth of individual plants and the depth of moisture penetration after watering. Ideally, water should penetrate just a bit deeper than a plant's roots. Drip irrigation and other methods of low-waste watering play a major role in these applications and are thoroughly discussed throughout the book.

Christopher borrows heavily from the xeriscape movement, encouraging gardeners to familiarize themselves with, and utilize whenever possible, the native flora of their regions. In his ideal landscape the traditional role of great sweeps of water-guzzling lawn is significantly reduced or, in many cases, eliminated. This is not to say that only native species are appropriate for water-wise gardening. There is a place for climatically compatible but nonaggressive exotic plants alongside natives in many garden situations. Regardless of your plant choices, even the simple technique of grouping plants according to their water needs will by itself reduce waste. Readers can pick up some good ideas for water-wise plantings from 48 color photographs that illustrate successful designs in gardens across the United States.

This is not a book filled with handy lists of the best plants for every region, nor does it need to be. What it does provide are numerous tips, such as learning how to read the physical characteristics of individual plants that can indicate their drought tolerance. An excellent appendix lists re-



sources the water-wise gardener can turn to for additional information. Readers who absorb the lessons here will acquire skills that benefit their plants, conserve precious water, and, in short, help them become better gardeners. —*Chip Tynan*

Chip Tynan is a horticulturist with the horticultural answer service at the Missouri Botanical Garden, St. Louis, Missouri.

Poached Parklands

With illegal harvesting on the rise, a last refuge of some natives is under siege.

BY YVETTE LA PIERRE

MICHAEL THOMPSON

ROB SIMPSON

Hikers explore a trail in Crater Lake National Park, top, which has been the site of vast organized mushroom poaching. A favored pick is the matsutake, above, which is highly prized in Japan. The Pacific yew, opposite, has been a target since the discovery that the taxol its bark contains is effective against cancer.

In September 1989, a ranger at Crater Lake National Park in Oregon stopped to check on a truck that had been parked at a roadside pullout for hours, unattended. Because it was opening weekend of deer season, the ranger expected to find hunting paraphernalia. Instead, he found several five-gallon plastic buckets full of wild edible mushrooms. The ranger soon found four people picking mushrooms, lectured them on protecting natural resources in parks, and let them go with a violation notice.

There seemed no reason to be unduly alarmed. After all, mushroom gathering has been a fall ritual in the southern Oregon Cascades for many years. But over the next several weeks, other rangers came across more groups of pickers with significant amounts of the forest fungi—one ranger recovered 50 pounds in one incident. A bit more investigating revealed that what had once been a harmless activity enjoyed by locals and families had developed into an unregulated, multimillion-dollar industry.

Before this incident, plant poaching in national parks was considered a relatively isolated activity: a few overzealous tourists in one park, a farmer supplementing income with ginseng collection in another. "I had worked in the parks for 15 years, and no one had looked at the issue on a national level before," says Jen Coffey, resources management specialist in the National Park Service (NPS) Washington office. But this offense was too high-profile—involving clearly organized activity and an unprecedented number of collectors, some of them armed—to be ignored. It was the catalyst for periodic Native Plant Protection Surveys by NPS, which have found poaching astonishingly widespread.

In the Northwest each fall, literally hundreds of people sweep through the forests en masse in pursuit of mushrooms. At the end of the day, pickers hit roadside buying stands to sell their daily harvest, some pocketing hundreds of dollars. The roadside buyers truck the produce to Portland or Seattle and, within 48 hours, the mushrooms arrive by air in Japan, where fresh mushrooms command up to $200 a pound. Poachers take chanterelles, morels, truffles, and others, but the pick-of-the-day is the matsutake *(Armillaria ponderosa)*. This spicy fungus, also known as pine mushroom, is highly prized in Japan, whose own declining pine forests produce fewer and fewer mushrooms. Each year an

ART WOLFE, INC. / RAY PFORTNER

estimated $8 million to $15 million worth of matsutakes are removed from Pacific Northwest forests, according to Mike Blankenship of the NPS Northwest Regional Office.

The pickers may start out in national forests, where mushroom picking is legal with a permit, but quickly filter onto park service land, where visitors are supposed to take nothing but pictures.

"What we're finding is that after they (mushroom pickers) have picked Forest Service areas clean, they come onto park service land," Blankenship says. Last October, an estimated 1,000 pickers were on the boundary of or inside Crater Lake.

But the problem isn't limited to mushrooms. National and international demands for plants for food, decoration, private collection, and medicinal purposes have brought commercial poachers into national parks at an alarming rate. As habitat loss and overharvesting threaten plant species nationwide, parks are targeted by poachers as the best—and sometimes last—refuge for native plants.

"A 1991 report by the World Wildlife Fund (WWF) found that plant poaching is increasing worldwide, and parks are reflecting what they've found," says Coffey.

The increasing demand for some wild plants is being driven by a renaissance in herbal healing, maintains a WWF report, "Medicine From the Wild" by Douglas O. Fuller. Some 400 million people worldwide use plants for medicinal purposes, and many believe that wild-harvested plants are somehow superior to cultivated ones. Asian consumers, for example, are willing to pay three times as much for wild American ginseng *(Panax quinquefolius)* as for cultivated varieties.

National parks harbor more than 140 species of plants that are of known commercial value, including ginseng, Pacific yew, orchids, rhododendrons, irises, lupines, pines, grapes, yucca, and many cacti. Chris Topik, U.S. Forest Service Botany Program leader, says that although he doesn't have data to prove it, his sense is that the market for wild plants is growing. "Plants like ginseng, lily and orchid bulbs, carnivorous plants, bonsai trees at the treeline. That's really disgusting—people taking dwarf trees that are hundreds of years old."

There are currently 474 American plant species listed as endangered or threatened, and 102 proposed for addition to those lists. Peggy Olwell, coordinator of the NPS endangered species program, said that national parks harbor at least 33 of those currently listed, but she suspects this number is low. "I think there are many more endangered plant species out there that we just don't know about," Olwell says. There are 132 populations of threatened or endangered plants on park lands; 557 parks have species proposed for listing. Some threatened or endangered species occur only on park lands. One of these is the Chisos hedgehog cactus (*Echinocereus chisosensis*), one of the species being poached at Big Bend National Park in Texas.

ROB SIMPSON

MARILYN WOOD, PHOTO/NATS

Poaching is believed to have wiped out the showy lady's-slipper, top, from Acadia National Park in Maine. The Garden Club Federation of Maine hopes that educational efforts will reduce collection of sea lavender, above, before it meets the same fate.

According to a recent NPS Native Plant Protection Survey led by Coffey, 99 species of native plants were known to have been illegally collected in 37 parks in 1990, and 88 species were poached in 41 parks in 1991. Of the plants reported poached in parks, at least 20 are federally listed as endangered, threatened, candidate species, and/or are protected by state law.

Moores Creek National Battlefield in North Carolina reported in the survey that the Venus's-flytrap *(Dionaea muscipula)*, popular in the wild plant trade, has virtually disappeared from the park, and the atamasco lily *(Zephyranthes atamasco)*, also popular in the wild plant trade, is declining at Congaree Swamp National Monument in South Carolina. Plant poaching most likely has resulted in the extirpation of *Cypripedium reginae*, the showy lady's-slipper, from Acadia National Park in Maine. One of several illegal timbering operations inside West Virginia's New River Gorge National River in 1993 removed 254 trees and damaged 18 others—83,000 boardfeet of hardwood timber with an estimated value of $18,000, according to Anthony Liguori, Canyon District investigator at the park. Such massive damage is made easier by the fact that

RICHARD QUATAERT

Acadia National Park's Bass Harbor Lighthouse at sunset. Tips of conifers in the park are often snipped off to make Christmas wreaths.

many parks border forest service land.

In the Northwest, trees, ferns, and edible mushrooms top the list of poached species. Some of these trees are bound for nurseries. "Most of the ornamentals are used in landscaping," said Bob Martin, acting central district manager at Shenandoah National Park. "There have been reports of hundreds of small pines being taken out of some areas, their entire root bases dug up." In Acadia National Park, the tips of balsams and pines are cut off for commercial production of holiday wreaths. In the Southwest, yuccas and cacti are the favorite target of poachers; at least 13 different species of cacti were stolen from parks in 1990 and 1991. Rangers at Organ Pipe Cactus National Monument in Arizona used to outline rare cactus plants with rocks and post their names nearby for the benefit of visitors, but they soon found empty circles of rocks. "Apparently it's better not to attract attention to a plant," says Supervisory Park Ranger Brent Pennington. "We don't do that anymore."

Plants commonly stolen from parks in the East include lady's-slipper orchids, rhododendrons, irises, and jack-in-the-pulpits. But the single species reported by the most parks as illegally collected was ginseng.

"I firmly believe that ginseng poaching is our biggest threat in the park," says John Garrison, supervisory ranger at Great Smoky Mountains National Park in Tennessee and North Carolina. "I used to think it was bear poaching, but I think ginseng is potentially higher—the plants can't run and hide."

Rangers there and at Shenandoah National Park in Virginia are finding large groups of people engaged in intensive ginseng harvesting. In nearby forest service land, groups are known to "sweep" an area, spreading out evenly in a line and taking every ginseng root in their path. Last fall, rangers in the Great Smokies confiscated two loads of more than 1,600 roots each within one week of each other, Garrison says.

"Fifteen hundred roots were taken from one group of three people out for three days," adds Janet Rock, a park botanist. "That really hits home that they can do so much damage in so short a time." Rangers sometimes try to replant confiscated ginseng, but the plants are often too damaged. If a poaching case goes to court, the roots have to be kept as evidence.

According to Garrison, ginseng is becoming less and less common in the park, and when stands are found, they are usually small and all the same age. And though Shenandoah and Great Smoky Mountains national parks are the largest areas of contiguous, fully protected ginseng habitat (ginseng can be legally harvested in North Carolina between March and September), the plant is rare at Shenandoah and scarce at Great Smoky Mountains.

DAVID CAVAGNARO

Ginseng poaching is on the rise, Garrison says, because the market value has gone up. A dry weight pound of ginseng brings a harvester $300. Like matsutake mushrooms, most of the ginseng roots are destined for Asia, where they are prized as an aphrodisiac and a treatment for inflammation, infection, and lack of vigor. American ginseng is increasingly in demand in Asia, which has been nearly stripped of wild ginseng.

Wild ginseng collecting has been a tradition in these areas for centuries. In the southern and central Appalachians, some Depression-era families were able to sustain themselves in part by digging ginseng. But the intensity and method of collecting is what is jeopardizing the species now. In the past, people dug roots only when the berries were ripe and they scattered the seeds to ensure a next generation of plants. But poachers dig immature plants and take roots out of season, before the seeds are viable.

"When you dig up a root, you've taken the plant," explains Rock. "They only propagate by seed, and the plant needs to reach maturity to produce seeds."

The method of mushroom harvest is also a prime concern in the Northwest. "If the mushrooms were taken at ground level, that would be one thing, but they're uprooted and the soil is disturbed," says Erv Gasser, natural resource specialist for the park service's northwest region.

Mushrooms are the fruit of the fungal colony, and picking in moderation does little harm. But poachers, in an attempt to get all mushrooms quickly, rake the ground, damaging the underground network of threads from which mushrooms sprout. This network of filaments, called mycelium, helps feed a forest. The strands surround and penetrate tree roots, helping them absorb nutrients. Fungi also rot treetops, creating holes that are used as homes by pileated woodpeckers, flying squirrels, and other high-rise dwellers. On the ground, mushrooms feed animals from hares to bears. Mycologists fear that forests won't be able to regenerate if overharvesting of mushrooms continues.

PAT O'HARA

In the West, cacti of all types are a draw for poachers. At Organ Pipe Cactus National Monument, top, rangers found that it was a mistake to mark rare species. An endangered relative of the hedgehog cactus, above, is found only on national park ground.

Though wide-scale collecting for commercial sale is most damaging, even incidental picking by park visitors impacts plants. Shenandoah botanist Randy Winstead discovered a large purple fringed orchid, *Platanthera grandifolia,* in the park, "and by that I mean one plant." Because the orchid is extremely rare in Virginia, he went back every few days to check on it. One day it was gone. "Apparently someone had decided it was pretty and pulled it up," he says. "As you can see, one collection can have a pretty good impact on an area."

Clearly, designating a parcel of land as a national park does not ensure that its plants and animals will be protected. Though problems like plant poaching are increasing, the number of rangers available to protect resources is declining. Over the past 20 years or so, the NPS has grown from 294 parks with 29.6 million acres to 367 parks with more than 80 million acres, yet the number of front-line rangers dropped more than 11 percent. The National Parks and Conservation Association estimates that the visitor-to-ranger ratio is more than 84,000 to 1.

When park rangers are able to catch a poacher in action, they give out fines ranging from $25 for collecting for personal consumption to $250 for commercial picking. For poachers making hundreds of dollars a day, however, an occasional fine is worth it, and some don't bother to pay at all. Many collectors are illegal immigrants, who can't be traced when they fail to show in court.

There appears to be no plan to raise these fines. Natural resource crimes are considered victimless and given low priority by an overburdened court system. Ginseng collecting in the Great Smoky Mountains National Park is an arrestable offense, Garrison says, but rangers only make an arrest if the poacher is dangerous,

DAVID CAVAGNARO

which is very rare. "There are certainly some areas in the country where courts have other priorities," concedes Tony Bonanno, NPS southwest regional chief ranger, "and there has been some frustration for people dealing with natural resources violations. The bottom line here is, are we serious about protecting our public resources?"

To make matters worse in the Northwest, many pickers carry long knives to cut mushrooms as well as guns to protect themselves and their picking turf. There have been isolated incidents of pickers threatening other pickers as well as forest service and park service rangers, and two mushroom pickers were killed a couple of years ago in Oregon. According to Blankenship, a significant number of mushroom poachers have criminal records. As a result, Crater Lake's six rangers now patrol the park's 183,000 acres in pairs. Says Gasser: "From a law enforcement standpoint, it's just a monumental effort with the staff we have."

With no increased funding to hire more rangers in the foreseeable future, the park service is hoping to involve and educate private organizations and visitors to help protect plants. "A ticket doesn't solve the problem, but a change in thinking will," Blankenship believes.

In forest service campgrounds adjacent to Crater Lake, rangers educate people on ecologically sound harvesting techniques and pass out brochures that clearly define the park as off-limits to picking. At Great Smoky Mountains, rangers make visitors aware of the problem of plant poaching and its long-term effects. "I'm a firm believer that the only way we're going to stop poaching is through education," says Garrison. "I think we're already off to a good start." In Acadia National Park, rangers are getting help through the Garden Club Federation of Maine, which is asking craftspeople to purchase common German statice for use in holiday decorations and dried flower arrangements, rather than illegally collecting sea lavender *(Limonium carolinianum)*, a wildflower that grows just above the intertidal zone. "We're learning that we don't have to just do it by ourselves," says Bonanno.

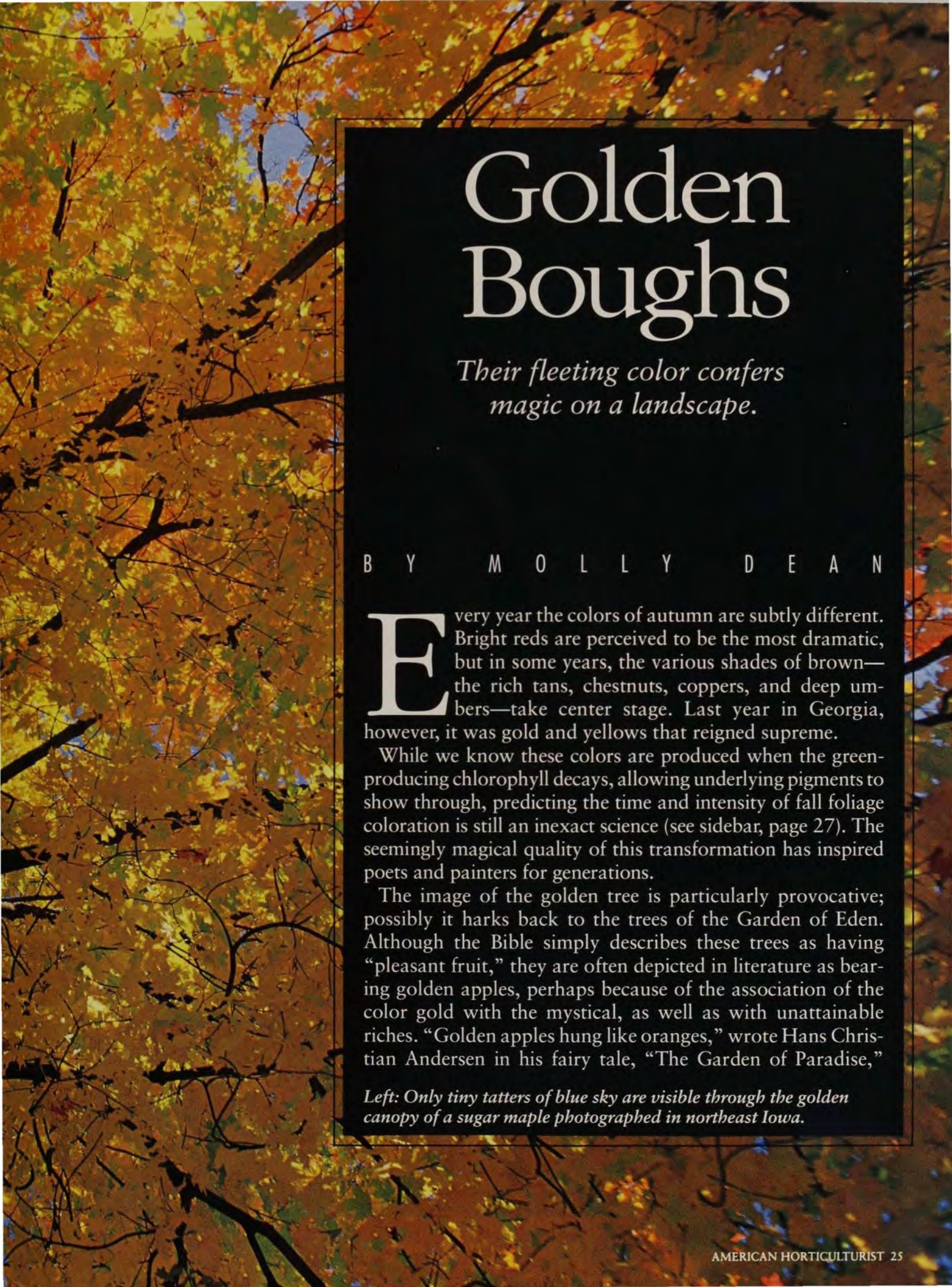
The long-term survival of native plants may depend in part on the parks' ability to protect them from poaching. "Because of all the pressures on plant populations outside of parks, park populations are even more important," says Olwell. "Species need the genetic diversity of those populations to survive. We can't afford to lose plants out of parks."

Formerly the associate editor of National Parks *magazine, Yvette La Pierre is a freelance writer and children's book author living in North Dakota.*

ROB SIMPSON

At Great Smoky Mountains National Park, top, a ranger says the collection of ginseng, above, is a greater problem for them than bear poaching. "The plants can't run and hide."

DAVID CAVAGNARO



Golden Boughs

Their fleeting color confers magic on a landscape.

BY MOLLY DEAN

Every year the colors of autumn are subtly different. Bright reds are perceived to be the most dramatic, but in some years, the various shades of brown—the rich tans, chestnuts, coppers, and deep umbers—take center stage. Last year in Georgia, however, it was gold and yellows that reigned supreme.

While we know these colors are produced when the green-producing chlorophyll decays, allowing underlying pigments to show through, predicting the time and intensity of fall foliage coloration is still an inexact science (see sidebar, page 27). The seemingly magical quality of this transformation has inspired poets and painters for generations.

The image of the golden tree is particularly provocative; possibly it harks back to the trees of the Garden of Eden. Although the Bible simply describes these trees as having "pleasant fruit," they are often depicted in literature as bearing golden apples, perhaps because of the association of the color gold with the mystical, as well as with unattainable riches. "Golden apples hung like oranges," wrote Hans Christian Andersen in his fairy tale, "The Garden of Paradise,"

Left: Only tiny tatters of blue sky are visible through the golden canopy of a sugar maple photographed in northeast Iowa.

describing the Tree of Knowledge of Good and Evil. The concept of an Eden or Paradise appears in almost every culture, and it is interesting to note that this almost always includes a cosmic tree with the power of conferring immortality. Some examples of these are the Chinese Tree of the Universe and the Norse Yggdrasil or Pillar of Heaven.

Partly as a reflection of this inherent universal image, magical trees abound in myth and literature. Consider the golden apple trees of the Hesperian Grove of Greek legend, which on earth had sweet fruit, but in the land of the gods, shone with the radiance of the stars. Then there are J. R. R. Tolkien's golden-leaved Laurelin and silver-flowering Telperion, as described in *The Silmarillion,* eldest of trees and suffused with their own inner light. These gave a radiance to the land of the Valar, who were guardians of Middle Earth, even before the appearance of sun and moon. Tolkien's tales, in fact, contain a wealth of mythic golden trees, including the hanging yellow clusters of "laurinque" blossoms that delighted the residents of the western kingdom of Numenor. In *The Fellowship of the Ring*, the hobbit Frodo and his companions encountered the beechlike, silver-barked mallorn tree, whose pale green leaves turned to gold in the autumn. These leaves did not fall, however, until after the tree bore delicate, clustered golden flowers. Only when the blossoms opened would the leaves drop, so that "through spring and summer a grove of mallorni was carpeted and roofed with gold."

It is not the golden leaves of autumn that bring the mallorn to my mind, but the midsummer flower spikes of the golden-rain tree (*Koelreuteria paniculata*). Under certain conditions, set against a gloomy sky for instance, it often seems to radiate a quality of misty golden light.

The beautiful flowers of the golden-chain tree (*Laburnum* × *watereri*), pea-shaped and dangling in racemes, resemble a golden wisteria. Its fruits, flowers, and leaves, however, all contain a dangerous poison, and it does not perform well in hot climates.

The yellow flowers of the little-leaf linden (*Tilia cordata*) appear in small, fragrant clusters and are always surrounded by bees. One group of yellow-flowered trees that many find particularly intriguing are the magnolias: 'Miss Honeybee', a cultivar of *Magnolia acuminata* var. *subcordata*, possesses clear yellow blooms with "twisted and curled" petals, and

DICK KEEN

HUES TO BLAME

Scientists are still learning about the complex chemical and physiological processes that influence fall foliage color. They do know it is related to the annual process by which deciduous trees in temperate regions store food and prepare for winter dormancy. Shorter days and cooler temperatures signal trees to stop producing chlorophylls—the green pigments that absorb energy from light via photosynthesis to manufacture food—and to begin transporting nutrients to the roots for storage. The subsequent decay of the remaining chlorophylls unveils other pigments present in the leaves.

In addition to chlorophylls, leaves contain two principal types of pigments indirectly involved in photosynthesis: carotenoids, which produce yellows and oranges; and anthocyanins, which are red-colored pigments associated with sugars and tannins. Differing quantities of these pigments produce the range of colors seen in autumn foliage.

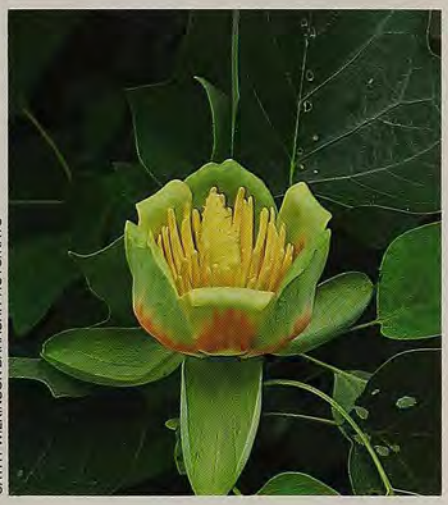
Other factors that scientists believe influence the changing colors seen in individual trees and in different years include exposure to sunlight, temperature, and atmospheric moisture levels.

"Typically a combination of warm, sunny days and cool nights tends to intensify the reaction," says Tom Blount, a supervisory ecologist at Shenandoah National Park in Luray, Virginia. Sunny days are optimum for production of sugar by foliage, while cool nights inhibit the translocation of those sugars to other parts of the tree, thus leading to a buildup of sugars and other chemicals in the foliage. Those sugars are then trapped in the leaves when scar tissue, known as the abscission layer, begins to form at the base of leaves in preparation for leaf drop. Conversely, muted foliage colors are often associated with protracted cloudy, wet conditions in fall.

Because there are so many variables involved with foliage color, predicting the quality and timing of our autumn spectacle—like predicting the weather—is still an uncertain science. "Every time I think I have it figured out I realize Mother Nature knows more than I do," says Blount. *—David Ellis*

David Ellis is assistant editor of American Horticulturist.

For information about fall foliage in national forests, beginning September 1 the U.S. Forest Service offers a toll-free Fall Color Hotline, (800) 354-4595. A recorded message provides forest-by-forest information, updated weekly.



CATHY WILKINSON BARASH: PHOTO/NATS

Golden colors aren't confined to fall foliage. The pale yellow flowers of the tulip poplar, left, and the vivid wisterialike clusters of the golden-chain tree, opposite, appear in the spring.

'Butterflies' has large, upright flowers of a golden yellow, said to resemble a flock of butterflies poised upon the branches. For creamy yellow panicles of bloom in late summer, a time when few other trees are in flower, there is the stately Chinese scholar or Japanese pagoda tree (*Sophora japonica*), whose feathery leaves turn to clear yellow in the fall.

For the quintessential "golden tree," however, we should return to autumn, with emphasis on foliage rather than flower. For rich yellow leaves, shaped uniquely like miniature fans, there is the ginkgo or maidenhair tree (*Ginkgo biloba*). This tree has the unusual characteristic of shedding its autumn leaves all at once, like a shower of golden rain. The ginkgo is a fascinating tree in its own right. Fossil records of the genus have been found and dated at 200 million years old. Once inhabiting lands filled with steamy jungles, the ginkgo nearly became extinct until revived and preserved by Buddhist monks. Dutch traders brought it to Europe in 1727, and today it is a common street tree in the United States, unusually tolerant of traffic fumes and pollution.

If I could choose only one tree for golden autumn color, it would be that tall, graceful tree of Eastern forests, the tulip poplar (*Liriodendron tulipifera*), perhaps simply because I'm used to them. The woodland belt surrounding my yard contains many poplars, all burning with a fiery brilliance at the peak of autumn. The leaves are a much richer gold than the tree's spring flowers, which are a pale yellow with a greenish hue and an orange blotch at their centers. When viewed from the ground the unusual leaves, with their two lobes and a square tip, give off a starry effect, much in the manner of maples. The tulip poplar, with its arrow-straight trunk, is the tallest deciduous tree in America, growing to 200 feet.

Another native of eastern woodlands, the sassafras (*Sassafras albidum*) does not reach those heights, growing only to about 60 feet. All my life I have heard of sassafras tea, an old-time brew made from this tree's root bark, but what I find most fascinating about the sassafras is that it has three different types of leaves: a three-lobed variety; an asymmetrical, mitten-shaped variety; and a simple boat-shaped leaf. The fall foliage color is also varied, from vivid yellow to orange and red. Walking in the woods this October, I came upon one small sassafras whose myriad patterns of clear green, bright gold, rosy orange and red, all

highlighted with sun, had the delightful effect of stained glass. Because of difficulty in transplanting, however, the sassafras is not often sold at nurseries.

Another common woodland tree renowned for its golden autumn color is the shagbark hickory (*Carya ovata*), so named because it develops a rough-textured bark that splits off into long, rounded strips. Its compound leaves change in October to a dark yellow, deepening to coppery brown.

Famous both for its brilliant autumn color and its graceful form, the maple adorns both woods and lawns all over the country. A great diversity in size, foliage, and color exists among the more than 120 species available.

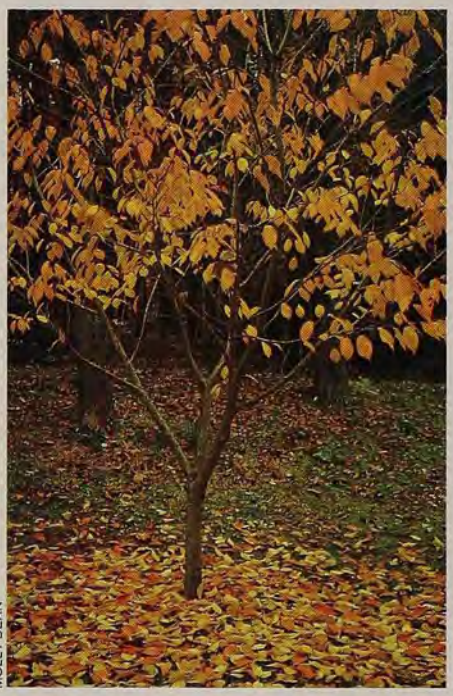
Probably the best known is the sugar maple (*Acer saccharum*), the tree most often depicted in New England scenes. Words fail to do justice to its luminous colors, which at most stages in the fall contain varying hues of gold, accented with jewel tones of red, peach, and orange. The combinations each leaf develops are amazing. Almost invariably there is a pale lemony yellow leaf, tipped or splotched with an improbable shade of red. As they fall, these starry leaves cloak the ground beneath the trees, providing an above-and-below golden effect similar to Tolkien's mallorns.

The golden color of the 'Aureum' cultivar of the maple *A. shirasawanum*, which is one of several cultivars formerly classified with *A. japonicum*, is found not in fall but in the pale yellow-green of the spring leaves. This tree's autumn foliage darkens to orange and purplish red.

It is a happy rule that many small trees, grown primarily for their fruits or spring flowers, have the added bonus of pleasing autumn color. For instance, the weeping cherry that I grow as a specimen on my lawn turns to a very delicate golden orange, almost a pale peach tint, in October. Others changing to golden hues include many other types of cherries (*Prunus* spp.), serviceberry (*Amelanchier* spp.), eastern redbud (*Cercis canadensis*), fringe tree (*Chionanthus virginicus*), yellowwood (*Cladrastis lutea*), and certain cultivars of crab apple (*Malus* spp.).

One of the main appeals of all these trees lies in their quality of change, so that they offer something different for each season. Conifers, on the other hand, are a source of constant color, and the color of those that are golden throughout the year can be intensified by complementary plantings.

While the yellow leaves of the 'Kwanzan' cherry, below, provide only an evanescent autumn carpet, the golden needles of the 'Filifera Aurea' false cypress, bottom, are a year-round source of color.



MOLLY DEAN

PAMELA HARPER

DAVID CAVAGNARO

JERRY PAVIA

GALEN GATES

Dangling like ornaments, the last golden leaves of the paper birch, left, appear to be held in the icy grip of winter; the delicate yellow flowers of the sassafras, above, herald spring. The ginkgo's fan-shaped golden leaves, top, drop almost simultaneously in autumn.

One of the yellowest is the yellow bronze-tinged ground cover, *Juniperus horizontalis* 'Mother Lode'.

Cultivars of *Chamaecyparis obtusa,* such as 'Crippsii' and 'Lutea', display golden-highlighted foliage. This is also true of 'Rainbow's End', a newly available cultivar of Alberta spruce (*Picea glauca*), said to have a luminescent butter yellow glow. This conifer is both broad and compact, usually reaching nine by five feet in 15 years.

Golden trees in nature create many memorable visual images, but their beauty is usually fleeting, whether the gold is found in foliage, fruit, or flower. A golden tree in nature is something of an illusion, since nothing in nature exactly duplicates the color of that precious metal so many have given their lives to possess. Yet the color suggests a kind of magic, a magic I experienced during my most recent autumn, filled with golden trees.

Molly Dean is a free-lance writer who lives in Clayton, Georgia.

Rustic

It took a full day to pack Aunt Bess's '58 Ford Sedan. Suitcases, linens, and groceries filled the rear trunk. A roasted turkey, complete with trimmings, nestled on top of her new portable television. Games and comic books (mine) crowded the back seat where my sister Bonnie and I settled in for the long journey up the New York State Thruway to Utica, then farther north into the Adirondack Mountains. For two weeks in August, Bess freed Mother and Dad from parenthood and plunged my brother, sister, and myself into the "wilderness" of upstate New York.

Our summer home was a log cabin, surrounded by pines that seemed as tall as the skyscrapers we left behind. Forest creatures, whose frolics ended years before with a visit to the taxidermist, peered down from the walls through eyes of glass. Tables, chairs, and cabinets appeared to grow from the floors. And why not? Craftsmen had assembled them from twigs and branches and roots, still clothed with their bark. The same was true of the rustic hickory porch chairs we rocked in each evening for two idyllic weeks, watching the sun set over Big Moose Lake.

Although I didn't know the term "rustic" at the time, the furniture I remember so well is a classic example of the craft of making simple, picturesque objects—not only indoor furniture, but fences, gates, foot-bridges, flower baskets, garden benches, gazebos, and even entire summer cottages—fashioned from unstripped tree limbs, burls, and roots. The natural shape, condition, and type of the wood dictate the design. The ingenuity, skill, and experience of the craftsman determine its quality.

Rustic adornments—so called in the title of an 1856 book by Shirley Hibbard—became popular in America in the early to middle part of the 19th century, when formal classical architecture and landscape design became inappropriate for the humbler homes and smaller land holdings of an emerging middle class.

Andrew Jackson Downing (1815-1852) was the premier American advocate of rusticity. A pioneer in landscape architecture as well as a horticulturist and pomologist, he wrote an 1841 book, *A Treatise on the Theory and Practice of Landscape Gardening Adapted to North America,* that is considered a landmark work. It adapted principles from the English "natural" school of gardening to the needs of Americans.

Simpler architecture and landscape design called for less formal ornamentation. Where marble statuary would have been called for to adorn the garden of a house built in the classical style, a rustic bower or garden seat was judged more appropriate for the garden of a rural Gothic house.

For those creative souls who enjoy a challenge, many of the designs popular in the 19th century can be successfully recreated and integrated into the naturalized garden settings currently in vogue. One of the illustrations in Downing's *Treatise* shows a covered seat with a thatched roof of straw. A lattice of irregularly shaped branches about three inches in diameter embellishes a framework of 12 posts.

Structures like this can be made from a mix of woods; excellent choices are eastern red cedar (*Juniperus virginiana*) and western red cedar (*J. occidentalis* and *J. scopulorum*), whose branches twist as they grow to form curious curves, angles, and knots. Cedar is the most durable of native woods, weathering in less than a year to a pleasing gray.

An alternative is to cover the shelter's framework with split, straight maple or larch branches, one to two inches in diameter, laid vertically. A mosaic can then be created with square panels of thin, straight hazel or birch rods nailed to the framework in an alternating horizontal and vertical pattern.

This structure can be built to surround a living tree, benefiting doubly from the support provided by the trunk and the shade created by the overhanging foliage.

If thatching the roof seems too onerous a task, omit it. An alternative is a tightly boarded roof shingled with unstripped slabs of wood; split, straight sticks about three inches in diameter; or sheets of birch bark. Another alternative is an open, natural lattice roof similar to the sides of the structure, over which vigorous vines and rambunctious creepers are allowed to weave together.

Downing's contemporary and friend, architect and artist Alexander Jackson Davis, designed rustic garden furniture for his Montgomery Place home, a Hudson River villa that operates today as a museum and public garden. He designed a series of rus-

tic seats for strategic locations along a mazy wilderness walk and an octagonal shelter in Gothic revival style, constructed from rough-hewn poles, for a perch above the river. Recently Staten Island resident Ruth Soren had Catskill Mountain craftsmen build an identical shelter of eastern red cedar, the silver arches of which frame a skyline view of Manhattan.

A similar type of covered seat—benches under a latticed arbor—was incorporated in a different type of New York scene in 1858, when Frederick Law Olmsted and Calvert Vaux were designing Central Park, a project long championed by Downing. The roughly cut poles used for such an arbor are capable of supporting vines like Dutchman's pipe (*Aristolochia durior*), trumpet vine (*Campsis radicans*), or grape cultivars, which will provide shelter from sun and even light rain. In Central Park today, *Wisteria sinensis* twines through a large rustic arbor, shielding the seats below.

An even more magical structure proposed by Downing is the moss house—a shelter that you might expect to be inhabited by wood nymphs and fairies. These are formed by collected mosses being wedged between rustic laths. A thick, carpetlike tapestry can be formed if different-colored species, like *Leucobryum glaucum* or *Hypnum* spp. are crowded together. The effect can be made even more primeval by planting ferns like ostrich, cinnamon, or royal around the foundation, or planting rockcap fern (*Polypodium virginianum*) in the moss-filled crevices so that the evergreen, leathery fronds collect dew that will then drip on the velvety moss cover.

It is likely that Downing's designs for fanciful structures like these were influenced by the thinking of a number of prominent English landscape designers and architects active in the late 18th and early 19th century. One who had a major impact on Downing's philosophy was English writer John Claudius Loudon (1783-1843), who espoused cottages with barked porches, clad with vines.

Natural bowers played a role in the meandering landscapes of English country houses as early as the 18th century. This garden style was carefully contrived to imitate nature, with the intention of presenting a glimpse into an arcadian fantasy. Paths would twist through hilly estates to open on an awe-inspiring vista, sometimes terminated by a classic statue like Apollo or Diana the huntress in a belvedere, sometimes by their opposite, a rustic hermitage. Rustic bowers were constructed where the strollers could best admire these distant prospects.

To make these viewing stations more comfortable, English cabinetmakers began

The rustic style, as reflected in the summer house and plant stand on the opposite page, had its heyday in the 19th century. Below, a rustic-style bridge spans a small creek.

COURTESY OF ROMANCING THE WOODS

Pleasures

These twiggy structures from a century ago are perfect for today's more natural gardens.

BY RICHARD R. IVERSEN

to construct outdoor furniture using pattern books and instruction manuals. Sometimes common indoor benches and even Windsor chairs were moved outdoors, but for the most part garden seats were rustic affairs made of indigenous woods and incorporating rococo and Chinese styles popular at the time.

It may seem a stretch to see the Chinese influence on rustic styles. But *A New Book of Chinese Designs,* written by Edwards and Darly in 1754, includes etchings of four chairs and a table intended for use in garden shelters and created out of outlandishly contorted tree roots. Exotic Chinoise fretwork, fashioned from straight sticks, skirts the seat, which is shaded with a pagodalike umbrella.

Rustic seats often incorporate the frivolity reminiscent of rococo, since roots and branches naturally grow into the asymmetric "S" and "C" curves that characterize that style. The grace of Thomas Chippendale would seem to have little in common with rustic furniture and ornaments, but in the third edition of his *The Gentleman and Cabinet-Maker Directory* in 1762, the furniture designer illustrates a seat and two chairs constructed from branches of trees and styled in his interpretation of rococo. Robert Manwaring carried this style further in his 1765 book, *The Cabinet and Chair-Maker's Real Friend and Companion.* It illustrates 14 designs for rustic seats, which he suggests be made with well-seasoned "Limbs of Yew, Apple or Pear Trees . . . which if properly painted will appear like Nature."

RICHARD IVERSEN

Late 19th- and early 20th-century Adirondack Mountains furniture is a rustic interpretation of the artistic reformation embodied in the work of William Morris, Charles Eastlake, and Gustav Stickley. Artisans decorated the geometric forms preferred by these designers with a mosaic of split wood—yellow birch (*Betula alleghaniensis*), paper birch (*B. papyrifera*), river birch (*B. nigra*), Atlantic white cedar (*Thuja occidentalis*), or white pine (*Pinus strobus*). Although these woods decompose rapidly outdoors, these objects brought indoors the natural beauty of the Adirondacks—and it seemed to me and my sister, also the woodland spirits that inhabit its forests.

One of the major sources of such furniture was not in the Adirondacks at all. Between 1898 and 1940 the Old Hickory Furniture company of Martinsville, Indiana, shipped full rail cars of chairs, settees, and tables into the wilderness to furnish many a hunting lodge, cabin, dining room, and porch. Its furniture-makers bent immature hickory saplings into shape on patented metal frames, and wove chair seats and backs from strips of bark that had been soaked until they were pliable.

Gardeners who lack a Hudson River villa or wilderness retreat can still add elements to their landscape that will create a picturesque setting appropriate to rustic furniture and other objects. Groves of Norway spruce (*Picea abies*) will create misty, secluded gloom where a rustic shelter can nestle. English holly (*Ilex aquifolium*), cherry laurel (*Prunus laurocerasus*), and *Rhododendron maximum* will intensify this ambiance. Rustic art can be combined

Rustic garden structures can be ornate and ornamental or simple and functional. The trellis above supports vines at Thomas Jefferson's Monticello. The summer house at left was designed by Calvert Vaux for Central Park in New York City.

PHOTOS COURTESY OF ROMANCING THE WOODS

with treelike specimens of old-fashioned peegee hydrangea (*Hydrangea paniculata* 'Grandiflora'), and picturesque perennials like bugbane (*Cimicifuga racemosa*) or *Hosta ventricosa* can roam around rustic seats, fences, and foot-bridges, sending up flowers where they want.

The simplest type of rustic adornment is probably one of several types of basket that can be woven of willow branches or grape vines. One illustrated in *The Gardener's Magazine* of 1834 rests upon a tripod fashioned from three gnarled and knotted, unstripped branches, about two inches in diameter, of oak, apple, or elm. The actual plant receptacle is an old, octagonal oak bucket, but it has been rusticated with a mosaic of split sticks of various lengths and sizes and barks of different colors. Inside, wispy *Pelargonium* and *Fuchsia* are planted with climbing *Asarina lophospermum* and *A. barclaiana* and trailing *Lysimachia nummularia*.

Of course, if your home is symmetric in design—say Georgian, federal, or Greek revival in style—you might want to consider garden accouterments that are formal and architectural in shape, constructed of stone or painted wood. But for homes ranging from Victorian Gothic to modern Tudor to a summer cottage, and for gardens where the influence of nature predominates over that of humans, rustic adornments are the perfect romantic—and sometimes practical—complement.

Richard Iversen, a garden designer, garden historian, and collector of works on 19th-century furniture, is currently a senior lecturer in tropical horticulture at the University of the West Indies in Barbados.

Re-creations of historic designs are available from Romancing the Woods, 33 Raycliffe Drive, Woodstock, NY 12498, (914) 246-6976.

Marvin Davis built the gazebo above for his property on a promontory in Woodstock, New York, then founded a business with cabinetmaker Bob O'Leary to produce other garden structures, like the bench at right.

DAVID CAVAGNARO

Penstemon Heaven

In the infernal West, these natives are a blessing.

BY ROBERT NOLD

A revolution is brewing in American horticulture. Gardeners in dry regions who wish to stop desecrating their environment with excessive water, fertilizers, and pesticides are rejecting traditional methods and, in the bargain, finding new plants and new means of expression in their landscapes. That you can have a beautiful garden in areas previously considered inferior and even impossible, without performing ritualistic compensatory practices with soil amendments and the garden hose, makes this a pretty exciting concept for those of us in semiarid parts of the western United States.

The revolution is not occurring overnight. Western gardeners are innately conservative, and there are considerable pressures on homeowners to maintain conformity. In the suburbs of Denver, for example, covenants are in place to force homeowners into line with standardized concepts of what a yard should look like: neatly manicured and massively irrigated lawns, foundation plantings (primarily consisting of the same plants concealing foundations in Minnesota, Virginia, and Maine), and extensive chemical programs to help support these artificial paradises. All this, of course, in a city that gets less than 15 inches of precipitation a year.

This obsession with lawns and lush greenery may eventually meet its belated end as a result of legislation, increased water prices, or heightened awareness of the environmental consequences of these practices. But perhaps, after the humiliation of having tried to grow rhododendrons in alkaline soils, long misguided gardeners will come to see the beauty of more natural gardens—sans chemicals, complaining, or imploring rain gods who never listen. Here, in this utopia, penstemons will come into their own.

The genus *Penstemon* (in the family Scrophulariaceae) is a fairly large group of about 270 species that performs best, for a change, not in the East or Pacific Northwest, but in Colorado, Utah, Wyoming, New Mexico, and all those other "hopeless" states. The reason is simple: Most are native west of the 100th meridian in the United States and down into Mexico.

Depending on which author you consult, penstemons are divided into five subgenera that are irregularly divided into 12 sections, themselves irregularly divided into 22 subsections. More observant gardeners than I can probably tell which sub-

Dry-region gardeners can mend their watering ways and still be the envy of the neighbors with a garden full of penstemons, such as lilac-flowered* Penstemon grandiflorus, *opposite.

A WORD ABOUT HARDINESS

Denver is situated at the extreme western edge of the Great Plains, where the Rocky Mountains rise abruptly (almost two miles within less than 20 miles from the farthest western suburbs). The city, in other words, lies in the rain shadow of the Rockies, itself a relatively dry mountain range. Annual precipitation is about 13 inches, spread throughout the year, although autumn and winter are markedly drier than spring and summer. Precipitation from October to early April is exclusively snow, but because the city's elevation gives it high light intensity, constant snow cover is rare, except in shaded areas such as the north side of buildings. Winter lows sometime descend to minus 25 degrees, albeit for short periods, firmly placing the city in USDA Hardiness Zone 4.

Many plants rated to Zone 4 or colder do quite poorly in Denver, however, because of the hot winter sun, frequent hurricane-force winds sliding down the foothills, violently fluctuating temperatures (sometimes as much as 90 degrees in a 48-hour period), and generally very dry conditions. Many conifers typically grown in equally cold eastern gardens burn to a crisp here, and the widely planted 'P.J.M.' rhododendron, which Denver gardeners attempt to grow in peat beds, is not hardy except in the most protected locations.

On the other hand, many plants from sunny climates have proven hardy beyond the wildest dreams of the most rabid plant fanatics. *Zauschneria* (California fuchsia) is a good example. Its species, listed as hardy only to zero degrees (USDA Zone 7), have proven perfectly hardy to at least 27 degrees below zero—in dry soil—in Denver, provided they are planted in early spring so that their roots can gain a firm hold in the native soil.

The reputation for tenderness of penstemons in general most likely derived from their being grown in climates with winter rainfall. Excess moisture at the crown or roots of most plants used to being dry in winter usually proves fatal in short order.

Most serious gardeners in the drier areas of the western United States tend to dismiss USDA hardiness zone ratings as climatocentric—useful only for gardeners in regions of regular rainfall of 20 inches a year or more, probably because this is where most garden writers, nurseries, and, alas, gardeners, tend to be. —*Robert Nold*

ANN BARTLETT

The yellow staminodes of Penstemon eriantherus, *above, contrast sharply with the plant's vivid purple flowers.*

section is which simply by glancing at a plant. But the names of the sections seem to change every time someone writes something about penstemons, so I feel fairly safe in generalizing.

All penstemons have a fairly strong family resemblance in flower shape—an either tubby or elongated snapdragonlike flower, with four stamens and a sterile fifth stamen, or staminode. (The fact that this part of their anatomy is frequently fuzzy inspired the somewhat unpleasant nickname, "beard-tongue.") The genus name was originally spelled "pentstemon," stemming from the Greek word for five. Other authors suggest that the "pen" derives from the Latin *paene,* meaning almost, and referring to "almost a stamen." Both make sense, so take your pick.

The "sharkshead" flowers of section Elmigera are readily recognizable and include a few of the more well-known penstemon species, such as *P. barbatus* and *P. eatonii.* The section Habroanthus (or Glabri) contains some of the most glorious, intense blues of the flower kingdom. Section Aurator (or Cristati) plants are set apart by their golden staminodes, which are less memorable than their relatively large, sometimes gaping flowers on comparatively tiny stems. The "heather" penstemons of section Ericopsis are mostly very low mat- or tuft-forming plants suitable for dry rock gardens.

Penstemons have long been familiar to rock gardeners, although their attentions have largely been on the "shrubby" penstemons in the subgenus Dasanthera from the Pacific Northwest. Usually growing less than a foot tall, these are thick-leaved, semiwoody-stemmed evergreens, such as *P. rupicola, P. fruticosus,* and *P. newberryi.* Given enough sun and a moderate amount of moisture, these are among the showiest of rock garden plants, smothering the foliage with flowers.

As is so often the case, the English have been growing these American natives for over a century, although their interests have tended toward species and hybrids more amenable to their damp climate, namely tender hybrids of Mexican species, sometimes crossed with *P. cobaea* from the American Midwest—writer Reginald Farrer's "gorgeous garden fatties." These "enormous bloated bells of dim and washed-out lilac" (Farrer again), when crossed with the bright colors and four- to six-foot stature of such species as *P. hartwegii, P. gentianoides, P. campanulatus,* and *P. isophyllus* (or these Mexican species crossed with themselves), created the penstemons most commonly grown in Britain—hybrids whose relationship to penstemons in general is similar to the relationship of modern hybrid tea roses to wild species roses, with similar differences in constitution.

Because both rock gardening and English gardening have taken place under relatively similar conditions of abundant rainfall, high humidity, acid soils, and comparatively little sunlight, the resulting garden writing about penstemons gives the impression that penstemons are shy-flowering, short-lived, difficult, and tender—all of which are rarely the case.

The majority of penstemons prefer dry, alkaline soil, low humidity, and full sun. A number of species, just as tall and fat-blooming as the hybrids grown in England, are suitable to the dry, sunny border, or can be grown in drifts in a more naturalistic setting. Some of these are *P. strictus,* with masses of large blue-purple flowers in early June; *P. barbatus,* which sports red sharkshead flowers in late June, and its pale yellow-flowered cultivar 'Schooley's

Yellow'; *P. pseudospectabilis,* producing brilliant pink flowers against beautiful blue-green foliage; the brilliant blue *P. cyananthus*; the "desert snapdragon" *P. palmeri,* with large white to pink, heavily fragrant flowers; blue *P. glaber*; dark red *P. cardinalis,* flowering from late June until frost; *P. clutei,* electric pink with sky blue foliage (whoever said nature arranges colors tastefully?); *P. alamosensis,* contrasting its orange flowers against blue gray foliage; *P. eatonii,* whose bright red flowers appear in early May; and *P. grandiflorus,* with relatively huge pink flowers, and its ravishing white variety, 'Prairie Snow'. All of these put on a very impressive show in their blooming season, stopping traffic, astonishing suburbanites, wooing hummingbirds, and making their growers exceedingly self-satisfied.

Gardeners in milder parts of the Southwest and California can also grow the English hybrids, of course (their drier winters possibly extending the lives of the plants to some degree), and the few dozen Mexican species. (The northern Mexican *P. kunthii* is mysteriously hardy—to minus 27 degrees—in Denver, so perhaps there are more of these species that could be tried here.) There are also seven beautiful woody penstemons native to California—now sensibly arranged in their own genus, *Keckiella*—mostly two to six feet tall, although there is one, *K. cordifolia,* described as a vining shrub less than two feet tall.

Not all penstemons are big and blowzy, and some less than a foot tall are very appropriate in the dry garden. *Penstemon nitidus,* with its unbelievable incandescent blue flowers—from even bluer buds—demands very dry conditions, as does the voluptuous *P. eriantherus,* which has huge, gaping, lilac-colored flowers. The species name of *P. arenicola* is from the Latin word for "a dweller on sand," but it doesn't need sand to show off its blue beauty. *P. angustifolius* not only relishes alkalinity but also rewards those hapless gardeners struggling against hard clay soil when it produces its spires of sky blue blossoms. Rich pink *P. secundiflorus,* white-flowering *P. albidus,* and *P. humilis*—as blue as any gentian—all are desirable additions to dry gardens.

How low do they go? *P. caespitosus* is a loose mat half an inch tall with blue flow-

Broiling sun? Alkaline soil? No problem for the brilliant pink-flowered **Penstemon pseudospectabilis,** ***below, or*** **P. angustifolius,** ***above, which sports blue and purple blossoms.***

PHOTOS BY DICK AND ANN BARTLETT

ROB SIMPSON

GALEN GATES

The cultivar name of 'Husker Red', above, was inspired by its reddish purple foliage. It actually bears a white flower. Penstemon barbatus *is available with its original red flowers, top, or as a spectacular yellow-flowered cultivar, 'Schooley's Yellow', right.*

ers. While the species has needlelike foliage, a cultivar, 'Claude Barr', has tiny oval leaves and forms, over a few years, a gnarled, absolutely prostrate bonsailike trunk. *P. teucrioides* is slightly taller, with a display in May that has to be seen to be believed—a two-foot-wide pool of blue with no visible foliage.

Penstemons are of easy culture. All you have to do is dig a hole, plant the penstemon, water it regularly the first year, and stand back. No fertilization is necessary.

One of the most controversial aspects of dry, or xeriscape, gardening is the subject of soil preparation. Many writers—none of whom apparently have ever grown dryland plants—suggest extensive soil amendments as the principal means of conserving moisture in dry soils. This is wrong. Soil amendments are for vegetable gardeners.

DICK BARTLETT

The principal means of moisture conservation is to select plants that don't require supplemental irrigation and can withstand the intense sunlight of the southwestern uplands without hiding under the shade of trees planted for that purpose. This is wrenching for many gardeners, faced with abandoning the tried and true, but good gardening really demands this approach.

Except in very sandy soils, where the addition of some rotted manure may be beneficial, the ordinary, awful, rock-hard clay soils typical of the dry West need only be spaded up in winter to allow the natural heaving and ho-ing of frost to break them up. This doesn't mean that the soil will become even remotely fluffy. The soil in my front garden, which hasn't been irrigated in seven years, is still bricklike in consistency. Yet it grows penstemons and other plants quite well. After all, you don't find wild penstemons growing in rich bottomlands or in soils containing fine compost added over several decades by some dedicated naturalist.

The peaty soilless mix used in most potted plants can be detrimental to the new growth of penstemons, especially in very dry soil. I often find it beneficial to wash off as much of this mix as possible and to transplant the practically bare-rooted penstemon directly in the native soil. Otherwise, the organic mix around the roots will dry out in a few hours and the plant will die.

Drainage, as in the phrase "well-drained soil," is not a consideration. Plain clay soil will hold just enough moisture to keep most penstemons happy for years. As for drainage, in my garden, with 12 inches of annual precipitation, drainage isn't something we think about very much. If the dryland garden is situated next to a typical lawn (an unfortunate combination and very embarrassing to the lawn owners, who have nothing to look at for all their troubles but an unvarying expanse of green), it might be appropriate to till in some pea gravel to drain away the inevitable excess moisture from the lawn.

A number of plants serve as excellent companions to penstemons in the dry perennial garden, the most obvious being cacti, many of which share the same habitat in nature. A few xerophytic perennials that would go well with the larger penstemons might include the magenta-flowered desert four-o'clock, *Mirabilis multiflora*; the desert morning glory, *Ipomoea leptophylla*, with its huge purple trumpets; various species of *Zauschneria* in red, white, and pink; the yellow daisy, *Hymenoxys scaposa*; the immense gray-leaved, orange-flowered *Sphaeralcea incana*; the white powder puffs of *Eriogonum niveum* and *E. corymbosum;* and, of course, snapdragons—short-lived perennials that self-sow in my dry garden.

Some xerophytic shrubs that consort well with penstemons and have proven cold hardy are the ravishing blue-leaved evergreen Oregon grapes, *Mahonia fremontii* and *M. haematocarpa*; the cliff rose, *Purshia stansburia* (*Cowania mexicana*); the silverberry, *Elaeagnus commutata* (I call it the silver-suckering siren, because I wanted it in my garden for a long time and when I finally got one it sent up suckers all over the place); oaks like *Quercus gambellii* and *Q. turbinella*; the desert willow *Chilopsis linearis* (not a willow, but related to catalpa and trumpet vine); and

BRED IN THE USA

Eastern gardeners who are lusting after penstemons as the result of Robert Nold's article can take heart: there are a few that will prosper in more acidic soils, according to Dale Lindgren, horticulturist at the University of Nebraska and developer of several well-known cultivars. In fact, one of the goals of the breeding program at the university's West Central Research and Extension Center at North Platte is to develop penstemons that are adaptable to a wider range of conditions.

Penstemon digitalis is found naturally as far east and north as Maine, and through the central United States as far south as Texas. It was the parent for Lindgren's 'Husker Red', named in honor of his university's nickname and the penstemon's burgundy-colored foliage—the flowers are white. "It's grown throughout the Midwest and East Coast," says Lindgren, noting that a major nursery based in Michigan sold 30,000 plants of 'Husker Red' last year. (Nold says the cultivar was too thirsty for his garden "and died a horrible death.")

A species that is adaptable to both cold and acidic soils, being native from Maine to Virginia and west to Wisconsin, is *P. hirsutus,* which has violet flowers.

English hybrids have been the most easily available to eastern gardeners, but while Lindgren finds them outstanding in a number of ways, he notes that some become tall enough to require staking or can't be relied on to survive American winters. He would like to draw on their germplasm for beautiful flowers, but wants plants that are more compact and cold-hardy. Similarly, he would like to combine the long-flowering nature of Mexican species with other species that can tolerate a more bracing chill factor.

But beauty and weather resistance still aren't enough. Penstemons native to the West and Midwest, he says, succumb easily to mildew, leaf spot, and root rots in the humid, rainy East. "That's why we're trying to develop plants that also have disease tolerance."

Other Lindgren introductions are 'Schooley's Yellow', a selection of the normally red *P. barbatus* from New Mexico; 'Prairie Snow', a white version of *P. grandiflorus,* a normally lavender-colored native of our central states; and most recently, 'Prairie Splendor', a seed-propagated line selected for its large flowers of white, pink, lavender, and rose. Its foliage is evergreen, and it blooms in Nebraska for four weeks, beginning in early June. The increased use of tissue culture is making vegetatively propagated American hybrids more widely available, as well. —*Kathleen Fisher*

Kathleen Fisher is editor of American Horticulturist.

DICK BARTLETT

The usually bearded, modified stamen of penstemons has given them the common name "beard-tongue." This staminode is especially prominent in some, like this Penstemon secundiflorus.

the Apache-plume, *Fallugia paradoxa*, among others.

Penstemons are more or less easy from seed if you're patient. Some, I admit, are impossible, but for most, the simplest thing to do is to sow the seeds in pots outdoors in January with a mulch of fine gravel. Germination will usually follow in mid-spring, although it can take a year. There is some evidence, contrary to conventional wisdom, that year-old seed has a superior germination rate, but in any event, happy penstemons will seed themselves about, ultimately producing fine colonies.

Penstemons have few diseases. The worst is probably pittosporum pit scale, which shows up first as a swelling at the internodes, then as twisted and contorted foliage and stems. As far as I know, no one has found a way to combat this effectively, although a dormant oil spray in late winter might be helpful. The easiest way to avoid this disease is to look gift penstemons closely in the mouth, so to speak, and to grow your own from seed. The worst pest in our garden is the giant flea beetle, whose disgusting pink maggotlike larvae will devour a penstemon in two days. Pyrethrin kills them, but you can also pick them off and squish them with your fingers, uttering a horrible cry of revenge as you do so.

Although penstemons are herbaceous plants, a few species have attractive winter foliage as well. None are completely deciduous in Denver. People tend to think of the West as being snow covered in winter, which is certainly true of land above 7,000 to 8,000 feet. But Denver typically enjoys relatively warm, sunny, barren winters (although it can drop from mild to minus 25 degrees in a matter of hours), so the rosettes of some penstemons are a definite plus in the winter garden. The leaves of *Penstemon pseudospectabilis*, for instance, become deep blue-green with purple undersides. The toothed foliage of *P. palmeri* becomes almost sky blue after a few cold spells, and other species turn glossy burgundy, purple, or green.

With a garden full of penstemons, there is something to look at any time of year, even if you live where rain is just a four-letter word.

Robert Nold, his wife, two border collies and a cat, live in the extreme western suburbs of Denver with 2,000 species of more or less living plants, including a large alpine collection, traditional perennial weeds, and six tomato plants.

SOURCES

Membership in the American Penstemon Society is $10, which includes a quarterly publication and a seed exchange. For more information write Ann Bartlett, Secretary, 1569 South Holland Court, Lakewood, CO 80232.

Plants

Although Robert Nold advises against accepting gifts of penstemon plants that might harbor pittosporum pit scale, he has found that mail-order nurseries have a good track record of selling only healthy plants.

Canyon Creek Nursery, 3527 Dry Creek Road, Oroville, CA 95965. Catalog $2. Gorgeous garden "fatties."

Laporte Avenue Nursery, 1950 Laporte Avenue, Fort Collins, CO 80521. Catalog $1. Penstemons for rock gardens and dry gardens.

Plants of the Southwest, Agua Fria, Route 6, Box 11A, Santa Fe, NM 87505. Catalog $1.50. Large penstemons for the dry border or naturalistic garden.

Prairie Nursery, P.O. Box 306, Westfield, WI 53964. Catalog $3. Large penstemons for a "prairie" (i.e., dry but not bone-dry) garden.

Siskiyou Rare Plant Nursery, 2825 Cummings Road, Medford, OR 97501. Catalog $2. Mostly "shrubbies" from subgenus Dasanthera.

Seed

Alplains, 32315 Pine Crest Court, Kiowa, CO 80117. Catalog $1. Twenty-five kinds in the last catalog.

Jim and Jenny Archibald, "Bryn Collen," Ffostrasol, Llandysul, Dyfed, SA44 5SB, Wales, United Kingdom. Catalog $2. Wild varieties collected from the western United States are often listed; many rare and choice varieties.

Northwest Native Seed, 915 Davis Place South, Seattle, WA 98144. Catalog $1. Shrubbies, alpines, drylanders. About 110 kinds listed.

Rocky Mountain Rare Plants, P.O. Box 200483, Denver, CO 80220-0483. Catalog $1. Emphasis on penstemons suitable for rock gardening. Ships November 1 to March 1.

Southwestern Native Seeds, Box 50503, Tucson, AZ 87503. Catalog $1. Penstemons from Arizona, California, Colorado, Idaho, Montana, New Mexico, Utah, Wyoming, and Mexico.

Eureka!

In need of a dream, an Arkansas couple found it in a fledgling, for-profit botanical garden.

BY ART ODE

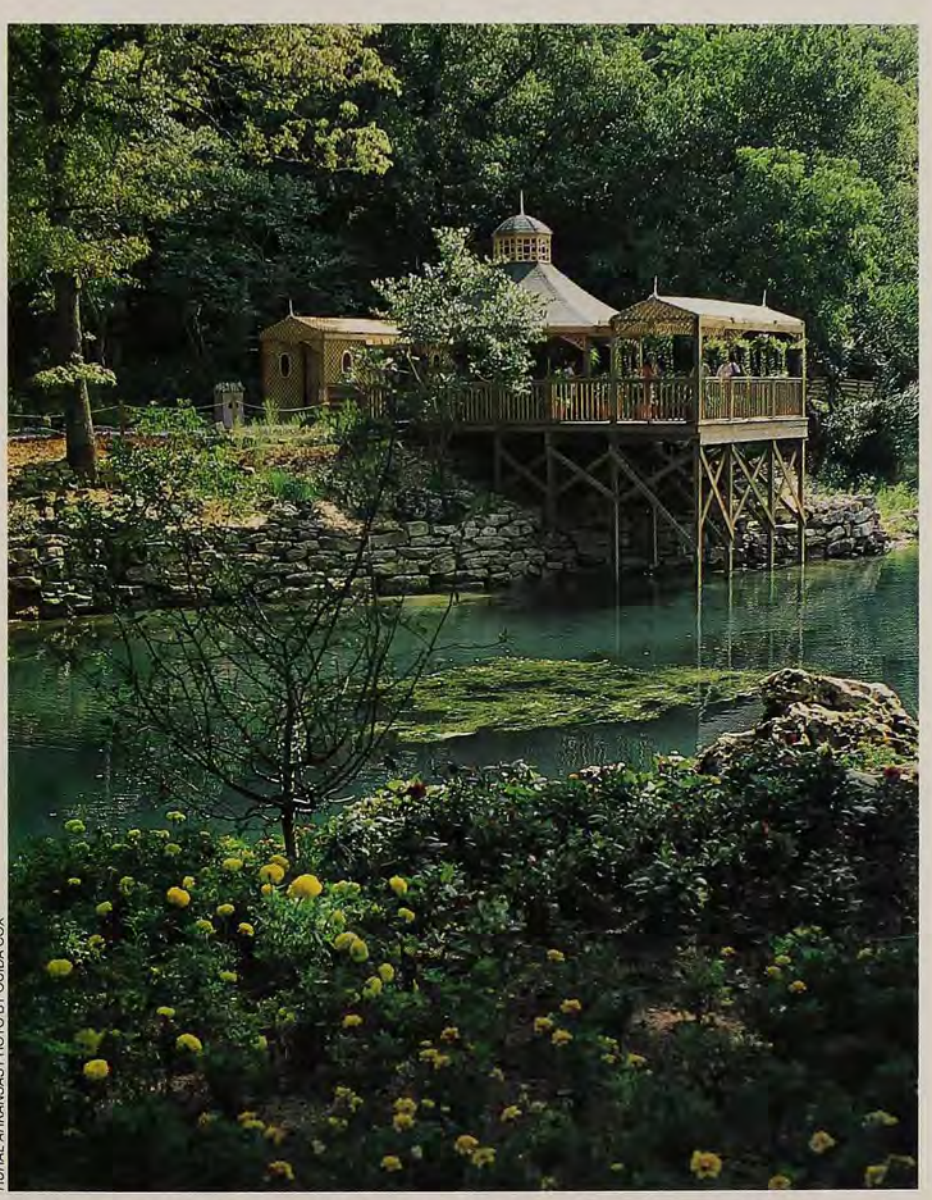
A botanical garden operated for profit. Does such a notion border on blasphemy?

My dog-eared Webster's simply states that a botanical garden is "a place where collections of living and preserved plants and trees are kept and exhibited." The bylaws of the American Association of Botanical Gardens and Arboreta cannily resist the temptation to define botanical garden, although they allude to "display, study, and conservation of plants for public benefit." No mention of money. Nevertheless, virtually all botanical gardens are nonprofit, legally tax-exempt organizations.

I would chuck the matter as an exercise in semantics were it not for Eureka Springs Gardens in northwest Arkansas. Here is a mutant strain of botanical garden that, instead of putting its roots into the rich humus of the taxpayers' pockets and imbibing the fertilizer of philanthropy, has germinated on hostile entrepreneurial shale. Its owners, Steve and Kathy Chyrchel, expect it to thrive on the sunshine and showers of fickle tourism, and need to turn a profit to repay $1.7 million in loans.

I first visited the spot in the fall of 1990, drawn by a combination of curiosity and the promise of a free dinner with old botanical garden friends. The Chyrchels had invited a half dozen of us to brainstorm the idea of creating a public garden in the Ozarks about 50 miles due south of Branson, Missouri, that booming mecca of country music.

We concluded that the area was near enough the demographically correct tourist base of mid- to upper-income women mid-



RURAL ARKANSAS PHOTO BY OUIDA COX

Visitors to Eureka Springs Gardens can relax on this pavilion or feed the trout that populate the lagoon below.

dle-aged and older (and a smattering of not-yet-deceased males and yuppie families). We opined that a place of beauty, tranquility, and knowledge should offer as much opportunity for monetary profit as hillbilly bands, although probably not as much as a casino—none of us thought our civilization had progressed to that level.

Jocularity aside, all of us were struck by the natural beauty of the area and the microclimates that made it suitable for various types of gardens and plant collections. One of those at this summit meeting was Carl Totemeier, who had recently retired as vice president of the New York Botanical Garden to start an apple orchard in nearby Fayetteville. "In my 25 years' experience," he said, "I think this site has the most potential of any I have ever seen for a beginning garden."

The northwest corner of the Ozarks is indeed beautiful, with mini-mountains clothed in oaks and hickories and lakes both man-made and natural glinting silver in the sun. The crimson oaks make it beautiful in fall, but it is equally beautiful in spring, when the hillsides are resplendent with drifts of white-flowering dogwood, blushing redbuds, and glimpses of native rhododendrons, azaleas, and mountain laurels blooming among the understory of pawpaw, chinquapins, and ferns.

It is also one of the oldest tourist destinations in the nation, going back to the days of "taking the waters" in the numerous springs for reasons both medicinal and social. Eureka Springs, the largest town (population about 2,000) in the region, is a fantastic Victorian village and spa, replete with painted-lady gingerbread houses and a grand old hotel perched on a mountain like a castle on the Rhine. Since the Civil War, this combination of natural beauty and health mecca has attracted not only tourists but also a never-ending stream of gamblers, evangelists, healers, palm readers, theatrical troupes, musicians, utopians, and fortune-seekers.

The Chyrchels are no hucksters. Since 1969 they have owned the property six miles east of Eureka Springs on which Blue Spring—a giant bubbling cauldron of azure water—pumps out of an underground Ozarkian river. Steve Chyrchel was attracted to the spot 23 years ago, shortly after he had graduated from Elmhurst College in Elmhurst, Illinois, with a degree in business administration. He and Kathy bought and renovated the park and picnic grounds, which had been closed for years, and worked up the attendance to around 10,000 a year. But they began to feel that they were just running in place, without any new ideas or any dreams.

BILL NYSTROM

Chyrchel will readily tell you he knew little about public gardens before he experienced an epiphany of sorts in the summer of 1987. A visitor approached him as he was picking up trash from the picnic grounds and suggested that Blue Spring would be an ideal site for a botanical garden.

After some reflection, cooling off in the shade, he recalled that his sister, with no more background in the subject than he or Kathy, had suggested the same thing back in 1970. So had a local museum curator several years after that. How could all of these people with no horticultural backgrounds be drawn to the same, somewhat unorthodox conclusion?

In the Chyrchels' 26 years of marriage their gardening had been limited to one abortive attempt at growing vegetables. Yet it was their appreciation for natural beauty that brought them to this place. Steve had always had an affinity for native wildflowers, Kathy for rhododendrons and azaleas. Both were avid environmentalists. He recalled an occupational test he had taken in high school in which the city boy's suitability for one particular calling—"farmer"—went off the charts. Not "gardener" or "horticulturist," but perhaps it was close enough.

The Chyrchels decided it was time for a change—a change that would preserve and enhance this beautiful 250 acres. But would a botanical garden work? Would the tourists come? How much would it cost, and would they go broke in the process?

Over the next five years, the couple spent more than $30,000 of their hard-earned money visiting public gardens across the continent. They sent a detailed questionnaire to 92 North American gardens, over half of which responded. "That's when I realized how really helpful and nice the people in the botanical garden field are," he says.

COURTESY OF STEVE CHYRCHEL

Top: Touring the garden site at a 1990 brainstorming session are, from left, Steve Chyrchel, Charles Lewis, Carl Totemeier, and Art Ode. Above: An Arkansas-shaped sculpture honors native son Bill Clinton.

One of those who responded was Totemeier. "The site is a gardener's dream," he says. "Its woodland, meadow, hillsides, rock outcroppings, proximity to the White River and Blue Spring lend themselves to the development of a variety of garden settings that should prove fascinating to visitors. There are people on Long Island who would kill for that site."

PHOTOS COURTESY OF STEVE CHYRCHEL

A focal point of the garden is Blue Spring, now surrounded by pink landscape roses (top), and shown during relandscaping (above). The garden owners will have to repay $1.7 million in construction costs.

Totemeier, who agreed to be horticultural advisor to the project, convened the fall 1990 brainstorming meeting where I saw Eureka Springs for the first time. Among those also invited were Donald Buma, executive director of Botanica, the Wichita Gardens, in Kansas; Jeff Dickinson, then an environmental scientist with the Meadowcreek Project in Fox, Arkansas, and now at the Ohio State University; Kris Jarantowski of the Chicago Botanic Garden; Charles Lewis of Morton Arboretum; Barry Yinger, formerly of the U.S. National Arboretum and then affiliated with the Somerset County Parks in New Jersey; and Al Einert, a landscape architect and a professor of horticulture at the Fayetteville campus of the University of Arkansas. We all agreed that it was a great spot for a garden. Only one piece of the puzzle was missing: the estimated $1.5-million construction cost.

Their spirits buoyed by our enthusiasm and moral support, the Chyrchels went to the Bank of Eureka Springs for a $955,000 loan for the first phase of garden construction. The bank approached the Small Business Administration (SBA) for a $750,000 loan guarantee, but met with some reluctance since "gardens don't make good collateral." The bank's directors, which fortunately include some garden enthusiasts, finally prevailed with the SBA, and the first loan was obtained in 1992. The project immediately ran into site problems, including unstable ground, and the bank increased its loan to its maximum of $1.3 million. The Chyrchels then obtained an additional $300,000 from the First Eureka Springs Bank. Construction began in 1992, but bad weather caused the loss of two months' construction time. Instead of opening in April 1993, as planned, the garden didn't open until Memorial Day weekend. The Chyrchels were forced to go to the well one more time for a loan of $120,000 to cover the loss of projected income.

Steve Chyrchel is the first to caution that Eureka Springs is a fledgling garden with many rough edges. Even the first phase is incomplete, with annuals filling space to be replaced by more permanent plantings and many woody ornamentals yet to become established.

To fully appreciate this garden site, visitors should stop en route at "Inspiration Point," high on a bluff overlooking Blue Spring and the 250-acre property, on an oxbow of the White River. The land falls away in a series of cliffs, with the spring hidden from view in a deep crevasse.

After winding down the mini-mountain, visitors drive through the garden gateway to the parking lot. At the entrance plaza are a theater showing a film on the history of the region, a gift shop, and a garden honoring native son Bill Clinton.

The site's topography is one of its greatest assets and one of the Chyrchels' greatest challenges. From the entrance plaza, stairs descend a ravine to a large lagoon—actually a dam-created pond that in the 19th century powered a succession of mills. Those mills are long gone, but an old hydraulic ram that once pumped water out of Blue Spring is on display, and an updated version pumps water over a mill wheel and into a series of pools.

Those wanting or needing less of a physical challenge can take an alternative route on a gently sloping switchback that consists of a series of ramps and decks. For others this is the recommended return route.

The steps down the ravine provide two resting points with dogwood-shaded benches. Ground covers and annuals take advantage of the southern exposure; shadier spots are filled with impatiens and wax begonias. At the bottom, a Victorian pavilion perched out over the lagoon is a pleasant spot from which to look up the ravine to the surging waters of Blue Spring, which is enclosed by a stone wall surrounded by hundreds of low-maintenance pink Meidiland shrub roses. Suspended from the roof of the pavilion are baskets of cascading petunias, browalias, and ferns.

The lagoon, filled with clear, cold water from the spring, is home to thousands of the largest trout imaginable. To see them the visitor has to throw a handful of pellets—available from a strategically placed vending machine—onto its placid surface. Immediately the water will boil with trout, many jumping out of the water in their frenzy.

South of Blue Spring, which has been sounded to 510 feet, are wildflower gardens where visitors can see some four dozen prairie species from the vantage point of another large pavilion. A bit farther is the meadow garden, intended to suggest practical ways of using prairie plants at home.

A path along the lagoon, recently

COURTESY OF STEVE CHYRCHEL

This past season, the gardens staff planted 18,000 annuals, 16,500 bulbs, and 6,000 chrysanthemums. Annuals are gradually being replaced by more permanent collections.

planted with azaleas and rhododendrons, crosses the dam over a foot-bridge. Nearby is an overhanging bluff, where a sign explains that the site was long a campground for Native Americans. Artifacts have been found dating back to 8000 B.C. Members of the Cherokee Nation stopped here during their forced removal on the "Trail of Tears" to Oklahoma Territory in the winter of 1838-39, when 4,000 of them—one-quarter of their population—died.

To the west of the dam formal plantings end as the return route passes under the bluff on the way to a woodland garden, where dogwoods, redbuds, native azaleas and rhododendrons are shaded by oaks, sweet gums, pawpaws, amur maples, and birches. The area has recently been naturalized with bulbs, and native cedars replaced with more unusual conifers. Shortly before the path begins ascending is a new rock garden, where the Chyrchels have taken advantage of rubble left by Mother Nature to show off a collection of heaths, heathers, and other plants. The gently sloping switchback is planted with shade-loving ground covers, perennials, shrubs, and trees chosen for year-round interest.

The Chyrchels' formal plant collections now include rhododendrons, witch-hazels, viburnums, hollies, heaths and heathers, *Pieris,* hostas, old-fashioned and shrub roses, irises, daylilies, and ferns. More than 28,000 plants, representing some 2,250 genera and 575 species and varieties, exclusive of indigenous plants, are now in the ground. This past season, the six-person horticulture staff planted 18,000 annuals, 16,500 bulbs, and 6,000 fall-blooming chrysanthemums. The team is managed by John Folker, formerly owner of a landscape management firm in Kansas City, Missouri.

Chyrchel has found that his visitors truly want to be educated. They have asked for more labels on plants, which he is doing his best to provide. He has instituted a series of lectures on topics ranging from integrated pest management to daffodils, bringing in experts from around the country. Phase II of garden construction, which will begin soon, will include a "solar" garden apropos of the Chyrchels' commitment to the environment, where solar-powered pumps will feed water from the spring along narrow ravines to waterfalls.

Indigenous plants will be emphasized where appropriate. For instance, signs will identify those that thrive in particular microclimates throughout the gardens. Chyrchel also plans to experiment with plants not normally grown in Arkansas but known to tolerate similar extremes of heat, cold, and drought. "I realize that not all of them will prove adaptable," he says. "But over the next several years a collection will take shape that will not only be attractive to visitors and adapted to the site, but will provide the people of the region with a previously unavailable living encyclopedia of plants that can be expected to do well in their own gardens."

Phase II will also include a wedding garden for ceremonies and receptions, for which there is a considerable market: The town of Eureka Springs issues wedding licenses to more than 2,000 of its visitors each year.

Such additional sources of revenue are important, since the Chyrchels are now irrevocably committed to the botanical garden business and have to turn a profit to keep the gates open and to keep the bank from foreclosing. "It's an expensive operation running a garden, and we rely on other sources of income, like our gift shop, to help offset the extra costs we incurred in starting up," says Chyrchel.

Their business plan projected about 66,000 visitors and admissions of $524,000 for the first full year of operation. Despite opening four months into the year, 44,000 persons visited Eureka Springs Gardens in 1993. After 10 years, the Chyrchels project the garden will receive 156,000 visitors annually and take in more than $1.2 million in admissions.

Is this realistic? The Chyrchels have done their homework. Using data from the questionnaires they got back from botanical gardens contacted earlier, they estimate that the average U.S. public garden gets about 400,000 visitors a year. If that's the case, their projections are fairly conservative, considering that well over a million tourists visit the town of Eureka Springs annually. There are other "for-profit" gardens in North America, depending on your definition. Butchart Gardens in Victoria, British Columbia, certainly is, and so is the Biltmore Estate in Asheville, North Carolina. Major aspects of several other large North American public gardens are certainly "for profit."

The Chyrchels bring to the botanical garden scene an ethic that is typically American and that is becoming more relevant to traditional botanical gardens every day. Their objective is to satisfy their customers by providing them with a fulfilling and cost-effective product, or as Steve says, "The key to any successful business is having a product people want to buy."

Chyrchel didn't pay himself a salary last year, and he would certainly like to reach that point. But the couple have a second bottom line. "We cannot be successful unless Eureka Springs Gardens accomplishes what a good garden always seems to do for everyone who visits," he says. "That, very simply, is to make people feel good through plants."

Dr. Arthur Ode, former director of the Nebraska Statewide Arboretum, is now a consultant and free-lance writer living in Wauwatosa, Wisconsin.

Eureka Springs Gardens is open seven days a week, 9 a.m. to 6 p.m. April through October and 9 a.m. to 5 p.m. November through March. It is five and a half miles west of Eureka Springs off Scenic Highway 62. For more information write to Route 2, Box 362, Eureka Springs, AR 72632, or call (501) 253-9244.

CLASSIFIEDS

Classified Ad Rates: All classified advertising must be prepaid. $1.25 per word; minimum $25 per insertion. 10 percent discount for three consecutive ads using the same copy, provided each insertion meets the $25 minimum after discount. Copy and prepayment must be received on the 20th day of the month three months prior to publication date. Send orders to: AHS Advertising Department, 2300 South Ninth Street, Suite 501, Arlington, VA 22204-2320 or call (703) 892-0733.

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RARE, OLD, OUT-OF-PRINT BOOKS on gardening, landscaping, flowers, fruits, floras. Request catalog. CALENDULA, Box 930/N, Picton, Ontario, K0K 2T0 Canada.

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We at the American Horticultural Society are often asked to refer individuals to significant horticultural positions around the country. We are not in a position to offer full placement services to candidates or employers. However, as a service to our members—jobseekers and employers alike—we are very glad to receive résumés and cover letters of individuals seeking job changes and employers seeking candidates. All responsibility for checking references and determining the appropriateness of both position and candidate rests with the individuals. AHS's participation in this activity is only to serve as a connecting point for members of the Society. Inquiries and informational materials should be sent to HORTICULTURAL EMPLOYMENT—AMERICAN HORTICULTURAL SOCIETY, Dept. 1094, 7931 East Boulevard Dr., Alexandria, VA 22308-1300.

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BEE BALM BEESWAX LOTION for working hands, troubled hands. No artificial additives. Beeswax heals and protects. Free catalog. Box 71H, Arlee, MT 59821.

PRONUNCIATIONS

Acer japonicum AY-ser jah-PON-ih-kum
A. saccharum A. sa-KAH-rum
A. shirasawanum A. shee-ra-sa-WA-num
Adiantum venustum ad-dee-AN-tum veh-NUS-tum
Agastache foeniculum ah-guh-STAH-she fee-NIK-yew-lum
A. mexicana A. mex-ih-KAN-uh
A. rugosa A. roo-GO-suh
Ailanthus altissima ay-LAN-thus al-TIH-sih-muh
Amelanchier am-eh-LANG-kyer
Ampelopsis brevipedunculata am-peh-LOP-sis brev-ih-peh-dunk-yew-LAH-tuh
Aristolochia durior uh-ris-toe-LO-kee-uh dew-RE-or
Armillaria ponderosa ar-mih-LAIR-ee-uh pon-deh-ROH-suh
Asarina lophospermum ah-SAH-ree-nuh low-FOH-spur-mum
A. barclaiana A. bark-lay-AH-nuh
Azolla filiculoides ah-ZOHL-luh fih-lik-yew-LOY-deez
Betula alleghaniensis BET-yew-luh al-leh-GAY-nee-EN-sis
B. nigra B. NY-gruh
B. papyrifera B. pap-ih-RIH-fer-uh
Blennosperma bakeri bleh-no-SPUR-muh BAY-ker-eye
Buxus BUCKS-us
Campsis radicans KAMP-siss RAD-ih-kanz
Carya ovata KEH-ree-uh owe-VAH-tuh
Celastrus scandens see-LAS-trus SKAN-denz
Cercidiphyllum japonicum ser-sid-ee-FIL-um jah-PON-ih-kum
Cercis canadensis SER-siss kan-uh-DEN-siss
Chamaecyparis obtusa kam-eh-SIP-ah-riss ob-TOO-suh
Chilopsis linearis ky-LOP-siss lih-nee-YAR-iss
Chionanthus virginicus ky-oh-NAN-thus vir-JIN-ih-kus
Cimicifuga racemosa sim-ih-sih-FEW-guh ras-eh-MOH-suh
Cladrastis kentukea kla-DRAS-tis ken-TUK-ee-uh
Clivia KLY-vee-uh
Cowania mexicana ko-WAH-nee-uh mex-ih-CAN-uh
Cyathea princeps sy-ATH-ee-uh PRIN-seps
Cypripedium reginae sip-rih-PEE-dee-um reh-GEE-nay
Dionaea muscipula die-oh-NEE-uh mus-KIP-yew-luh
Echinocereus chisoensis eh-kee-no-SEER-ee-us chi-so-EN-sis
Elaeagnus commutata el-ee-AG-nus kom-yew-TAH-tuh
Eriogonom corymbosum air-ee-OG-oh-num koh-rim-BOH-sum
E. niveum E. nih-VEE-um
Exacum affine EKS-ak-um ah-FEE-nay
Fagus grandifolia FAY-gus gran-dih-FOH-lee-uh
Fuchsia few-SHA
Ginkgo biloba GINK-go bye-LOW-bah
Hosta ventricosa HAHS-tuh ven-trih-KOH-suh
Hydrangea paniculata high-DRAN-juh pan-ik-yew-LAY-tuh
Hymenoxys scaposa high-men-OX-iss skuh-POH-suh
Ilex aquifolium EYE-leks ah-kwi-FOH-lee-um
Ipomoea leptophylla ih-poh-ME-uh lep-TOH-fill-uh
Juniperus horizontalis joo-NIP-er-iss hoh-rih-zon-TAL-iss
J. occidentalis J ahk-sih-den-TAL-iss
J. scopulorum J. skop-yew-LOR-um
J. virginiana J. vir-jin-ee-AN-uh
Keckiella cordifolia keh-KEY-eh-luh kor-dih-FOE-lee-uh
Koelreuteria paniculata kel-roo-TEE-ree-uh pan-ik-yew-LAY-tuh
Laburnum× watereri lah-BURR-num × waw-TEH-rah-rye
Lasthenia burkei las-THEE-nee-uh bur-KEE-eye
Leucobryum glaucum lew-ko-BRY-um GLAW-kum
Limnanthes vinculans lim-NAN-theeze vinn-KOO-lans
Limonium carolinianum lee-MO-nee-um keh-roh-lin-ee-AH-num
Liriodendron tulipifera leer-ee-oh-DEN-dron too-lih-PIH-fer-uh
Lysimachia nummularia liss-ih-MAHK-ee-uh num-yew-LAIR-ee-uh
Magnolia acuminata var. *subcordata* mag-NOH-lee-uh ak-yew-min-AY-tuh var. sub-KOR-dah-tah
Mahonia fremontii mah-HO-nee-uh free-MON-tee-eye
M. haematocarpa M. hee-mat-toe-KAR-pah
Malus MAL-us
Matteuccia mah-TOO-key-uh
Mirabilis multiflora mih-RAB-ih-liss mul-tih-FLOR-uh

Panax quinquefolius PAN-aks kwin-kwe-FOE-lee-us
Pelargonium peh-lar-GOH-nee-um
Penstemon alamosensis PEN-steh-mon ah-lah-moh-SEN-sis
P. albidus P. ahl-BEE-dus
P. angustifolius P. ang-gus-tih-FOE-lee-us
P. arenicola P. ah-RAY-nih-koh-luh
P. barbatus P bar-BAY-tus
P. caespitosis P. sez-pih-TOH-sis
P. campanulatus P. kam-pan-yew-LAY-tus
P. cardinalis P. kar-dih-NAL-iss
P. clutei P. KLU-tee-eye
P. cobaea P. koh-BEE-yuh
P. cyananthus P. sigh-uh-NAN-thuss
P. digitalis P. dih-jih-TAL-iss
P. eatonii P. ee-TONE-ee-eye
P. eriantherus P. eh-rih-an-THAIR-us
P. fruticosus P. frew-tih-KOH-sus
P. gentianoides P. jen-shen-OY-deez
P. glaber P. GLAY-ber
P. grandiflorus P. gran-dih-FLOR-us
P. hartwegii P. hart-WEG-ee-eye
P. hirsutus P. her-SOO-tus
P. humilis P. HEW-mih-lys
P. isophyllus P. eye-so-FIL-us
P. kunthii P. koon-TEE-eye
P. newberryi P. noo-BAIR-ee-eye
P. nitidus P. nih-TEE-dus
P. palmeri P. pawl-MER-eye
P. pseudospectabilis P. soo-doe-spek-tuh-BIL-iss
P. rupicola P. roo-PIH-koh-luh
P. secundiflorus P. seh-kun-dih-FLOR-us
P. strictus P. STRIK-tus
P. teucrioides P. too-kree-OY-deez
Picea abies P. PIE-see-uh AY-beez
P. glauca P. GLAW-kuh
Pieris PY-air-iss
Pinus strobus PIE-nus STROH-bus
Platanthera grandifolia pluh-TAN-ther-uh gran-dih-FOH-lee-uh
Polypodium virginianum pawl-ee-POH-dee-um vir-jin-ee-AN-um
Polystichum acrostichoides pah-LISS-tih-kum uh-kro-stih-CHOY-deez
Prunus laurocerasus PREW-nus law-row-SAIR-uh-sus
Purshia stansburiana PUR-sha stanz-bur-EE-an-uh
Quercus gambellii KWER-kus gam-BEL-ee-eye
Q. turbinella Q. tur-bih-NEL-uh
Rhododendron maximum roh-doh-DEN-dron MAKS-ih-mum
Sassafras albidum SASS-uh-frass AL-bih-dum
Sophora japonica so-FOR-uh jah-PON-ih-kuh
Sphaeralcea incana sfeer-AL-see-uh in-KAN-uh
Thuja occidentalis THEW-yuh ahk-sih-den-TAL-iss
Tilia cordata TIH-lee-uh kor-DAH-tuh
Wisteria sinensis wis-TEER-ee-uh sigh-NEN-siss
Zauschneria zowsh-NEH-ree-uh
Zephyranthes atamasco zef-ih-RAN-theez ah-tah-MAS-koh

STUDY TOURS

TRAVEL/STUDY TRIPS FOR THE AHS GARDENER

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

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

NOVEMBER 3-16, 1994
GARDENS OF HAWAII

A unique look at the splendor of a tropical paradise. Participants will visit the islands of Maui, Hawaii, Kauai, and Oahu. Garden destinations include the unique English-style gardens of Masaru and Shirley Yokouchi on Maui and the splendid gardens of AHS members Ed and Joyce Doty on Kauai. A relaxed sightseeing program will allow every opportunity to enjoy the marvelous settings of the hotels selected for this program. This is a splendid way to see Hawaii as you have always imagined it, with quiet picnics and even a helicopter exploration of the Na Pali Coast of Kauai. Leading this program for AHS will be its President, H. Marc Cathey, and his wife, Mary, along with Philip Parvin, researcher emeritus of the University of Hawaii.

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

Participants in our November trip to Hawaii will visit the gardens of Ed and Joyce Doty on Kauai.

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