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THE AMERICAN GARDENER

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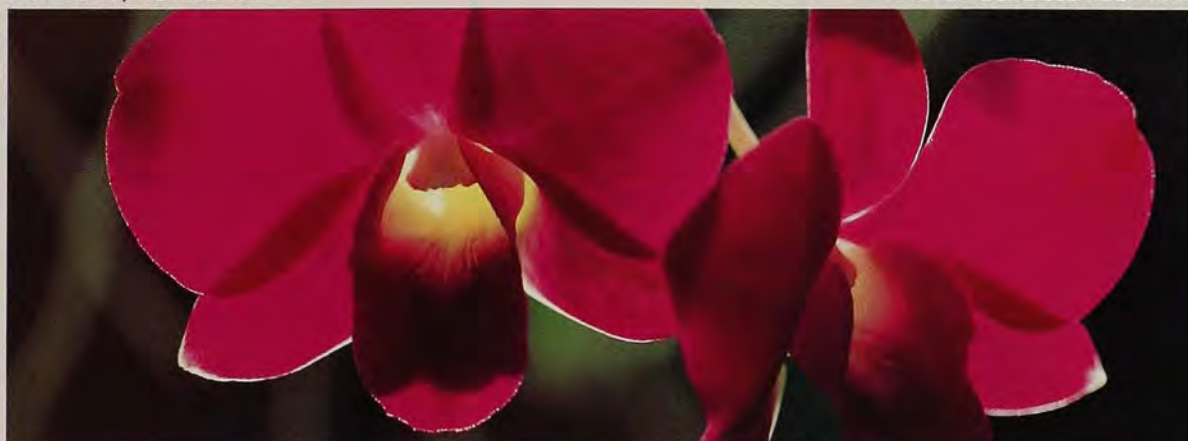
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On the cover: Branches of possumhaw (Ilex decidua) laden with red winter berries. Only the female plants of this native holly produce this brilliant display, which can last from October until March. Photograph by Roger Foley.

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commentary

In most areas of the country, the garden is drifting into dormancy at this time of year. Some gardeners are barred from the soil by frost or snow; others have already completed their fall tasks and can rest on their laurels until spring. For many of us, the garden is also upstaged by preparations for spending time with friends and family at various holiday celebrations.

But for those who just can't stay away from gardening, even in winter, there are countless container plants that can occupy the dreary winter days. In this issue we'll tell you about conophytums, a little-known genus of miniscule succulents from southern Africa. These stonelike plants are easy to care for and reward their growers with an astonishing display of daisylike flowers in late summer and fall. But beware of these little gems: Author Steven Hammer warns that

"conos," as they are known to their fans, can be habit-forming!

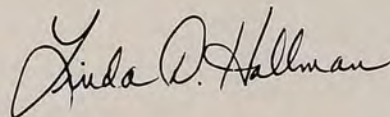
Escaping the cold weather for warm exotic destinations is a favorite pursuit of almost everyone. For gardeners, what could be better than a trip to a subtropical botanical garden? We've provided you with a vicarious trip to Marie Selby Botanical Gardens in Florida, renowned for its lush tropical plantings as well as for its commitment to a variety of conservation and education programs.

Another popular winter pastime for gardeners is poring through catalogs in search of plants for the spring garden. But after reading Andy Wasowski's article on the importance of selecting plants based on provenance—the geographic and climatic region in which they originated—you may want to rethink your choices to make sure you are picking plants that are adapted to local growing conditions.

Many people also use winter as a time to see the "bones" of their garden. One of the most important and versatile structural elements in a garden is stone, which serves as a focal point, a framing element, and as a surface against which to display plants. In this issue, landscape designer Richard Dubé offers practical tips on how to integrate stone effectively into your garden.

Catching up on the latest and best gardening books is still a time-honored winter pursuit, so be sure to read Kathleen Fisher's lively portrait of Frances Tenenbaum, one of the dynamos of the garden book publishing world. Tenenbaum is editor of Boston-based Houghton Mifflin Company's acclaimed line of garden books and author of several books of her own.

As you spend time with your family and friends this holiday season, I hope you will share our magazine with them and encourage them to join the extended family of members that make up the American Horticultural Society. We look forward to growing with all of you in the New Year and beyond.



—Linda D. Hallman, AHS President/CEO



members'
forum



HETEROMELES ARBUTIFOLIA

It's tough, evergreen, drought tolerant, flowers in springtime, produces abundant red berries in autumn, and is adaptable to steep slopes. How could a dry-climate Southern California gardener living at the bottom of a steep, south-facing slope not love this plant? Yet *Heteromeles arbutifolia* offers even more—berries that make colorful cut sprigs for the holidays and provide food for wildlife.

Commonly known as toyon or California holly, this shrub or small tree is a California native that is naturally distributed in chaparral, oak woodland, and mixed evergreen forests. Extremely well adapted for ornamental use, my toyons proved to me their mettle within a few years after they were planted on my hillside.

In August, about the time when the salvias have dropped their leaves for the summer and the matilija poppies have finished blooming, the toyons, with their dark green, leathery, toothed leaves, remain as oases of green dotting the hillside. By September, just when they are most needed in my landscape, the colorful, eye-catching red berries appear and remain to the end of the year, when winter rains turn the slope green again.

Heteromeles arbutifolia is particularly suitable for landscape use in Los Angeles.

Once established, it can survive the dry summers with little or no additional water. If grown, however, with plants that need watering in the summer, or if—as is the case with one of my shrubs—it is placed too near a sprinkler head, it still blooms, fruits, and grows—unlike some other native shrubs that can't tolerate water in summer.

A particularly grand specimen guards the bottom of my hillside, about 25 feet from my kitchen table. I admire the view through the glass windows and doors and watch the visiting birds pick its berries. I am thankful that my plantings can feed the birds. I have never eaten the berries, since I always want to leave them on the bush as long as possible, but I've heard they can be quite tasty when lightly roasted.

Heteromeles translates from the Greek as "different apple tree"; the species *H. arbutifolia* is the only one in the genus, although some cultivars apparently do exist, including one with yellow berries, which I have never seen. One story has it that the California holly inspired the name of that legendary town, Hollywood.

I rarely prune my toyons. When I hike in the local mountains and see specimens that stand up to 25 feet tall, I smile, happy for the future of the shrubs on my hill.

Elizabeth Schwartz
Los Angeles, California

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MORE PRAISE FOR IPOMOPSIS

I just received the July/August issue of *The American Gardener*, and I have to write concerning your reader Fritz Fuhs' appreciation in "Members' Forum" of one of my pet plants: *Ipomopsis*, or *Gilia*, depending upon your source for the plant!

About 35 years ago, I was also living in Iowa—Iowa City in this case—and I, too, chanced upon the tall plant with bright red flowers. This plant, which my source called "standing cypress," was at the time available from a few catalogs under the name *Gilia rubra*. Both *Ipomopsis* and *Gilia* are in the phlox family, but I believe that *Ipomopsis* is currently the recognized name for this species. It was one of the most dependable plants for me and did reseed itself—it is usually listed as a biennial—each year. The leaves were "chameleon green," as we discovered when our son's pet Florida anole escaped onto it! The red flowers were a bright, true red at that time, although nowadays I'm finding yellows and oranges in my mixture.

I have since moved to Maryland and then to Florida. A few years ago I began to look for seeds again, but it was only listed in one of the numerous catalogs I receive. That company returned my money with a note saying it was not available at the moment. About two years ago I placed a request on the Internet, and a kind lady from Texas sent me some seeds. This year I see it listed in various places: J.L. Hudson lists it as *Gilia rubra* and Wildseed Farms and Thompson & Morgan as *Ipomopsis rubra*.

In honesty, I have to say that in the two years I have grown it here, it has behaved like a short-lived annual, but when it thrives there is nothing like it. I would suggest buying some seed before it disappears again.

Amy G. Skallerup
Ormond Beach, Florida

Ipomopsis is now the accepted name for some two dozen taxa formerly listed as gilies. According to Hortus Third, Ipomopsis species are distinguished from gilies by having well-developed leaves on their stems, flowers with individual bracts, and long, curved seeds. Only four or five of these annual and biennial native species are available in the trade: skyrocket or scarlet gilia (I. aggregata), which has red, golden yellow, or pink flowers; I. longiflora, which has white flowers that can be blue-tinged; standing cypress (I. rubra), which has flowers that are scarlet outside and yellow with red dots inside; and I. spicata, which has white or cream-colored flowers. Subspecies of I. aggregata and I. spicata are also recognized. The largest selection

of Ipomopsis can be obtained from Southwestern Native Seeds, P.O. Box 50503, Tucson, AZ 85703. Send \$2 for a catalog. In addition to the source listed above, Richters nursery and The Fragrant Path also offer standing cypress seed.

KEEP YOUR EYE OUT FOR...

The florist I work for has a membership to AHS, so all the employees get to see your great magazine. I especially enjoyed the article on centaureas (July/August), which have long been one of my favorite groups of plants. I would suggest your members also try the white form of the mountain bluet, *Centaurea montana* 'Alba'. I first saw the loose white stars of this selection sparkling two years ago in the semi-shade at Marjory Fish's garden in England.

I was able to find 'Alba' this spring through Forestfarm nursery in Williams, Oregon. They sent me two hunky gallon-sized plants covered with buds. These were in full bloom in May, twinkling and adding much life in a semi-shaded corner, where they were underplanted with *Stachys byzantina* 'Silver Carpet'. More flowers were produced sporadically all summer. This plant should be more widely available, and I'm hoping mine will seed itself around a bit as the blue form does.

Thanks for an enjoyable and informative article.

Linda Beutler
Portland, Oregon

Correction

A quote by Doreen Howard in the July/August "Focus" section was rendered incorrectly. In describing the number of tomatoes she had harvested from plants treated with mycorrhizal fungi, Howard said she had picked 1,297 tomatoes and "was still counting." Howard, a garden writer and contributing editor at *Woman's Day*, was counting tomatoes as part of a study to see whether heirloom tomato plants inoculated with mycorrhizal fungi would yield more fruit than untreated plants. The conclusion of her study was that mycorrhizae appeared to increase fruit yield, speed up fruit maturation, and aid plants in tolerating climate and disease stresses. However, individual fruit on inoculated plants were smaller than normal for each variety tested. To see the complete results of Howard's study, e-mail a request to doreen@fgi.net.



news from ahs

YOUTH GARDEN SYMPOSIUM

The Society's sixth annual Youth Garden Symposium, held July 30 to August 1 in Arlington, Virginia, was a rousing success, thanks to a stimulating group of speakers, a variety of workshops, and the enthusiasm of the 250 teachers, administrators, and horticulturists in attendance.

This year's keynote speakers celebrated the diverse viewpoints that can be brought to bear on youth gardening. Felder Rushing, a garden writer and host of radio and television garden shows, challenged participants to break the traditional rules associated with children's garden design by incorporating unusual objects and play areas in the garden. Jane Taylor, past curator of the 4-H Children's Garden at Michigan State University, described the important role family involvement has played in the success of that garden and suggested ways in which other public gardens can achieve the same rapport with the community. Robin Moore, professor of landscape design at North Carolina State University, outlined his philosophy for

transforming America's schoolgrounds into more natural environments for play and learning. And Katy Moss Warner, director of horticulture at Walt Disney World, offered an inspiring vision of the future for children's gardens and gardening in America.

Concurrent sessions focused on a wide variety of youth gardening themes. Jim Flint of the National Garden Association in Burlington, Vermont, gave a hands-on workshop on using growlights to garden indoors with children. Molly Dannenmaier, former children's editor of *Garden Design* and author of *A Child's Garden*, presented nine simple ideas for gardens designed to appeal to children. And Vicky Urcuyo of USDA's child nutrition division introduced the "Team

Nutrition" project, which teaches children to grow their own food in order to encourage healthier diets.

The opening reception for the sym-



Symposium participants on a field trip to the National Arboretum mingle with kids from the arboretum's youth program, left. Below left, a young visitor enjoys the roses blooming in the heart-shaped Princess Diana garden at AHS's River Farm headquarters.



Planning the Future

This year's Youth Garden Symposium launched a five-year cycle of symposia organized around four key educational tracks. These tracks—Garden Basics, Schoolyard Habitat, Integrating Curricula and the Garden, and Gardens of the Future—will focus on the newest and best programs and concepts that youth gardens and gardening have to offer. Each year the symposia will address these tracks and, by building on past programs, keep attendees up to date with the latest developments in each subject area. The educational tracks were developed in consultation with the National Youth Garden Advisory Panel, a group of 29 leaders in children's gardens and gardening programs across the country. The panel, co-chaired by Robin C. Moore, professor of landscape design at North Carolina State University, and Norm Lownds, curator of the 4-H Children's Garden at Michigan State University, is developing short- and long-term goals for the Youth Garden symposia. In addition, the panel is discussing issues AHS should pursue as part of a national youth gardening agenda. Such issues may include: ensuring all children have access to gardens and natural places; developing information ex-

changes among all groups involved with children's gardening; advocating the improvement of life for all youth through gardens and gardening; and setting up fundraising, lobbying, and educational systems to advance these goals.

AHS members are encouraged to offer suggestions or comments for consideration in the development of this national agenda. Write to Mary Ann Patterson, AHS, 7931 East Boulevard Drive, Alexandria, VA 22308-1300, or e-mail suggestions to mpatterson@ahs.org.

The next three Youth Garden symposia will be held at:

- *Denver Botanic Gardens*
Denver, Colorado (July 22-24, 1999)
- *Walt Disney World*
Orlando, Florida (June 8-10, 2000)
- *4-H Children's Garden, Michigan State University*
East Lansing, Michigan (July 12-14, 2001)



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posium was held at the Society's River Farm headquarters. Guests at the reception got a chance to see two new children's gardens that were added to the grounds following a garden design contest among students at several local elementary and middle schools. The contest winners were the Jelly Bean Garden, designed by Deidre Swider, and Princess Diana's Garden, designed by Cristina Luna. Both designers are fifth-graders at the Nativity School in Burke, Virginia.

PLANT RESCUE

In late June, AHS interns and volunteers helped "rescue" a variety of native plants threatened by road construction along a section of Interstate Route 66 bordering the Thompson Wildlife Area in Lindell, Virginia. Interns Cara Murray and Pier Hutton collaborated with River Farm volunteers Jordan Price, Katie Burney, and Andrew Lawrence in the plant salvage operation, which was performed with the blessings of the Virginia Native Plant Society.

Among the natives saved from the bulldozer were wild ginger (*Asarum canadense*), black cohosh (*Cimicifuga racemosa*), bloodroot (*Sanguinaria canadensis*), Solomon's-seal (*Polygonatum biflorum*), false spikenard (*Smilacina racemosa*), and an as-yet unidentified trillium (*Trillium* sp.).

"It was really satisfying to see the truck full of these woodland treasures at the end of our hunt," says Murray. The salvaged natives are now growing happily in the shade of the enormous osage orange tree here at River Farm.

ASIAN BEETLE STRIKES AGAIN

No sooner had we published the article on the sightings of Asian long-horned beetles in Brooklyn and Long Island, New York (see "Conservationist's Notebook" in the July/August issue), than we heard news out of Chicago that an infestation of these imported, tree-boring pests had been discovered in the Ravenswood section of that city. Subsequently, smaller infestations were found in another Chicago neighborhood.

The beetles in these Chicago areas were first discovered in firewood cut from local trees, but officials from the USDA's Animal and Plant Health Inspection Service (APHIS) and local regulatory agencies believe the original source of the beetles is the same as that of the infestations in New York and of beetles intercepted at ports in California, South Carolina, and Canada: wooden crates and other packing material used to bring in goods from China.

The Ravenswood infestation—estimated to be at least two years old—appears to

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be confined to just under 100 acres, but officials plan to continue surveys in surrounding areas before beginning removal of beetle-damaged trees this fall.

The beetle, which bores holes in living trees, has the potential to damage or kill a wide range of ornamental and forest trees. Large-scale infestations could trigger a proliferation of quarantines on interstate shipments of ornamental trees and firewood. To lessen the likelihood of further infestations, the Washington, D.C.-based American Nursery and Landscape Association and other nursery trade organizations are lobbying for stricter federal regulations on wood packing materials used with imports from Asia.



Franklinia alatamaha at River Farm.

FRANKLINIA CENSUS

Next year is the 300th anniversary of the birth of American botanist and plant explorer John Bartram who, along with his son, William, fortuitously saved one of our most beautiful native trees, *Franklinia alatamaha*, from extinction. As part of celebrations planned for the anniversary year, Historic Bartram's Garden in Philadelphia is conducting a nationwide census of franklinias, all of which are originally derived from seeds the Bartrams collected from a small grove of the trees they discovered in 1765 growing along the Altamaha River in Georgia. Propagated and grown in the Bartrams' botanic garden near Philadelphia, the tree was named to honor the elder Bartram's good friend Benjamin Franklin. After 1803 the trees had vanished from the wild.

The census will help determine the tree's range, cultural preferences, potential life-span, and potential dimensions in cultivation. Five franklinias growing at AHS's River Farm headquarters have already been included in the census.

Respondents to the census will be entered in a "Franklinia Olympics," in which prizes will be awarded in various categories—largest tree, most westerly tree,

strangest franklinia anecdote, etc. Final results of the census will be posted on the Historic Bartram's Garden web site in May as part of Bartram 300 festivities. To receive a census form or more information about the planned celebrations, call (215) 729-5281 or visit www.libertynet.org/~bartram.

FRED GALLE

Fred Galle, an internationally known azalea expert and former president of the American Horticultural Society, died July 26 in Springfield, Illinois. He was 79. Galle was primarily responsible for designing, planting, and nurturing the renowned plant displays at Callaway Gardens in Pine Mountain, Georgia. He worked at Callaway for 30 years—26 as director of horticulture—before retiring in 1983. In 1985, Galle's 486-page opus, *Azaleas*, was published by Timber Press. Now in its third printing, it is still considered the pre-eminent reference on the subject and was recognized last year as one of AHS's 75 Great American Garden Books. Galle wrote a similarly authoritative book, *Hollies: The Genus Ilex*, published in 1997.

Although Galle is best known for his work with native azaleas, his interests were wide-ranging. His plant introductions include *Clethra alnifolia* 'Hummingbird', *Nandina* 'Harbor Dwarf', *Hexastylis shuttleworthii* 'Callaway', and two native azalea hybrids, 'Choice Cream' and 'Galle's Choice'.

"Fred's life was defined by all-around excellence. His horticultural legacy ranges from his exploration and plant introductions to research and publications," says AHS President Emeritus H. Marc Cathey. "His books on azaleas and hollies are the standard references on these marvelous and essential plants for everyone's garden."

Galle was AHS president from 1968 to 1970. In addition, he served as president of both the American Association of Botanical Gardens and Arboreta and the American Rhododendron Society (ARS). He received numerous awards during his career, including AHS's highest honor, the Liberty Hyde Bailey Award, in 1982; the Gold Medal of the ARS; and the Arthur Hoyt Scott Garden Award from Swarthmore College. An in-depth profile of Galle was published in the November/December 1997 issue of *The American Gardener*.



Fred Galle

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Bill and Sylvia Varney are the owners and operators of a combined 12-acre herb farm, bed and breakfast, and restaurant which has been written up many times in national and regional publications, including *Texas Highways*, *Country Living*, and *Victoria* magazine. They also create and distribute over 1,500 herb products worldwide.



MI Nursery in Brooksville, Florida, following a flood in February 1998.

THE VAGARIES OF THIS PAST YEAR'S WEATHER—*much of which was attributed to the effects of El Niño—were particularly tough on gardeners, farmers, and nursery owners. Hot on the heels of El Niño comes its sister current La Niña, which may bring more out-of-the-ordinary weather to North America.*

But El Niño and La Niña are cyclical phenomena that occur on average every two to seven years. Longer-term climate problems may lie ahead. So far, six of the 10 hottest years on record occurred in the 1990s, and average temperatures worldwide are expected to continue to climb for at least the near future. Gardeners need to adjust to changing climatic conditions, which prevailing scientific opinion suggests are tied to global warming. With the issuance of the American Horticultural Society's Plant Heat-Zone Map last year, AHS has already taken a step toward helping gardeners choose plants that will thrive in their area.

In this section, we've summarized some of the problems—and blessings—that El Niño bestowed upon gardeners this year. We've included a sneak peek at what to expect from La Niña, as well as tips on how to cope with or minimize the effects of severe weather. We've also put together a short history of some time-honored practices and tools gardeners have used to predict the weather.

el niño and la niña

by Mark C. Mollan

El Niño left its mark on North America this year with some of the worst weather ever recorded. Eastern Canada and New England were pounded by severe ice storms. Many parts of California, wracked by seemingly never-ending rains, received more than two-and-a-half times the normal precipitation. Florida set records for rainfall this winter and early spring, followed by the driest summer in the state's history. Devastating tornadoes cut a 100-mile-long swath across central Florida, followed quickly by wildfires that spread from Lake Okechobee north to Daytona. Texas and Oklahoma experienced a severe drought, including 30-plus days of temperatures in excess of 100 degrees.

Gardeners suffered along with everyone else. "All the intense rain we received this spring depleted the oxygen in the soil, so many plants were lost or damaged due to fungal diseases," says Los Angeles resident Karen Dardick, a regular contributor to *The American Gardener*. "Also because of the unusually cool weather in California due to the rains this spring, our growing season was six weeks late. My tomatoes didn't come in until mid-August."

Scott Aker, horticulturist at the U.S. National Arboretum in Washington, D.C., says "the constant rains in D.C. triggered an increase in foliar diseases. This spring and summer's drought has favored stress-related disorders, especially *Botryosphaeria* canker." On the other hand, he points out that the unusually warm weather caused everything to bloom two to three weeks earlier than normal in most of the Northeast.

Like Florida, eastern Missouri also experienced a wetter and warmer-than-usual spring, followed by a somewhat drier, hotter summer. "With this weather, the vines

What's El Niño?

Each year in late December, an ocean current off the coast of Peru draws warm, nutrient-deficient water southward, forcing fish to seek cooler waters. Local fishermen either draw in their nets and head home for a brief holiday respite or sail further afield in search of the teeming schools. Because of the Yuletide timing of this warm water spell, the fishermen call the annual phenomenon El Niño, which means “the little boy,” a reference to the Christ child.

Every two to seven years, this rush of warm currents is unusually extended, reversing the flow of undercurrents and thus preventing the normal upwelling of cold water further off the coast. As early as the 1500s, local farmers understood the connection between the arrival of these warmer waters and the subsequent increased precipitation that brought bountiful harvests and gave birth to gardens in normally barren lands. In appreciation, Spanish colonial farmers called the phenomenon “años de abundancia,” or years of abundance. Sometimes, following the warm spell, a cool pocket of water takes its place in the equatorial waters of the eastern Pacific. Today, meteorologists refer to the cycle of warm water as El Niño—Southern Oscillation (ENSO), or El Niño for short. La Niña—also known as El Viejo, or “the cold tongue”—is the catch phrase for the cold cycle.

The origin of the name is much easier to pinpoint than the cause of El Niño. According to Stephanie Kenitzer of the National Weather Service, “El Niño and La Niña are complex interactions between the ocean and the atmosphere. Changes in the ocean affect the atmosphere and climate patterns around the globe. In turn, changes in the atmosphere affect the ocean temperatures and currents.”

—M.C.M.

are growing incredibly well this year, but sweet gum trees all over the St. Louis area are cracking and breaking,” says Christine Fuerhoff, an AHS member who lives in Saint Charles, Missouri. Chip Tynan of the Missouri Botanical Garden explains that this damage was caused by “a bumper crop of fruits that weighed down the trees every time it rained.”



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The warmer winter in the Northeast proved a boon for farmers and orchard managers. Chris Blanchard of Beech Hill Farm in Mount Desert, Maine, a supplier of organic produce, said the farm prospered as a result of the abnormally warm weather. "We were very lucky only losing one main branch of a tree in our 150-year-old orchard in the ice storms. Aside from that, spring was beautiful. We were able to head into the season early with a wide variety of produce."

After suffering through the 1990s with everything from cicadas to record snowfalls, a deep freeze, tornado hits, and devastating floods, Brent Wearren, a 19-year tree nursery veteran and partner of Waterford Valley Nursery and Wearren and Son Nursery of Taylorsville, Kentucky, finally enjoyed a disaster-free year. "All we have been getting is a constant, steady rain, so for us it has been a great growing year."

Even California residents such as Dardick could see a bright side to El Niño. "All the rain leached out the heavily salt-laden soil that stems from over-fertilization and other gardening-related activities, which can eventually be harmful to plants." Increased fungal activity even had a beneficial side, as it took a toll on mites that have been wreaking havoc on honey bee populations in the West for the past few years. As a result of El Niño, bee populations were expected to increase 40 percent from 1997.

PREPARING FOR LA NIÑA

El Niño may be behind us now, but what can gardeners expect from the weather patterns associated with the La Niña season? "Most of our weather models are showing that La Niña is expected to remain a factor in North American weather until March," says Stephanie Kenitzer, public relations officer with the National Weather Service. "The dryness the American Southwest experienced throughout the late spring and summer is forecast to continue into the fall and spread east to the Atlantic later in the winter, perhaps as far north as Virginia. The northern tier of the country from the Pacific Northwest to the Great Lakes region should experience wetter-than-normal conditions. And Atlantic states will see much-enhanced chances of hurricane activity this late fall and winter."

COPING WITH EXTREME WEATHER

It is often impossible to prevent problems caused by severe weather—flooding, high winds, drought, ice storms—but good gardening practices and plant selection can help minimize the damage. "If you use plants that are found growing naturally in your area," says Aker, "they are adapted to the region's extremes of climate and will survive better than exotics, even in abnormal weather conditions." (For more de-

tailed information on selecting plants appropriate to your area, see the article on provenance on pages 45 to 52.)

Understanding microclimates within your garden also helps in choosing appropriate sites for plants. Plants that are not heat tolerant should be placed where they get morning sun, but are shaded in the afternoon when the sun is most intense. Plants that are barely hardy in your area should be planted near a south-facing wall and protected from winter winds. Avoid planting tender plants in low areas of the garden, where cold air tends to pool. A good discussion of microclimates in the garden can be found in Jane Taylor's *Weather in the Garden* (see Resources, page 13).

The best way to combat problems created by short-term flooding is by steadily amending soil with organic matter and avoiding activities that lead to soil compaction. "Plants need pockets of air in the soil as a source of oxygen for their roots, so amending is very important," says Dardick. "It cuts down on the fungal activity that can occur when soil is waterlogged for a period."

To lessen potential damage from ice storms, thunderstorms, and hurricanes, trim weaker limbs from your trees and make sure there are air channels through the canopy to reduce the likelihood of blowdowns.

For the Record

El Niño certainly had a dramatic effect on gardens, farmlands, and nurseries in North America in 1998. Here's a brief look at some of the items that made news.

- In the Canadian Great Lakes region record warm temperatures last winter devastated the winter grape harvest.
- In February, several tornadoes blazed a 100-mile-long trail of destruction through Central Florida. Just days earlier, a twister hit MI Nursery in Brooksville, causing extensive plant uprootings and damaging buildings and the irrigation system.
- Winter storms in late March blanketed Nebraska in layers of ice and snow, shortening the harvest season at the Bessey Nursery of the Nebraska National Forest and delaying the planned shipment of 380,000 trees for reforestation projects in Shoshone National Forest and Yellowstone and Big Horn national parks.

- Heavy spring rains in California wiped out 80 percent of the national romaine lettuce supply and left other vegetables in short supply. The rains also encouraged garlic rust disease, which reduced crop size by 35 percent.
- Milder-than-normal winter temperatures in the Midwest led to a dramatic increase in skunks, rats, raccoons, and opossums.
- In June, lightning storms in Florida caused a string of fires from Lake Okechobee to the Florida Panhandle, threatening thousands of homes, damaging \$100 million in crops, and devouring \$10 million in commercial timber.
- Summer droughts in Texas caused \$2.1 billion in agricultural losses, including \$659 million in cotton and \$140 million in horticultural crops.
- California and Arizona deserts teemed with life this summer as normally barren landscapes exploded with wildflowers. Anza Borrego Desert Park, near La Cañada, Flintridge, in

California, attracted hundreds of scientists and up to 10,000 visitors a day.

- After a sharp decline in honey bee populations in recent years due to mites, the rains in California brought ideal conditions for an expected increase of bees by 40 percent over last year.
- Milder weather in the Midwest led to record U.S. soybean production of 2.82 billion bushels, up 4 percent from last year's record harvest. The Iowa corn crop is also expected to be the third largest in the state's history, according to USDA estimates.
- According to the National Oceanic and Atmospheric Administration, the first two months of 1998 were the warmest and wettest on record for the continental United States.
- The national average temperature in January and February was 37.5 degrees Fahrenheit, compared with a normal 32.1 degrees. The old record, set in 1990, was 37 degrees.

—M.C.M.

If you have plants in your garden that just drag along from year to year or require constant infusions of water, fertilizers, or pesticides to stay alive, you should consider replacing them with something better adapted to the site. "If you do lose plants to extreme weather conditions," counsels Aker, "don't think of it as a loss, but as an opportunity to make your garden stronger."

Mark C. Mollan is communications assistant at AHS.

Web Sites

For more about El Niño and La Niña, visit the following web sites:

SAN DIEGO DAILY TRACKER:

www.elnino.com

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION:

www.noaa.gov

NATIONAL CLIMATIC DATA CENTER:

www.ncdc.noaa.gov

THE CENTER FOR OCEAN ATMOSPHERIC PREDICTION STUDIES:

www.coaps.fsu.edu/lib/elninolinks

THE EARTH SPACE RESEARCH GROUP:

www.crseo.ucsb.edu/geos/12.html

Maps and Climate Information

AHS PLANT HEAT-ZONE MAP. Send a check for \$14.95 to AHS Plant Heat-Zone Map, 7931 East Boulevard Drive, Alexandria, VA 22308-1300, or call (800) 777-7931 to order by credit card.

USDA PLANT HARDINESS ZONE

MAP. The map can be ordered from the American Nursery and Landscape Association for \$10.95 plus shipping. Call (202) 789-2900 for more information.

METEOROLOGICAL EVALUATION

SERVICES COMPANY, INC. Weather data gathered between 1974 and 1986 for use in compiling the USDA Plant Hardiness Zone Map is available for individual states. For information, write to the company at 165 Broadway, Amityville, NY 11701.

Books

WEATHER IN THE GARDEN by Jane Taylor, Sagapress, Inc., Portland, Oregon, 1996. Available through the AHS Horticultural Book Service for \$31.50. **Book code: TIM 154.**

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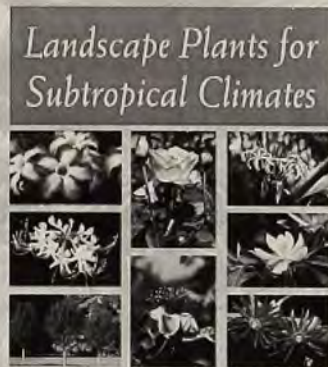
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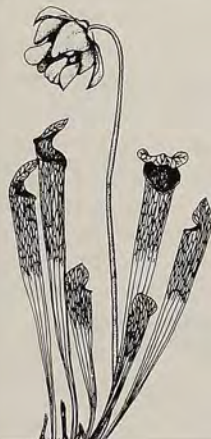
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folk predictions

by Christina M. Scott

Weather folklore has been associated with farming and gardening since well before humans began

recording their history. Weather played an integral role in the daily lives of our ancestors as they made the transition from hunting and gathering to farming. Back then, people didn't have access to television weather forecasters equipped with space-age meteorological monitoring equipment. They relied on seasonal patterns and the accumulated folk wisdom passed down from generation to generation. Because a knowledge of weather was so important—especially to farmers, whose lives depended on

their ability to predict the weather and plant crops accordingly—a large body of folklore developed over the centuries. Farmers and gardeners spend much of their time outdoors, so much of the folklore revolved around cultivated and wild plants and the organisms that feed on them. Some folklore is strongly rooted in keen observation. The Ozark folk saying that a tree showing the bottom of its leaves is a sign of rain shows a recognition of the windiness that often precedes a storm front. Other lore is harder to link to scientific processes, including the old belief that if the first snow sticks to the trees there will be a bountiful harvest.

As meteorological technology has improved, much of this folklore has moved into the realm of fun rather than as serious indicators of Mother Nature's intentions. According to the *Oxford Dictionary of Plant Lore*, compiled by Roy Vickery, one Englishman relates that during his boyhood in the 1930s, pennywort (*Umbilicus rupestris*) was a relied-upon gauge of dry weather. Taking two large leaves, he and his friends would spit on them, press them together, and throw them into the air. If the leaves were still pressed together when they hit the ground, rain was on its way; if they separated before reaching the ground, dry weather could be expected. Asked if the practice really worked, he replied, "Being Devon, it usually rained, but, on reflection, I incline to the view that the liberality of spittle was the main determinant of the outcome. But this, of course, was the main fun involved!"

PHENOLOGY

A more scientific offshoot of folklore is phenology, the study of the response of living organisms to seasonal and climatic changes. Cyclic events are monitored for specific plants and animals from year to year so that trends can be analyzed and used as the basis for farming or gardening practices. For example, the dates of first leaf, first flowers, and full flowering might be recorded for a specific plant. Phenology—derived from Greek roots that translate literally to "science of appearances"—has been used by a wide variety of cultures over the centuries. Planting times for crops were often based upon characteristics of wild plants. According to the *Horticulture Gardener's Desk Reference*, by Anne Halpin, Native Americans in New England planted corn when oak leaves were the size of the ears of mice.

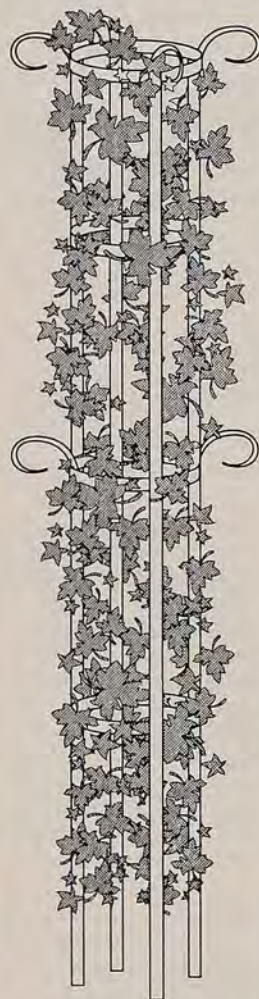
Horticulturists who study the phenology of plants in their local climate can often find patterns in the relationships between plants, insects, and the weather. In

(Continued on page 61)

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WHEELBARROWS UNLIMITED

by Fritz Hier

We own five wheelbarrows. Friends know that we are blessed: a solid family, kids and grandkids, a couple hundred acres of New Hampshire woods and hills, flora and fauna, and peace and quiet in abundance. But five wheelbarrows? For what purpose? To what end?

To begin with, only four of them are working wheelbarrows. One is near extinction, like an old rusted car without wheels. This one has a wheel all right, but not much in the way of handles. It rests—decoratively and discreetly—on a side lawn, earning its keep as a potholder. Not the kitchen kind; it holds flower pots. Geraniums at the moment. Looks nice, neighbors agree.

Two of the other critters have octogenarian written all over them. One belonged to my father, and it was also a part of me back in the mid-1930s, when, as a 14-year-old, I lugged and logged a fair share of chores with it. It's made of cast iron, I think, and is a possible descendant of the Monitor or the Merrimac. It weighs a ton, carries a ton. Anne, my wife, thinks it should be used as ballast for the new bridge across the nearby Connecticut River.

I nod and smile and point out that it's useful for mixing modest amounts of cement.

Which means it gets a terrific lot of use—like once every 10 years or so, when we need new cement to shore up the old milk can that holds up one corner of the barn.

In this world of playing favorites, wheelbarrow number three—I call her Woody—shines forth as my number one. She's showing her age, but so am I. We share aches and squeaks. She's a father-in-law hand-me-down, made of wood with a wide beam and removeable sides. Her wood-spoked wheel is circled with an iron band and has a couple of metal tie-ins to give her stability, but these days she tilts a bit to the left. Her paint is peeling, but I wouldn't part with my fading redhead for anything in the world, even to a dear old friend who covets her and says he would provide her with TLC to the end of his life.

"Sorry," I tell him. "No dice. She's spoken for."

Woody gets out now and then, but mostly she hangs out behind the shed, perhaps waiting for the phone to ring.

The last two vehicles are made of plastic or some such fabrication and have inflatable rubber tires that are as light as air. Anne

likes them because they are light as a feather and move like balloons. One was left behind when a son took a job overseas; the other was a \$10 steal at a yard sale—until we got home and discovered that it had a severe chassis leak. But not to worry. It and its twin serve yeoman garden duty carting out weeds and stones and wheeling in seedling flats and manure.

None of these practical, gentle vehicles need much maintenance. An occasional drop of oil, a touch of sandpaper on a splintery or rusted handle. They are environmentally friendly and always in style—no fancy fins or catalytic converters. Their mileage depends on how we feel at the time.

The late Hal Borland, naturalist and *New York Times* editorial writer, said of the wheelbarrow: "It may lack the grace of an airplane, the speed of an automobile, the initial capacity of a freight car, but its humble wheel marked out the paths of what civilization we still have.... [Its story] deals with rocks and roots and hunks of sod and bags of lime. It includes dead leaves and

lively onions, old compost and new potatoes...spades and rakes, squash and pumpkins and outsized heads of cabbage.... Best of all, it is shaped to its purpose. When the sun is at its height, the garden bench is far away and human energy has dwindled to the very neap, the wheelbarrow waits with welcoming arms and recumbent seat...."

Ours have also served the welcoming arms and youthful backsides of happy grandchildren.

There is nothing that equals the squealing and laughter of four-year-olds as Grandpa maneuvers them over the local terrain, a root-bump here, a swerve there.

We need all these wonderful, active wheelbarrows lest our neighbor, Woodley, come over on a big project and borrow three of them. Ha, we Dagwood Hiers would then still be in business—and retain Woodley as a good neighbor.

And how can you beat the harmony, Anne at one end of the garden with her barrow full of her stuff and me at the other end with my barrow full of my stuff? On a given day we touch regularly for shared growing and ecological pursuits, for bug spray, for blowing a kiss—and for lunch.

We also own five old iron tractor seats—but that's another story.



Now retired, Fritz Hier gardens with his wheelbarrows in Cornish Flat, New Hampshire.

Hal Borland's essay on the wheelbarrow first appeared in the New York Times on June 9, 1943.



mail-order explorer

GROWING GIFTS

by Christina M. Scott

Gardeners can't resist sharing their love of plants with others. They want their friends and relatives to get the same enjoyment from growing plants as they do—and the holiday season is a perfect time to send the gift of a plant.

Besides the ubiquitous poinsettia, there are many other plants that flower around the holidays and have more to offer the rest of the year. The well-known Christmas cactus (*Schlumbergera bridgesii*) sports its magenta flowers during the holidays and offers graceful, drooping foliage the rest of the year. *Passiflora* 'Jeanette' shows off its mauve-and-wine-colored petals not only in winter but year round. Many species of *Jasmine*, *Abutilon*, *Streptocarpus*, and *Begonia* bloom in winter as well.

If you're thinking about sending plants as a gift from a mail-order nursery, call as early as possible, because some nurseries stop shipping plants in December. And for nurseries that do ship through December, such as Logee's Greenhouses in Danielson, Connecticut, remember that the holidays are a hectic time. Most nursery owners probably echo Logee's president Byron Martin when he pleads, "Don't place your order just before Christmas, please!"

Weather is another important consideration when ordering plants later in the year. "In November, it frosts at night but warms up during the day. Those are very good conditions for shipping," says Tom Winn, co-owner of Glasshouse Works in Stewart, Ohio. By December, however, there can be problems with freezing in northern areas. If there's any danger of that happening, nurseries will usually send a gift card to let the recipient know your gift will arrive when the weather warms up.

SOMETHING FOR EVERYONE

If you're not sure what your gift recipient might like, a plant collection may be the solution. Winn says that Glasshouse Works' winter-blooming collection is very popular for the holidays. For as little as \$10 you can send five different plants. "We generally choose whatever looks good on that day," says Winn. "You could receive a camellia, gardenia, *Gloxinia sylvatica*, some jasmine, and so forth." If you have particular plants in mind, you can request that they be included in the collection.

For creative friends and family members, bonsai, topiary, and terrarium plants are excellent choices. These plants allow the recipients to shape and mold their

gifts to suit their own tastes. Many nurseries carry collections tailored to such special interests. To ensure an appropriate selection, you should describe how your recipient is likely to use the plants. Ken Frieling, co-owner of Glasshouse Works, says that he bases his choices of bonsai plants, for example, on whether the plants will be grown on a windowsill, under lights, in a greenhouse, or outside. "We also try to get a feel for what level people are on. If someone has not grown a lot of plants before, we'll throw in some of the easier plants to grow, such as portulaca, zamioculcas, and *Begonia cubensis*."

FOR BROWN THUMBS

For friends or family members who seem to possess the kiss of death when it comes to plants, Winn recommends the *Hoya* collection because, he says with a chuckle, "nobody can kill a hoyo." Succulents are well suited for the hot, dry conditions typical of many homes in winter. "Kalanchoe is very popular for the holidays, and it's pretty tough," says Martin. Arnie Mitchnick of Northridge Gardens in Northridge, California, agrees: "Succulents do best with a minimum of care." For seasonal color, Mitchnick suggests *Euphorbia millii*, which sports bright red flowers, or *Synadenium grantii* 'Rubrum', which has red foliage. Also good for the novice grower are philodendrons, sansevierias, begonias, ivies, and bromeliads.

Most nurseries will be happy to help you pick the ideal gift plant. After all, the recipient may become a customer—but only if that plant survives. "If someone has a bad first experience with growing a plant, they probably won't try again. We try to avoid that bad experience and make it as easy and enjoyable as possible," says Frieling. Of course you can also purchase a gift certificate and leave the choice of plants to the recipient.

So avoid the holiday blitz at the local mall and shop the plant catalogs from the comfort of your home. And don't forget to treat *yourself* by picking out that special plant missing from your own collection!



A kalanchoe for hanging baskets from Logee's.

Sources

GLASSHOUSE WORKS, P.O. Box 97, Church Street, Stewart, OH 45778. (740) 662-2142. www.glasshouse-works.com. Catalog free.

LOGEE'S GREENHOUSES, 141 North Street, Danielson, CT 06239. (860) 774-8038. www.logees.com. Catalog free.

NORTHRIDGE GARDENS, 9821 White Oak Avenue, Northridge, CA 91325. (818) 349-9798. Catalog free with two first-class stamps.

Christina M. Scott is assistant editor of *The American Gardener*.



gardeners information service

Where does spaghetti squash come from and how do I prepare it?

—S.B., Seattle, Washington

Spaghetti squash (*Cucurbita pepo*)—also called vegetable spaghetti—is a cream-colored to yellow or orange, watermelon-shaped winter squash with a fibrous interior that, when cooked, separates into subtly-flavored spaghetti-like strands. Its exact origins are unclear, but most authorities agree that the squash, like all members of the gourd family (Cucurbitaceae), originated somewhere in North or Central America.

Spaghetti squash stores well and is usually available year-round, but it is most flavorful when purchased freshly harvested from a local source in early fall to winter. Choose squash that are hard and smooth with an even color;

avoid those with bruised or greenish skins. To cook spaghetti squash, first cut it in sections and scoop out the seeds. Then it can be steamed, baked, or broiled. After cooking, the strands can easily be removed from the shell and fluffed with a fork. It can be eaten as a vegetable—seasoned with butter, pepper, salt, or garlic—or used as a low-calorie, vitamin-rich substitute for



spaghetti. Spaghetti squash tastes surprisingly good in combination with a wide range of sauces, including clam, pesto, tomato, alfredo, and garlic and herbs.

A good source of information about this and other out-of-the-ordinary plant edibles is *Uncommon Fruits & Vegetables: A Commonsense Guide* by Elizabeth Schneider. This book can be ordered through the American Horticultural Society Book Service. See pages 56 and 57 for details.

I live in eastern Washington State, where the temperature can get down to 10 degrees below zero in winter, and I have nine peony plants in containers. I don't want to take them out of the containers because we are moving next summer and I want to take them with me. How do I winter them over?

—D.W., via e-mail

There are about 30 species of *Paeonia* found throughout Europe, eastern Asia, and western North America, mainly herbaceous perennials and deciduous shrubs that are generally hardy in USDA Zones 3 to 8. Not knowing which types of peonies you have, it is difficult to determine their hardiness. Certain Mediter-

ranean species, such as *Paeonia cambessedesii*, *P. clusii*, *P. parnassica*, and *P. rhodia*, may be susceptible to winter damage. As a general rule, though, a standard peony, such as *P. officinalis* or *P. mascula*, should survive outdoors as long as you bury the containers in the ground before the first frost. Kelly Dodson, owner of Reflective Gardens in Poulsbo, Washington, says, "I've seen peonies left outside through the brutal winters of Minnesota, and they made it okay. In the fall, after the foliage has withered, cut back the plant and bury the container in the ground up to the rim. For added protection, you may want to mulch around the plant with some evergreen branches. The plant will remain dormant until the spring, when you can remove the container from the ground."

For more information, contact the American Peony Society, 250 Interlachen Road, Hopkins, MN 55343; (612) 938-4706. A good general reference for peonies is *The Gardener's Guide to Growing Peonies* by Martin Page, Timber Press, Portland, Oregon, 1997.

How do I keep my compost pile active during the winter, when it gets to be below freezing outside?

—C.G., Minot, North Dakota

In the northern part of the country, keeping a compost pile from freezing can be difficult. One of the keys to preventing a freeze, according to Robin Tech, compost advisor at Toronto Works in Ontario, Canada, is to get the compost going in the early fall and keep it hot and cooking during the winter by adding shredded leaves to the pile each time you add food scraps. "To keep a constant supply of leaves on hand, shred them with a lawn mower or weed wacker in the fall and keep a bag of them by the pile," says Tech. Even if your pile doesn't get steaming hot, adding brown material such as shredded leaves along with the food scraps will help the pile continue to decompose slowly through the winter. Cold-climate composters may also want to add red wiggler worms to the pile to help break down materials. The sides of the compost bin can also be insulated with two-inch-thick pieces of foam padding.

For more information on composting, AHS offers its GIS Resource Bulletin #112, "Compost—Black Gold." To order, send \$4 with your request to: GIS, AHS, 7931 East Boulevard Drive, Alexandria, VA 22308-1300. Another good reference is "Easy Compost: The Secret to Great Soil and Spectacular Plants," Handbook 153 of the Brooklyn Botanic Garden's 21st-Century Gardening Series. For more information on BBG handbooks, call (718) 622-4433 ext. 274.

—Melanie Bonacorsa, Information Specialist

For answers to your gardening questions, call Gardeners Information Service at (800) 777-7931 ext. 31 between 10 a.m. and 4 p.m. Eastern time, or e-mail us anytime at gis@ahs.org.



conservationist's notebook

SAVING THE ARIZONA CLIFFROSE

by Christina M. Scott

In the late 1980s, when the Arizona Department of Transportation (ADOT) announced plans to widen Highway 89A, which stretches from Sedona to Cottonwood, conservationists across the state jumped into action. The road ran through one of the last remaining stands of the endangered Arizona cliffrose (*Purshia subintegra*, formerly *Cowania subintegra*) and widening it would destroy another 15 acres of the cliffrose's shrinking habitat. But instead of a bitter legal battle between conservationists and the transportation department, a compromise was eventually reached: In the 1996 agreement between the U.S. Fish and Wildlife Service, the Federal Highway Administration, and ADOT, the highway will be widened as planned, and the Arboretum at Flagstaff has been provided with a \$500,000 budget over six years to study and help preserve the Arizona cliffrose.

The largest problem conservationists have faced is that, until recently, very little research had been conducted on the Arizona cliffrose. "Basically, we knew where the plants were, and that there had been some hybridization with the common cliffrose (*P. stansburiana*), and that was about it," explains Joanne Baggs, research botanist at the Arboretum.

There are only four known populations of the Arizona cliffrose—at Burro Creek, Cottonwood, Horseshoe Lake, and Bylas—all located in central Arizona in scattered patches of an uncommon limestone soil deposited by freshwater lakes that dried

up thousands of years ago during the Pleistocene era. While scientists do not know exactly how these plants evolved, John Anderson, state botanist for the Bureau of Land Management in Arizona, says the cliffrose most likely adapted to the relatively infertile lakebed deposits to escape competition for soil moisture from surrounding dominant vegetation, which was unable to make the same evolutionary adaptation.

Despite its name, the cliffrose is not confined to steep slopes; instead, it is most often found on gentle slopes and terraces at elevations between 2,000 and 3,600 feet. A member of the rose family (Rosaceae), it is an evergreen shrub with pale gray, rugged bark. Its leaves, twigs, and white or pale yellow flowers are covered with dense, short white hairs, which help protect the plant from the extreme heat of the desert climate.

Often reaching eight feet tall, the cliffrose is an important part of its uncommon habitat. "It provides cover shade to a number of other rare plants," explains Barbara Phillips, zone botanist for the Coconino, Kaibab, and Prescott National Forests. "It gives structure to its whole environment, which is disjunct from the main flora of the Sonoran desert. Because it's in such an isolated habitat, we don't yet know the full impact of losing it."

CONSERVATION EFFORTS

The Arboretum at Flagstaff is a member of the Center for Plant Conservation, a national consortium of botanical institutions working together to build a collection of rare and endangered plants. Arboretum researchers have been working with the cliffrose since 1986, when they first included it in their living collection.



A group of Arizona cliffrose grows in a research plot in Verde Valley, above. Right, Joyce Maschinski of the Arboretum at Flagstaff monitors a mesh-enclosed seedling.



COURTESY OF JOANNE BAGGS (EAR LEFT) AND ERIC WARDEN (LEFT)

Early attempts to propagate the plant had very limited success. "Only about 3 percent of the cuttings actually rooted," says Baggs.

But with the help of the Federal Highway Administration/ADOT funding, the Arboretum now has the resources to study the plant more closely. "Right now, we are trying to understand the life cycle—how long the plant lives and how often it produces seedlings," Baggs explains. And the Arboretum's success in rooting cuttings has grown exponentially, a wonderful first step in conserving the plant. "We've learned that the timing of taking the cuttings and the hardness of the cuttings is critical to success in rooting," says Joyce Maschinski, curator of plants at the Arboretum. "Eighty to 90 percent of cuttings taken during the fall have rooted."

HUMAN INTERFERENCE

Of course, botanical unknowns are not the only things slowing the recovery of the cliffrose. Various factors have worked against this plant for years, causing it to be placed on the federal endangered species list in 1984. Mining, urbanization, and grazing have been—and still are—major threats to the cliffrose.

In the 1960s and '70s, mining explorations for copper, turquoise, uranium, zeolite, sand, and gravel created surface dis-

"Because it's in such an isolated habitat, we don't yet know the full impact of losing it."

turbances in and near the Horseshoe Lake population. More recently, mining activities involving bentonite, a clay that is used in the production of cosmetics and pharmaceuticals, has caused significant habitat and plant loss within the Burro Creek population.

As with many endangered plants, urban sprawl has contributed to the demise of the cliffrose. Phillips notes that the town of Cottonwood, which supports one of the cliffrose populations, has been growing rapidly, creating a large risk to the plant. And although most of the plants in the four populations reside on state land, conservationists still fear the worst. "The purpose of the land is to make money for the state," Phillips says. "There is always the fear that the cliffrose could be lost to development."

Yet another problem is cattle grazing. "The cliffrose is very palatable to cows," says Angie Brooks, a botanist with the Fish and Wildlife Service. Some stands of the cliffrose have been fenced off, and Brooks has also been working on steering the cows away from the cliffrose using more natural methods. "With proper water and salt placement," she explains, "we can generally control where the cows will go." Controlling the grazing problem has helped tremendously. "We have noticed many more seedlings coming in since grazing has been slowed," says Phillips.

Conservationists hope that continued studies of the Arizona cliffrose, in conjunction with better land management, will eventually allow the plant to be downlisted from endangered to threatened. According to the Fish and Wildlife Service's recovery plan, downlisting may be possible by 2008. As for Highway 89A, ADOT is currently in the planning phase of the project and construction is tentatively scheduled to begin next year. And although the cliffrose habitat along the construction site will be destroyed, Maschinski is satisfied with the compromise. "This has been a great cooperative effort between the Fish and Wildlife Service and the ADOT," emphasizes Maschinski. "Both sides will win in this situation."

Christina M. Scott is assistant editor of The American Gardener.

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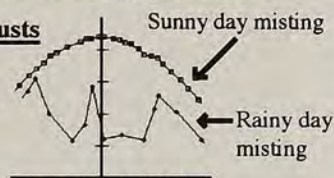
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natural connections

TAKING THE STING OUT OF WASPS

by John Alcock

All is quiet now in most gardens, since winter has banished vegetables and nearly all the creatures that live in gardens and help make them lively in season. But while we may be sad about putting the garden to rest in the winter, most of us are not too disappointed to see the insects that accompany our gardens disappear. When it comes to these creatures during the gardening season, the average person is inclined to spray first and ask questions later. This attitude, although understandable when flea beetles are decimating the eggplants, is unfortunate when expanded to embrace everything with six legs. So let me introduce you now, when the insect wars seem far away and the sprayer sits quietly in the cellar, to an intimidating but harmless insect well worth sharing a bit of garden with, even if its only benefit is sheer entertainment.

I speak of the cicada-killer wasp, *Sphecius speciosus*, one of the biggest—at two to three inches long—of all North American members of the wasp family (Sphecidae) to live east of the Rocky Mountains. But this wasp, no matter how ominous it may look in its red, yellow, and black outfit, really has no interest in stirring up trouble. In fact, in order for a human to get stung by a cicada-killer, one would have to grab a female (only females have stingers) and hold her tightly in one's hand.

Fortunately, it is not necessary to handle cicada-killer wasps in order to get to know them. These digger wasps often hang out in gardens because the relatively loose soil provides them with an excellent habitat in which to dig their nest burrows. It is in these burrows in your seemingly lifeless garden that a rather morbid scene is taking place right beneath your feet.

MATERNAL INSTINCTS

Several months ago, while you were innocently deadheading flowers or harvesting ripe tomatoes, a female cicada-killer was creating her own little shop of horrors. Somewhere in your garden—behind the lettuce, perhaps—the female wasp was mining her way downward at a moderate angle for a foot or so before extending her burrow another foot or two parallel to the surface, finally excavating a short terminal chamber about three inches long and an inch or so high. Having built this room without a view, she then set off on an incredible journey to rustle up some tenants for her underground lodgings.

The favored prey of the wasps are the locally available cicadas in the genus *Tibicen*. (Cicada-killers do not go after the more famous periodical 13- and 17-year cicadas, which emerge too infrequently to be a reliable food source.) Cruising up and around tree trunks and along tree limbs, the cicada-killer looked for potential victims. Upon finding one, she hurled herself upon the prey and



A female cicada-killer wasp straddles her hapless victim, top, in order to inject it with a quick-acting toxin. The wasp will carry her paralyzed burden to a burrow—the opening to one is shown above—to provide food for her offspring after hatching.

inserted her stinger into a spot near the cicada's front leg. The wasp's toxin took effect almost immediately, paralyzing but not killing the cicada.

By this point, you were probably resting on a garden bench admiring the results of your hard work. The cicada-killer's job, however, was far from over. For now she was faced with the task of returning to her burrow with her prey, which may have weighed six times as much as she did. Turning the inert cicada over on its back, the wasp straddled her victim, grasping it behind the eyes with her midlegs before launching herself and companion into space. Under the weight of a big *Tibicen*, the burdened wasp probably crash-landed far from her burrow, hundreds of yards from the point of capture. Undaunted, the wasp stoically hiked up a nearby tree trunk or corn stalk, carting the cicada along, before leaping out for another flight that brought her closer to home.

Back in your garden, the wasp dragged her victim inside the nest, pulling it down the tunnel to the terminal brood cell. De-

pending on the size of the cicada, it may have taken just one or as many as four trips to stock a cell. Finally, the female laid an egg on one cicada and sealed off the brood chamber with dirt. Two or three days later, just beneath your feet, the egg hatched into a grub that began feasting ravenously in darkness upon the larder its mother provided, demolishing all the living but helpless prey in its brood cells during 10 days of nonstop gorging. Meanwhile, the female cicada-killer went on to dig a new dead-end brood cell in the same nest, eventually having 10 or so chambers, each containing an egg and its own macabre complement of paralyzed cicadas being consumed or awaiting consumption.

The offspring produced by one generation of adult females spend almost a year underground waiting for the next summer. If you were able to dig up the nesting grounds of cicada-killers this winter, you would find the inert wasp pupae within their smooth tubular cocoons that the larvae build from silk and sand grains after finishing their gargantuan meal. The pupae will remain underground in this suspended animation until July or August when, in anticipation of the *Tibicen* hunting season, they become adults. Then these individuals will chew their way out of their underground chambers and up to the surface to begin the cycle all over again.

TERRITORIAL MALES

You may be wondering where male cicada-killers fit into this drama. Although it's difficult to distinguish males from female by sight, their behavior is quite different. If you pay close attention this summer, you will notice that males tend to precede females above ground, the better to establish territories around perches from which they can look for passing females. The male cicada-killers in my parents' Virginia garden favor vantage points on 'Better Boy' tomato plants, fence posts, or rocks. They dash out to chase off intruding males, even grappling with them in mid-air, and return to defend the same territories for hours each day for a week or so before they are ousted by a fresh newcomer.

When not battling for territories, or feeding on flower nectar, males rest quietly in the foliage of trees. During his week-long tenure as territory holder, a male may be lucky enough to spot, pursue, and capture a virgin female in flight; when a pair falls into the weeds, they may mate for as long as 45 minutes before separating. The male then immediately returns to his post to scan for still more virgin females. The combative, sex-crazed males and the hard-working, nesting females add zip to gardens made lethargic by the heat and humidity of midsummer. So, come next summer, you can look forward to more than the mere reappearance of flowers and vegetables.

If you should lack cicada-killers in your neck of the woods, do not despair. Gardens attract any number of other digger wasps, each with its own way of doing things. Some hunt grasshoppers, others stinkbugs, while moth caterpillars are standard fare for still other species. Even casual observers can learn a great deal about the diversity of life just by keeping an eye out for the local digger wasps. You need only wait for winter to concede to spring and summer, for frozen ground to become productive once again. Once bitten by the bug of wasp-watching, you may find that insect phobias fade as you harvest waspish melodramas along with cucumbers and melons.

Author of In a Desert Garden: Love and Death Among the Insects, John Alcock is a professor of biology at Arizona State University in Tempe, where he tends a garden and watches wasps (and many other insects).

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Cono

**Growing these
tiny stonelike
succulents can be
habit-forming.**



phytumms

by Steven A. Hammer
photographs by Chris Barnhill

For lovers of succulents, southern Africa is a treasure trove for thousands of species representing some 60 families. Among these is the mesembryanthemum—mesemb for short—family (Mesembryanthemaceae), which consists of perhaps 2,000 species ranging from small trees to creepers and humble ephemerals—tiny stemless succulents that bloom briefly at a set time each year. Some botanists list mesembs as a subfamily of the fig-marigold family (Aizoaceae).

Horticulturally, the best-known genera of dwarf mesembs are living stones (*Lithops* spp.) and living granite (*Pleiospilos* spp.). But there is another genus, *Conophytum*, which has only recently begun to get the attention it deserves. A much larger and far more diverse genus than *Lithops*, it has had a small but loyal following in England and Germany since the late 18th century and an avid one in Japan since the 1950s. Yet in the United States, it remains largely unknown outside a small but enthusiastic group of “conophiles.”

Small but Diverse

Conophytums are so diverse that characterizing them in general terms is next to impossible. Even the term “dwarf” is unsatisfactory when applied to plants that can be as small as peppercorns or as large as lemons, but for the most part they are very humble in stature, ranging from a quarter inch to two inches in length along their longest axis. No other genus of mesembs shows so wide a range of leaf shapes and textures. In

Conophytum bilobum, below, is named for its twinned “lobes”—actually leaves. Yellow flowers emerge from between the lobes in August. Opposite: The delicate floral tubes of *C. wettsteinii* subsp. *fragile* are huge for a conophytum, reaching an inch-and-a-half long.



“Even the term ‘dwarf’ is unsatisfactory when applied to plants that can be as small as peppercorns or as large as lemons....”

all cases, however, the leaves are thick, succulent, and at least partially fused together.

The results of this fusion are delightfully varied, including plants that are globe-shaped, dumplinglike, conical, or cylindrical. The leaf texture is also diverse, ranging from warty or pimply to smooth or silken. Some species grow mostly underground, with only their transparent lenslike tips exposed to the air. The leaves of most species are green, though one must qualify green with a hundred adjectives: sea, bluish, ivory, gray, chalky, chartreuse. Several species have rust-brown or chalky leaves that are ornately patterned and remarkably similar to the pebbles amongst which they hide.

Conophytums also have a peculiar mode of growth. Each leaf-pair persists for

about two-thirds of a year, whereupon it withers into a dead skin that protects the new leaf-pair hidden within it. This shrink-wrapping is usually in place by early summer and is shed in autumn. In many species, one leaf-pair “branches” into two, and within a few years the subsequent geometric progression produces dozens of leaves in a tidy clump or “cushion.”

Prime flowering season for conophytums begins as soon as the days shorten and nights cool down in autumn. In contrast to the diminutive size and subtle coloring of the plants, conophytum flowers are richly colored, shining, disproportionately large, and long lasting, so the annual blossoming creates a dramatic show. In recent years a number of “off-season” bloomers have been discovered, so that with the right variety of species there is hardly a week throughout the year when some plants are not in flower.

The various flowering times (morning, noon, and night), the strange and brilliant petal colors (ivory and gold to carmine and blackish purple), and the strong perfumes (including carnation, raspberry, and honey), give the plants great appeal to pollinators. These include butterflies, tiny bee-flies, beetles, and moths.

The floral structure has a common feature that unites the genus: The petals—technically petaloid staminodes—are fused together into a tube, unlike those of most mesembs, which are unfettered to their bases. The small ovoid fruits form and ripen deep within the active leaf-pair and are only exposed when the old leaves burst open at the beginning of the fall growing season. These woody capsules open when damp to release the seeds, which, in the conophytums’ native environment, are distributed by wind, water, and possibly tortoises.

Between a Rock and a Hard Place

Conophytums are endemic to the western parts of South Africa, with modest incursions into the adjacent parts of southern Namibia. The genus is essentially limited to the zones in which winter rainfall predominates, with the greatest concentration of species in the coastal region of Namaqualand. The plants survive on a mere three to four inches of rain per year, supplemented by fog and dew that condense on and around the leaves. Plants may rot or rupture from excess rainfall, especially if it is not evenly timed. Where summer rains fall, conophytum habitat ends.

In the wild, conophytums can be found clinging like barnacles to vertical cliff faces



Sources

LIVING STONES NURSERY, 2936 North Stone Avenue, Tucson, AZ 85705.

Fax: (520) 628-8773. Catalog \$2.

MESA GARDEN, P.O. Box 72, Belen, NM 87002. Fax: (505) 864-3124.

E-mail: cactus@swcp.com. Catalog free with self-addressed envelope and two first-class stamps.

NORTHRIDGE GARDENS, 9821 White Oak Avenue, Northridge, CA 91325. (818) 349-9798. Catalog free.

SPHAEROID INSTITUTE, 2077 Monte Vista Drive, Vista, CA 92084. E-mail: sphaeroid@juno.com. Catalog \$1.

Resources

The Cactus and Succulent Journal lists many commercial sources of conophytums and other succulents and has published descriptions of many new taxa. For subscription information, write to: 2391 E. Cactus Street, Pahump, NV 89048. E-mail: mpfusaro@aol.com.

THE MESEMB STUDY GROUP, whose quarterly bulletin has always featured more articles on conophytums than on any other genus, issues an annual seed list, which is well worth obtaining. To subscribe, send \$15 to Suzanne Mace, Brenfield, Bolney Road, Ansty, West Sussex, RH17 5AW, UK. E-mail: msg@mace.demon.co.uk.

Steven A. Hammer's full-color monograph, *Conophytum: A Conograph*, published in 1993, is available for \$95 from Rainbow Gardens Bookshop, Dept. H, 1444 E. Taylor Street, Vista, CA 92084. E-mail: rbgdns@aol.com.

or squeezed into the crevices of massive boulders, thriving where other plants would fail. In suitable crevices, water collects and periodic shade is guaranteed, but root room is limited, accumulated soil or detritus is sparse, and nutrients are meager. Thus many conophytums are situationally stunted, even if they are not inherently dwarf. These are sensitive plants, and minute territorial distinctions invisible to us can be vital for them. A given species may favor a certain rock type, soil depth, exposure to sun-



light, or some combination of such factors.

Little is known of the origin of conophytums, but they probably evolved from shrubby plants such as *Lampranthus* or ice plant (*Delosperma* spp.).

Easy to Grow

Conophytums have great horticultural virtues: They do well in weak light, tolerate winter dampness, take up little space, require repotting only once a decade or so, and they are extremely variable in flower color. Because of their naturally modest crevice-dwelling habits, they make ideal pot plants. Their longevity is legendary; properly managed, they will outlive the most Methuselah caretaker, never needing replacement. And they can be grown successfully by anyone. A large sunny window would suffice for a substantial collection. They also grow and flower very well under lights. They can even be grown outdoors in frost-free climates, although it is sometimes tricky to find an appropriately cool niche in summer. They tend to be lost in rock gardens unless they are planted en masse.

Habitat and rainfall data give us the most important clues to the behavior of conophytums: They grow during the short-day months and—unlike so many succulents, including cacti, living stones, and granite stones—are inactive in summer.

In late summer or early fall, the new leaves burst out of their wrappings, often flowering at the same time. Hyperactive and brilliantly tinged with suncreening pigments, the plants crave water; for a few blissful weeks it is hardly possible to overwater them. Once the flowers have faded and the leaves are thoroughly pumped up, the

The buttonlike leaf-pairs of *C. flavum*, above left, are just bursting through the spotted vestiges of last year's leaves.

C. x marnierianum, above right, distinguished by mottled, veinlike red markings and burnt-orange flowers, is a cross between *C. ectypum* and *C. bilobum*. Opposite: Flowers in a range of pink hues emerge from the withered old leaves of *C. ectypum*, top left.

Wispy yellow-gold flowers of *C. pageae*, top right, arise from the pealike leaf-pairs. Bottom: This image of *C. chrisocruxum* indicates the scale of these tiny plants.

Propagation and Breeding

The traditional method of propagating conophytums is to prune the outer branches from old richly clustered plants and to root them in sharp sand. In this manner, many very old clones have been enormously multiplied; the first *Conophytum wettsteinii* introduced from South Africa must now exist in a hundred collections in the United Kingdom. To take a cutting, gently separate the branches and break or cut them at a point less than a quarter inch below the meristem, which lies near the base of the leaf-pair. This is best accomplished soon after the plant has flowered. Water the cuttings sparingly while they root, which will occur within a few weeks in a shaded flat.

Certain indivisible species require propagation by seed, which is in any case the more interesting method, because you get much more variability in the offspring.

Sow seeds thickly in small pots, using a sterilized and screened commercial sowing mix cut 50/50 with an aerating material such as pumice or perlite, and covering them with only a thin scattering of fine grit. The pots should be soaked until the soil is saturated, covered with plastic for no more than four days, and left uncovered thereafter.

The most reliable results are obtained by placing the pots about six inches below growlights, which should be set for a 16-hour day. The seeds will germinate in seven to 10 days, and they should be misted daily. I always add a dilute fertilizer to the misting water, because the cotyledons, or seed leaves, should be encouraged to bulk up as rapidly as possible. Within 12 weeks, the cotyledons are gradually usurped by the developing true leaves. Once the leaves have emerged, the plantlets can be treated the



Conophytums such as *C. obcordellum*, above, form dense colonies of plants that can easily be separated and repotted as individual plants.

way medieval Europeans treated children: like miniature adults. They should not be transplanted until the true leaves are fully formed and the cotyledons have vanished. The soil mixture used should be a lean version of that used for mature conos: 40 percent commercial potting mix, screened to remove chunks; 40 percent pumice or perlite; and 20 percent coarse grit or grit and vermiculite.

Cultivars are becoming more popular amongst conophiles. A new one takes as little as two years to show its promise, three to mature, and thrice that long to become stable. It is possible to reinforce any desired characteristic: fuller petals, redder leaves, longer epidermal hairs, bolder patterns. Now that most species are in cultivation, efforts to tame and enrich them—some would say to corrupt them!—are inevitable. I have worked with cultivars for 20 years now, and a few of them do show greater horticultural merit than the “raw” material from which they were derived.

Hybridizing conophytums is quite easy to do, although the flowers are narrow-tubed and, in many cases, the stigmas are hidden at the very base of the tube. In some species, however, a starlike set of four or five tiny branches on a long style is visible at the tube's apex. Such stigmas need merely to be brushed delicately with pollen gathered from another plant. Use a fine camel's-hair brush to gather and apply pollen. Ordinary brushes are too blunt and fat to reach hidden stigmas, which are adapted to pollination by tiny insects. For these you must resort to an extremely fine detailing brush or a thin nylon fiber.

Pollination is most successful on the third or fourth day after the flowers open.

To date, the showiest results have been obtained by crossing species similar in floral structure but dissimilar in their leaves. Don't bother trying to cross night-and-day-flowering species—they are incompatible.

—S.A.H.

plants need just enough water to prevent wrinkling, to nourish any developing fruits, and to initiate and sustain the new leaf-pairs forming deep within the mature ones.

In winter the plants grow gradually fatter, and they also lose their most attractive colorations. This is the dull green season. “Stacking”—the unsightly phenomenon in which one set of plump leaves bursts prematurely out of another—is a danger at this time, particularly if the plants are overfed and overheated. Day temperatures between 40 to 75 degrees Fahrenheit and night temperatures of 35 to 55 degrees are ideal. By mid-winter plants may seem inert, but, in fact, they are actively transferring resources from old leaves to new. If watering is entirely withheld the old leaves will “deflate” prematurely and the new ones will suffer accordingly, so it is best to keep the plants slightly moist. In late winter the old leaves seem to glow for a brief period as their decaying pigments produce a half rainbow of russet colors and any markings stand out in bold relief.

By late spring the plants are torpid. The yellowish leaves fade to white and shrink into taut skins that protect the next set of leaves throughout the summer months. To some growers the annual summer retreat is a liability, because there is precious little to admire but a sea of bleached skins for several months. But in another sense the retreat is an asset. Conophytums are undemanding at a time when other plants are much more attractive and needy. In short, they are no more elusive than early narcissus.

At this point, the question arises: How long and at what temperatures can one keep the leaves under wraps? If the plants are not subject to excess heat—it is best to keep them under 100 degrees in moderate shade—and if the leaves are cracking out on their own without external provocation, it is wise to water them lightly, once or twice a week, lest they dehydrate. Most species are able to expand their leaves during the supposedly unfavorable summer season rather than waiting for autumn, but autumn is the season to which the plants are best adapted.

Tips on Care

Conophytums do best with bright light in autumn and winter; it improves their color and form. In spring and, especially, summer, they prefer at least half shade. In areas of high humidity it is probably safest to keep the plants quite dry in summer, merely misting them once a week. Where summers are arid and relatively cool, the plants

will accept light watering once a week. Wherever they are grown, conophytums appreciate ample water in autumn. Water deeply once a week or shallowly on alternate days. Overwatered plants will rot or bloat and burst. A well-drained, lean soil mix helps to guard against such obesity, as does plenty of fresh air.

Perfection lies somewhere between the Scylla of damp rotting and the Charybdis of burning desiccation, and it is up to each grower to find the way. Fortunately, the watery path is quite wide for most species, and some of the most satisfactory and accessible of these are described below.

Selected Species

All but *C. burgeri* and *C. maughanii* make substantial clusters and can readily be divided (see sidebar on page 26).

C. bilobum

The leaf-pairs on this species are only partly fused. Their pointed tips produce a rabbit-eared silhouette and exhibit one or two red "keel-lines," which correspond to the principal veins of normal leaves. The diurnal—daylight opening—flowers are yellow, white, or—very rarely—pink.

C. burgeri

Known in South Africa as Burger's onion and elsewhere as Fujiyama plant, this Hershey's-kiss-shaped species is always covered in white, flaking, onionlike skins. Its lacy magenta flowers, which open briefly just before dusk, smell like honey. The plants rarely divide and are usually propagated from the tiny seeds, the smallest in the genus.

C. flavum

This species consists of flat green "buttons" as big as quarters. It has chrome-yellow flowers—often with carmine stigmas—and blooms from late morning into afternoon.

C. maughanii

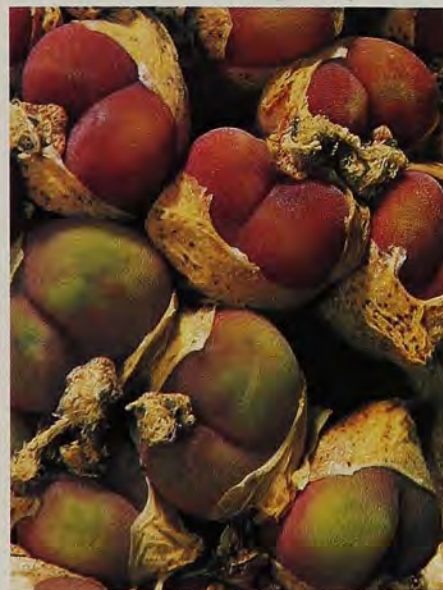
This species has a very soft jellylike body that turns ruby-red in spring before its annual meltdown. The plant collapses quite suddenly, and novice growers often think that it has rotted, until they discover its firm core, which bears a white or beige nocturnal flower in mid-autumn.

C. obcordellum

One of the first conophytums discovered, this was known in 18th-century England as the "great chequer'd dumplin"! The leaf-pairs are wholly fused into cones and marked at the apex with a maze of lines and spots. The white to rose-pink flowers open at night and smell of cloves.

C. pellucidum

The windowed and warted leaves of this



ubiquitous and variable species are caramel- or coffee-colored. Some have blood-red tannin spots and are often marked with dark bat-winged patterns. Wonderful selections and cultivars have been made within this species, which has orange-centered white diurnal flowers.

C. wettsteinii

Very similar to *C. flavum*, but its brilliant magenta flowers open around noon and last for at least a week, increasing in size every day. Although the two species have different numbers of chromosomes, they can be hybridized to produce plants with apricot-colored flowers.

When he is not in South Africa, Steven A. Hammer lives in Vista, California. He and photographer Chris Barnhill are currently working on a book on lithops.

The daisylike white flowers of *C. pellucidum*, top left, appear to be growing out of rock, but it's merely the remnants of the previous year's leaves. The plum-and-green leaves of *C. concavum*, top right, are "cracking out" through the withered membranes of their predecessors. Clusters of conophytums such as *C. minutum*, above, can be found growing on rock outcrops in their native habitat in South Africa.

When we think of gardens we naturally think of the trees, shrubs, herbaceous perennials, annuals, vines, and bulbs we grow there. We give careful consideration to the appropriate placement of each plant in relation to each other, to the sequence and length of blooming time, and to their height and cultural needs. We also give careful thought to the placement of certain structural elements—including walkways, benches, arbors, fountains, edging, and pergolas. When all of these carefully considered elements are blended in the correct proportions, the result can be breathtakingly beautiful.

In many cases, however, one very important element is missing from this carefully designed tableau—stone. Even when stone is found in the garden, it is rarely used to best advantage. Many gardeners don't realize the

variety of roles that stone can play in the garden to improve the composition and beauty of the plants growing there. It has been said that the garden is an improvement on nature. Our geology is an intrinsic part of the natural world, however, and as such it deserves strong consideration as part of our designed garden spaces.

Stone serves a variety of aesthetic and practical functions in the garden. It can be a focal point, a framing element and a surface against which to display plants. Stone can lead and direct the eye or add depth to the landscape. It can also stand alone as an aesthetic element in winter, and by reflecting the underlying geology of the region, provide a greater sense of place.

A lichen-covered group of stones provides a strong focal point in this landscape.

STONE



ESCAPING

**Used effectively, stone
adds beauty and depth
to the landscape.**

story and photographs by Richard L. Dubé



Clockwise from upper left: Growing ground covers over and around stones can make them appear larger; an illusion of greater space can be created by placing stones at various depths in a landscape; in winter, stones provide a canvas for snow; at the edge of water features, stones control erosion and create a transition from one medium to another.

Enhancing Plantings

Stones can work with plants in many ways. One of the most effective ways you can use them is to break up a monotonous single-textured mass planting such as juniper or an annual bedding plant. Stone can act as a focal point and lend meaning to the space. Stones of the same origin and character can be used to create a composition that appears to be more extensive than the rocks that are actually showing. The juniper or other ground cover appears to be covering the unseen portions of the exposed geology.

Stone can also be used to provide a sense of depth to a plant grouping. This helps to unify compositions that would otherwise lack definition. Stones in the background, mid-ground, and foreground become static formations that can create an illusion of space. Depending on how the

“Stone serves a variety of aesthetic and practical functions in the garden. It can be a focal point, a framing element, and a surface against which to display plants.”

stones are placed—and their size relative to the area they are being used in—they can either create a feeling of greater openness or of more intimate, confined space.

Stone can also be used as a backdrop to highlight plants with interesting colors and textures. Dark stone is ideal for setting off brightly colored or lightly hued flowers and even variegated foliage. By having plants drape over the top of a stone, you can also display colors and textures effectively. A finely textured threadleaf Japanese maple (*Acer palmatum* var. *dissectum*) shows to good effect when contrasted against a dark stone.

Winter Interest

For those of us who don't live in Florida, the Gulf Coast, or Southern California, our beautiful beds of flowers disappear into

dormancy in winter. In addition to grasses or plants that provide winter interest with their berries or colorful bark, a well-designed stone grouping provides welcome visual relief at this time of year. And in areas that commonly receive snow, stone arrangements can be designed to create dramatic and beautiful interactions with billowing snowdrifts.

THE FOUR SPACES FOR STONE GROUPINGS

Stone groupings can be used in four basic types of space in the garden—a flat plane, a connective mass, a slope, and a transition space between a slope and a flat plane. Each of these spaces influences the form that the grouping will take.

A Flat Plane

In the garden, a flat plane can be a lawn or garden bed, or a body of water such as a pond. If you want to create a vertical contrast to the dominant horizontal nature of such space, choose stones that are upright. By choosing recumbent forms that lead the eye along the ground plane, stone can also be used to reinforce the horizontal nature of the space. In nature, such a formation is often seen in areas with limestone bedrock, where parallel ridges of stone break the surface of the soil at intervals.

A Connective Mass

Often found within a flat plane, a connective mass can be thought of as an island, such as a large, rounded bed in a lawn or an island in a pond. This type of stone grouping is typically more tightly knit than those used in a flat plane. Stone is often placed within the defined island but can also carry into the lawn around the planting bed or into the water surrounding the island. This “coloring outside the lines” creates a look that more closely resembles natural scenes.

The Slope

Because the underlying geology often dictates the form and nature of a slope, using stone on hillsides seems more natural than on a flat plane. The angle of the slope helps determine what form the stone grouping will take. On a gentle slope, one effective use of stone is to create a stabilizing horizontal line across the slope. This short artificial “cliff” can be balanced with vertical forms such as trees or upright shrubs. Strong vertical stone groupings in a slope can also be dramatic. Massed plants flow-

ing around these silent sentinels can provide a beautiful focal point in the garden.

Environmental Transition

When you have a slope in the garden that leads down to a lawn, planting bed, or water feature, transition is important. Formal landscapes are usually composed of square or rectangular shapes whose boundaries rarely overlap or form transitions into other garden features. This abrupt design, where one space is clearly defined and separated from another, is very different from the overlapping edges seen in nature. To create a more natural effect in the garden, parts of both spaces in a transition zone should overlap at the point where they join. Stone acts as a wonderful transition element at the point where a slope dissolves into a flat surface.

CREATING STONE GROUPINGS

There are three basic rules of stone placement:

The stone should appear to be stable. The much repeated mantra of designers is that one-third of the stone should be underground. This is a good general rule, but at times it may only be necessary to put three or four inches of a four-foot stone in the ground. At other times it may be necessary to put more than two-thirds of a stone underground in order to show the best face or feature of that stone.

You should use odd numbers of stones—up to nine stones. Whether you are thinking about placing plants or stones, using odd numbers is always more aesthetically appealing because it is easier to create an informal balance. But once you get beyond nine stones, the eye seems to stop counting. If you are using more stones than that in a grouping, you need to be careful that it doesn't become too “busy.”

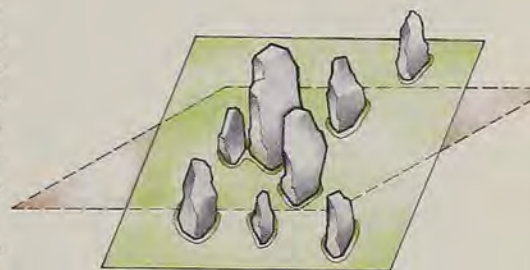
The stones should have a relationship to each other and to the group as a whole. To see good models for stone groupings, all you have to do is look at the way nature does it. There is an entire science—geomorphology—devoted to the study of geological formations. It looks at the ways that natural geological forms are created and influenced by forces such as tides, gravity, volcanoes, and erosion. It is also helpful to have a basic understanding of design principles related to good aesthetics. In stone placement, the most common principles used to establish relationships within a composition are: ra-



FLAT PLANE



CONNECTIVE MASS



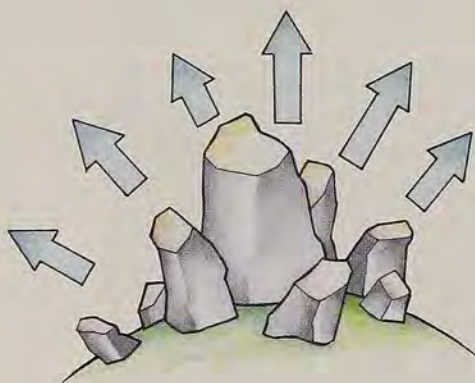
SLOPE



ENVIRONMENTAL TRANSITION



ANGULAR LINES OF FORCE



RADIAL LINES OF FORCE



REPETITION OF LINE AND FORM



IMPLIED PLANES

tios, contrast, framing, depth, internal context, relief, and lines of force.

RELATIONSHIP BUILDING

One of the biggest mistakes made when placing stones is to view them as separate objects rather than parts of a greater whole. When stones are not unified in the landscape, they appear random and unorganized. Contrarily, a well-placed grouping will stand on its own as a single object. A good way to conceptualize a stone arrangement is to look at it as a solid mass of stone that has been eroded away over a long period of time. When seen this way, the arrangement is like a three-dimensional jigsaw puzzle in which each of the pieces has a relationship to each other as well as the whole. Establishing those relationships means understanding concepts such as lines of force, repetition of line and form, implied planes, and the dynamic spacing of different elements.

Lines of Force

Lines of force can be thought of as similar to the invisible lines of magnetic flux that cause a compass needle to point toward magnetic north. We don't see the lines of force so much as we see their effect. If we put a magnet under a sheet of paper and sprinkle iron filings on that paper, they will no longer be separate, tiny pieces of iron, but rather a part of a larger pattern. Those lines of force that create and influence the entire pattern affect the filings. If you apply the same principle to a stone composition and establish an imaginary line of force, you have a basis for creating an environment that gives a sense of connection to all of the rocks. Usually the path of the lines of force is in one direction, but on occasion it can be seen in more than one plane. Relative to the ground plane, the line of force can be vertical, horizontal, angular, arcing, plume-like or even fan-shaped.

Repetition of Line and Form

Another way of creating a relationship between the stones is to repeat lines and forms that emerge from the placement of the initial or dominant stone in the group. The relationship may be based on the angle of that stone or the general form that it takes. This repetition creates a clear relationship between all the stones because they then share common features. The lines and forms generally will parallel the selected lines of force

but can be made to run contrary to them. Done effectively, this can result in a very balanced and internally framed grouping.

Implied Planes

Implied planes are one of the most powerful tools for creating the illusion that separate stones are part of a single entity. Implied means "suggested," and a plane is a flat surface—in other words, a flat surface that is suggested between the existing surfaces of stones. By placing stones carefully, the impression is given that the space between separate stones has eroded and left portions of the original single stone mass still standing.

Dynamic Spacing

Creating a relationship between stone through the use of dynamic spacing is more of a challenge than the three previously mentioned techniques. The type of relationship created here is based on a visual rhythm. You can think of a dynamic stone grouping as a symphony for the eyes; the emotional impact of that composition is transferred by way of its dynamic spacing and the visual tension associated with each stone's relationship to the whole. To carry on the musical metaphor, for example, placing a series of stones of equal size, shape, and spacing would be like a sequence of the same notes played at the same tone, pitch, and tempo. This would tend to be very monotonous. A set of stones, however, ascending vertically with transition stones leading the eye into the grouping would be equivalent to an uplifting musical piece with a crescendo. The rhythm of this spacing is far more dynamic and helps to cement the whole piece as a single composition.

Stone deserves a place in the garden and should be placed with at least as much consideration as is given to the strategic placement of plants. A successful stone grouping helps make a garden more alive throughout the year. It offers contrasts that are often sorely needed to create focus and provide an internal structure to the entire garden.

Ultimately, stone provides a garden with a truer reflection of the natural world. To use stone in the landscape is to make that landscape more complete.

Richard L. Dubé is a writer and landscape designer who lives in Lexington, South Carolina. His next book, Natural Stonescapes: The Art and Craft of Stone Placement, co-authored by Frederick C. Campbell, will be published in February 1999 by Storey.

Working with Stone

Finding stone suppliers can be as simple as looking them up in the phone book under the heading of “stone.” Masonry contractors can often recommend local stone suppliers. For larger jobs, it is usually more economical to deal with wholesale stone suppliers who will deliver the stones to your site. To get the best stones, however, it is better to select them yourself.

Choosing and Buying Stone

If stone is going to be used as a focal point in a landscape, it is helpful to look for stone that has “character”—an interesting surface texture, unusual shape, intriguing surface features, or a striking color. The most difficult thing is to find a stone of this nature that is also of the right scale for your space. At times a beautiful stone with character may dictate the way the space is to be used or defined, rather than the other way around. Another difficulty that often arises when you find a stone with character is finding enough related stone to make an entire composition.

Stones fall into four basic groups based on their shape: vertical, horizontal, chunky, and arcing. Within these forms, the surface features can be fractured, included (embedded with smaller stones of a contrasting nature), or free of markings (featureless). The texture can be angular, smooth, or rounded. The most challenging type of stone to work with is a combination of chunky, featureless, and rounded.

You can buy stone either by the ton or by the individual boulder or rock. It is inevitable that you will need more than you think, so you should plan to buy at least one-and-a-half times your initial estimate.

That way you will also have more choices when you start designing your groupings.

Power Tools

The tools you use will depend largely on the size of the stone you are working with. Stones over two tons usually require a crane and professional help. Nylon strapping is recommended for lifting these stones so that you don't mark up their surfaces. Stone in the one- to two-ton range can be handled with a large bobcat or small backhoe. Again, it is important not to

mar the surfaces, especially if the type of stone you are using is very fragile or brittle.

Medium to large rocks—which typically weigh 250 to 1,500 pounds—can usually be moved by hand using pry bars and tripods. Tripods used to lift engine blocks out of cars are also suitable for moving rocks. These have a winch or a “come-along” hanging from the center. The stone is suspended below the lifting tool. If nylon strapping is not available you can use a chain, but be sure to use burlap or some other cushioning material for the rock when lifting or lowering it.



Top: Using a small stone as a fulcrum, a pry bar can be used to lift a rock up and change its position slightly. **Above:** Medium-size stones can be moved short distances by “rolling” them end over end with a pry bar.

Hand Tools

A pry bar is a versatile tool for moving and adjusting the placement of medium-sized stones—those weighing a few hundred pounds—in or on the ground. It can be used to temporarily prop up a large stone or to turn or angle a stone already in the ground. Its most important use however, is as a device for moving a heavy stone forward along the ground. Two or more people using pry bars can “walk” a stone on its edge by moving forward in turn. Pry bars rotated in a rowing motion can be used to move a stone easily in any direction. The pry bar can also be used as a lever for rolling a stone over to see its underside or for moving it forward.

Both a pointed and a flat-bottomed shovel are helpful for excavating the hole in which the stone will be placed. Prior to digging any hole, figure out how you want the stone to sit. As with large plants, it can be more of a challenge to get a stone *out* of a hole than it is to get it in.

Stone shims—loose pieces of rock that are helpful for propping and stabilizing stones in a hole—are invaluable for helping to create the correct angle for the

composition or to hold the stone in place. You should have a good-sized pile on hand prior to digging the hole.

Playing it Safe

Safety is important whenever you work with stone. Stone is abrasive. It can have sharp edges, be unwieldy, and be extremely heavy. Heavy work gloves, steel-toed boots, long pants, knee pads, and—most important—a healthy respect for the stone are highly recommended.

—R.L.D.

Marie Selby's Legacy

In addition to its stunning tropical plant displays, Selby Gardens has a growing reputation for its conservation programs.

b y M o l l y D e a n



Marie Selby, above, loved the natural beauty of the Sarasota area and was inspired to preserve a portion of it for future generations. Opposite: Tree fern fronds against a blue Florida sky.

On my most recent visit to Marie Selby Botanical Gardens in Sarasota, Florida, I spotted a small child stilled to sudden wonder by the sight of the majestically spreading boughs of a bo tree (*Ficus religiosa*), the same type of tree under which Buddha is said to have first obtained enlightenment. Next instant she had climbed into a crook of the tree and was gazing rapturously up at the curious slender, long-tipped leaves, which were quaking mysteriously to the rhythms of an undetectable breeze. This sense of wonder is typical of many visitors, both young and old, who walk through this tropical paradise just south of Tampa and Saint Petersburg along Florida's Gulf Coast.

It's easy to be inspired by the breathtaking displays of subtropical and tropical plants, as well as by the insects, birds, fish, and mammals that are drawn to them. Temperate-zone gardeners often equate their ideal garden with the landscapes of artist Claude Monet, but the lush, surreal—even primitive—look of the gardens at Selby are more evocative of the works of Henri Rousseau. Vignettes include a gold-and-red hibiscus blossom the size of a dinner plate shimmering against a vivid blue sky; vast curtains of starry-flowered Confederate jasmine (*Trachelospermum jasminoides*) stirring in the ocean breeze and wafting a sweet, sultry perfume into the air; bizarre carnivorous pitcher plants rearing their tube-shaped leaves into the steamy atmosphere of the Tropical Display House; angel's trumpets (*Brugmansia* spp.) dangling their great yellow flower cups above a clear, koi-filled pool; and an exotic zebra longwing butterfly hovering languidly above a red pentas blossom.





Plants with bright colors and interesting textures abound at Selby, including *Navia igneosicola*, top left, a bromeliad native to Venezuela; gumbo limbo tree, top right, native to the Caribbean and Florida; and above, the orchid *Dendrobium pinkeysem* 'Sabine'.

But Selby is far more than just a display garden; its mission encompasses all the elements so necessary to a modern botanical garden—research, conservation, and education. Behind the colorful plant displays is where much of this critical work goes on. Among the more than 20,000 plants in its living collections are some 10,000 taxa representing a wide variety of tropical and subtropical plants, especially neotropical—or New World—flora. Selby houses perhaps the world's largest collection of epiphytes and has stellar collections of orchids—about 3,600—and bromeliads—some 2,700. Its department of research and conservation supports an internationally acclaimed canopy ecology program, as well as identification centers specializing in orchids and bromeliads.

The mission to play a role in preserving our planet's fragile ecosystems—conservation of tropical rain forests in particular—is shared at every level of the gardens, and the dedication is contagious. Raúl Rivero, director of education, speaks eloquently of Selby's commitment to making the earth a better place by instructing and inspiring children, especially in the areas of conservation and environmental issues. "We're basically trying to disseminate as much environmental education as possible," says Rivero. "It's important for children to learn about their local environment first, then to develop a strong awareness of the critical value of tropical rain forests, because they belong to us, too."

Selby takes the environmentalists' mantra—think globally, act locally—one better. The scope of its programs span local, national, and international issues. Annemarie Post, Selby's director of horticulture, recently spearheaded the restoration of a section of shoreline around Selby (Sarasota Bay Restoration Project, see sidebar page 40) to reduce erosion and filter pollutants from stormwater runoff. Members of Selby's research staff also head or participate in a variety of worldwide conservation programs. This month the gardens will host the second international forest canopy conference—the first was held at Selby in 1994. Among the invited speakers are Mark Moffett, a photojournalist with *National Geographic*, and Thomas Lovejoy, director of science for the Smithsonian Institution.

Adventurous Spirit

How did this amalgam of human endeavor and breathtaking beauty evolve? The gardens are the legacy of Marie Selby, wife of oil magnate William Selby. Charmed by the natural beauty of the Sarasota area, in the early 1920s the Selbys purchased seven acres on a small peninsula that juts into Sarasota Bay. They built a two-story, Spanish-style house on the property, and Marie planned much of the landscaping, including a large rose garden. The couple shared a love of the outdoors—in summer they rode horses and raised cattle on their Montana ranch—and Marie's adventurous spirit is exemplified by her achievement of becoming the first woman to drive cross-country in an automobile. A charter member of Sarasota's first garden club, Marie was also devoted to protecting Sarasota's natural beauty from overdevelopment. After her husband died in 1956, Marie lived on the property until her

death in 1971. In her will, she decreed the property be developed as a botanical garden for the enjoyment of the general public; a board of directors was appointed to oversee the formation and development of the gardens. Following consultations with the New York Botanical Garden and the University of Florida, the directors recommended that

Selby carve a niche for itself by specializing in epiphytic plants. With that mission in mind, the gardens officially opened in 1975. In the intervening years, purchases of adjoining property have expanded the gardens to nearly 13 acres.

Epiphytes

What is an epiphyte? Most of the school children who visit the gardens can tell you that it is a magical sort of plant with aerial roots that attaches

itself to other plants for support and obtains its nourishment from rainwater, dust, and organic matter that collects around it. Epiphytes include certain orchids, bromeliads, aroids, and ferns. Today Selby is a living museum of epiphytes. Wherever you are in the gardens, you're likely to see coils of ball moss (*Tillandsia recurvata*), like silvery bird's nests, perched overhead in a tangle of tropical blossoms, or the spiky red-stalked flower bracts of a cardinal airplant (*Tillandsia fasciculata*) protruding from the branches of a cypress tree.

"Epiphytes were, and still are, the main research, education, and display priorities," says Bruce K. Holst, director of the Selby herbarium. "A small garden needs focus, and the combined efforts of all of our departments toward this common goal have made a major impact on both scientific and public knowledge."

But Holst emphasizes that Selby is constantly expanding the scope of its plant collection and research activities. "We continue to study epiphyte diversity and taxonomy, but we have added a broader canopy biology program to the slate in

order to help understand canopy processes better," he notes. In addition, Holst says that despite the gardens' traditional focus on tropical plants, "We've realized it is unwise to ignore our own backyard and have begun informal programs to survey the flora of Sarasota County and increase the holdings of Florida native plants in our herbarium." While the tropical display house maintains its emphasis on epiphytes, "on the grounds there is an increasing effort to display native plants," he adds.

Holst himself embodies the best of what Selby—at the turn of the millennium—has to offer. In the course of gathering plants in the cloud forests of Central and South

Bottom left: Confederate jasmine (*Trachelospermum jasminoides*) shrouds tree trunks and branches with a starry white blanket. **Bottom right:** The massive conelike fruits of screw pine (*Pandanus utilis*). **Below:** Air plants such as ball moss (*Tillandsia recurvata*) are attached to trees throughout the gardens at Selby.



Sources

Marie Selby Botanical Gardens, located on South Palm Avenue at U.S. 41 in Sarasota, is open year round from 10 a.m. to 5 p.m., except for Christmas Day. Admission is \$8 for adults; \$4 for children ages six to 11. Special rates are available for groups of 20 or more. For additional information, write to Selby at 811 South Palm Avenue, Sarasota, FL 34236-7726; call (941) 366-5731; or visit its web site at www.selby.org.



From the canopy research platform, located 35 feet in the air in a live oak, Selby's visitors can get a bird's-eye view of the gardens, above left. The almost blue blossom of *Hibiscus rosa-sinensis* 'Blue Bayou', above right, is the product of a former Selby researcher's plant breeding program.

America, he has braved a 30-foot fall, aggressive insects, and extremes of climate. He has published floristic and taxonomic studies on bromeliads and neotropical members of the myrtle family (Myrtaceae) and is an expert on the flora of the Venezuelan Guayana. Holst also participates in Conservation International's Rapid Assessment Program, which provides baseline data on the ecological diversity of critical tropical habitats that are imperiled by activities such as development, logging, and slash-and-burn agriculture.

Selby even has its own research platform built 35 feet in the air among the gnarled and twisted branches of a giant live oak. Located near the center of the gardens, the platform serves as a prototype for visiting scientists interested in canopy research and will be a congregating point during this month's canopy conference. As you might expect, it is also a popular spot with children participating in Selby's educational programs.

A New Frontier

The forest canopy is considered one of earth's last remaining undiscovered scientific frontiers, and Selby's canopy ecology program is at the forefront of the field. The program, headed by canopy ecologist Meg Lowman, focuses on epiphytes and their role in the natural order of the forest

canopy. Field sites visited by Selby researchers include local Florida hammocks as well as sites in Africa, Australia, and Central and South America. The main reason forest canopies have not been heavily studied is that they are difficult to reach. Although rope walkways, cranes, and specialized "rafts" dropped on the canopy by hot-air balloons have allowed greater access to tree tops in the last two decades, scientists have still only managed to take a look at "two or three percent of the canopy," says Lowman. To change that, a network of walkways is being set up around the world, including in temperate rain forest sites in North America.

Record Collections

Selby's department of research and conservation is charged with managing and adding to its living collections of plants, herbarium specimens, photographic collections, and library. Many of the 10,000 taxa in the gardens' living collection are rare or endangered species that were gathered on field expeditions to tropical rain forests. Although some of these plants are reserved for study by scientists, many have been propagated and are on display outdoors or in the Tropical Display House. Another star in Selby's crown is a collection of historic orchids and bromeliads that were introduced in the 19th century.

Reflecting the gardens' overall focus, the Selby herbarium specializes in tropical and neotropical flora, especially epiphytes. The flora of Ecuador and epiphytic flora of the Andes are especially well represented. These dried specimens are arranged carefully on non-reactive paper so that both sides of leaves, flowers, fruits, seeds, and stems are visible; in their two-dimensional form these sheets resemble intricate, sepia-toned works of art. Collections at the herbarium also include about 1,700 type specimens—the specimen to which the original botanical name was associated—all housed in a specially protected area. Just as libraries loan books, the herbarium loans out these plant records to scientists, students, and specially recognized institutions.

At the Orchid Identification Center, orchid specimens preserved in vials of alcohol have a curious luminescent beauty. These, along with more than 20,000 taxonomic references and photographs, aid researchers in identifying orchids sent to them by botanists and collectors. The center works closely with the American Orchid Society and confirms the identity of prize-winning orchids. The day I visited the center, two large boxes filled with specimens to be identified had arrived from the Smithsonian Institution.

The Mulford B. Foster Bromeliad Identification Center was also established at



These muscular roots, above left, support the massive trunks of a grove of banyans planted by Marie Selby's gardener in 1939. The grove is sometimes used as an outdoor atrium for events such as theatrical performances and plant sales. Above right, the inflorescence of the aptly named bottlebrush tree (*Callistemon* spp.).

Selby in 1979 to provide a resource for scientists trying to identify the epiphytes daily being encountered in tropical rain forests around the globe.

Community Involvement

Selby's education department is eager to share its wealth of botanical knowledge and resources with the community. In addition to offering adult classes, Selby works closely with the local school system to provide a wide variety of educational programs for children.

One of the community projects in which Selby is involved is an interpretive nature trail at a nearby school. Director of Education Raúl Rivero says the trail is designed so that students "will learn to recognize the most important native vegetation and understand the interrelationship of native animals and plants."

Another way Selby reaches out to children is by encouraging teachers to use the gardens as an outdoor classroom. "For every school teacher we train to use the gardens as a teaching resource, we multiply by 25 the children we reach," notes Rivero. A second grader, for instance, has the chance to participate in a learning activity called "Life as a Butterfly" in the inspirational setting of Selby's colorful Butterfly Garden. The Tropical Display House, on the other hand, sets the stage for "Checking I.D.s in

the Rain Forest," a special activity for junior-high-age students. Graduate and upper-class undergraduate students majoring in botany can get a jump-start on further education or careers by enrolling in a three-month internship at Selby.

Feast for the Senses

Of course you don't have to participate in any of Selby's educational or conservation programs to enjoy the gardens. Selby is a place to broaden one's perspective, to take a step beyond the temperate-zone plants most of us are used to and discover such wonders as the Australian ant plant (*Hydnophytum papuanum*), the bloated stems of which serve as a home for thousands of ants.

The ant plant grows in the 6,000-square-foot Tropical Display House, one of 15 distinct themed areas at Selby today. Enter this glassed-in mini rain forest and you discover strange new shapes, colors, and scents. Looking up, you see a multitude of orchids cascading from overhead beams and the billowing fronds of tree ferns swaying soothingly; looking down, you see colorful gingers and heliconias blooming amid a wealth of other tropics. All around, exotic vines twist and tumble. Along one side of the building, water spills down a black volcanic rock wall—like the face of a mountain—among bright moss, glistening ferns, and shiny orchids.

The outdoor portions of the gardens are dominated by wide paths, open vistas, and glimpses of the blue bay alive with pleasure yachts, fishermen, and seabirds. You will be aware of the tangy smell and feel of the ocean even as you wander into the hushed, cathedral-like atmosphere of the Live Oak Grove, pass next to towering canes of Chinese giant timber bamboo (*Bambusa oldhamii*), or pause among the seemingly endless variety of palms in the Palm Grove.

Leaving the Palm Grove, you can climb onto a wooden boardwalk opening directly out onto the shoreline that surrounds about two-thirds of the gardens. Here Selby encourages native plant communities, including mangroves and sea grapes, whose shiny bronze, red-veined new leaves turn red with age. The leaves' flat, circular shapes once lent themselves to use as handy emergency notepads for early Spanish explorers to the area.

A white gazebo at the southern extension of the peninsula makes a strategic resting place. Here, one can contemplate the bo tree, or enjoy unexpected scenes such as a white egret striding purposefully among blurs of blue salvia. A walk along the main path past a wildflower garden brings visitors to two of Selby's most unusual areas. The Succulent Garden holds a strange fascination, both because of its stark beauty and because its nonnative inhabitants—

Shoreline Restoration Project

At the north end of the gardens, behind the Selby museum, a 1,000-foot area of shoreline draws the eye with its cool-looking green lagoon, golden brown swathes of waving marsh grasses, and a low white mound of crushed shells silhouetted against the blue of the bay. Visitors are often surprised to learn that these unassuming features are integral parts of an elaborate project to prevent erosion of the shoreline and reduce water pollution.

The two-foot-deep lagoon was designed to function as a stormwater retention area. "As we dug the lagoon we found evidence of an ancient marsh," says Annemarie Post, Selby's director of horticulture. "There had been marsh vegetation there at one time that probably had been washed away by storms." After digging the lagoon, Post and her staff planted more than 100 native species, including mangroves, appropriate to the various habitats throughout the site. Although the lagoon usually contains freshwater from runoff, Post says that during storms it sometimes gets inundated with salt water, so plants placed along the edge of the lagoon were chosen for their tolerance of brackish conditions.

Local Flavor

Woody and herbaceous plants used along the shoreline include exotic-sounding natives such as pawpaw (*Asimina tetramera*), pond apple (*Annona glabra*), gumbo limbo (*Bursera simaruba*), coco plum (*Chrysobalanus icaco*), coin vine (*Dalbergia ecastaphyllum*), cat's-claw (*Pithecellobium unguis-cati*), and wild coffee (*Psychotria nervosa*). Along the edge of the marsh Post planted leather fern (*Acrostichum danaeifolium*), which she describes as "one of my favorite plants."

Among the grasses Post chose for the site are cord grass (*Spartina patens* and *S. bakeri*), planted along the shoreline, and black rush (*Juncus roemerianus*), which

she selected for marshy areas. "What I found most amazing is that by using the native grasses in masses, the site really looked good in a very short amount of time," says Post.

The plants help filter stormwater runoff, which often contains pollutants such as fertilizers, pesticides, oil, and sediment. In addition, they provide habitat for the diverse organisms that inhabit tidal communities.



Selby staffers re-created this shell mound, anchored with a broad selection of native plants, as part of a shoreline restoration project at the north end of the gardens.

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Shell Mound

One reason Post decided to re-create a shell mound is that the feature—common to this section of Florida's coastline—has local significance. A shell mound once existed nearby, on

the site of what is now a condominium, and the local name for the highway that runs past Selby is Mound Street. Among the many natives planted on or around the mound are four night-blooming cacti, including prickly apple cactus (*Cereus gracilis* var. *aboriginum*), which is a rare endemic to the Sarasota area.

A nature trail guides visitors along the restored shoreline. As in other parts of the gardens, all the plants are carefully labeled and interpretive signs explain the restoration process for the school groups that use this part of the garden as a living laboratory. Here one can catch sight of a snowy egret feeding in the lagoon, a bevy of crabs scuttling along the sand, or a spray of sea lavender waving in the wind. These images highlight the interconnectedness of such habitats, which are rapidly disappearing around us. "We're in a very sensitive area here; that's why it was very important to do this project," notes Post. "We're sort of on a little peninsula surrounded by water, so the mangroves and other plants provided natural wind breaks and erosion control. Now all our shoreline has been taken care of."

—M.D.

among which are a Madagascar palm, prickly cacti, aloes, and euphorbias—have been successfully coaxed to thrive in the intense humidity of southern Florida.

A grove of banyans, planted in 1939 by Marie Selby's gardener, presents the strangest appearance of all to those unfamiliar with these fig relatives. Selby's banyans include *Ficus microcarpa*, *F. altissima*, and *F. benghalensis*. A person can appear lost among the banyans' vast conglomeration of trunks and spreading aerial roots, which support the dark canopy of their exotic green leaves. The outdoor atrium provided by Selby's Banyan Grove creates a convenient site for plant sales, a yearly Orchid Ball, and the occasional theatrical performance.

Other garden areas include a garden of hibiscus, whose showy, often ruffled flowers are the roses of the tropics. What these blossoms lack in scent they make up for in sheer size and variety of colors. One striking bluish purple cultivar called 'Blue Bayou' was developed by Kiat Tan, a former orchid expert at Selby. Other gardens feature tropical food plants and medicinal plants.

Bright, dramatic colors are a recurring sight in the gardens and some of the most vivid hues of all can be found in Selby's Butterfly Garden. Here, gulf fritillaries, sulphurs, monarchs, and swallowtails dart in clouds over exotic plants such as red and purple passionflowers, bougainvilleas, Mexican flame vines, and pentas, or the more familiar cosmos, zinnias, and salvias. This area is located in the "front yard" of the Christy Payne House, an elegant mansion once owned by neighbors of the Selbys. Purchased in 1973, the building now serves as a museum for exhibitions of botanical art.

The original Selby bungalow now houses one of the best botanical bookshops in the southeastern United States.

Many visitors pause at the Waterfall Garden, located near the bookshop and plant shop, before leaving Selby. Here, after a long day of sensory overload, it's relaxing to soak in the atmosphere of cool tranquility, listen to the soothing music of the waterfall and rustling bamboo, and watch orange, gold, and white koi streaking through the water in pursuit of handouts. Usually at this point in my visits to Selby, I'm already plotting how soon I can get back here again.

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

The Little Giant

Finding garden books with staying power is Frances Tenenbaum's forte.

by Kathleen Fisher

Just what do editors do, anyway? From movies like “The Front Page” and from “Shoe” on the comic pages, we have an image of newspaper editors as rumped and overworked journalists whose primary job is to yell about deadlines and shred reporters’ deathless prose.

As for book editors—well, we know that Jackie Onassis got to eat lunch with a lot of other celebrities. But otherwise, don’t they just move commas around and mutter complaints about dangling participles?

Those of us who are less-than-flawless writers can tell you: Finding a good editor is like finding a great hairdresser, therapist, and architect all rolled into one. They make you *look* good, and they make you *feel* good. They do that by combining an exquisite sensitivity to both public taste and your own personal style. But most important, they make sure that if you are building a ranch house of a book, it has useful features—Have you thought of a screened porch?—without any gargoyles or flying buttresses that will make you a laughingstock.

Everyone who has worked with Frances Tenenbaum says she is that kind of editor.

For the past 24 years, Tenenbaum has been an editor for Houghton Mifflin Company in Boston, and for the past three or four she has worked exclusively on garden books. She snagged the newspaper columns that became Henry Mitchell’s latest book. She shepherded *Noah’s Garden*, Sara Stein’s award-winning ecological call-to-arms, into print, and she shapes the long-running and extremely successful series of



With a keen eye and a firm hand, Houghton Mifflin’s Frances Tenenbaum turns raw manuscripts into classic garden books.



In her Boston office, top, Tenenbaum checks out potential images for a book project, while Lisa White, manuscript editing supervisor, looks on. Above: A sampling of the gardening books that Tenenbaum has edited, written, or championed include, left to right: *Tasha Tudor's Garden*, *Taylor's Weekend Gardening Guides: Window Boxes*, *Henry Mitchell on Gardening*, *Taylor's Guide to Ornamental Grasses*, *Taylor's Dictionary for Gardeners*, and *An Island Garden*.

Taylor's Guides to gardening basics. In addition, last year she herself compiled *Taylor's Dictionary for Gardeners*, a user-friendly guide to thousands of gardening and horticultural terms.

Four years ago, she began working closely with Connecticut author Tovah Martin and Vermont photographer Richard Brown to create the gorgeous *Tasha Tudor's Garden*, which has sold almost 100,000 copies and spawned spinoffs that include a crafts book and calendars.

"When you put in a proposal, she doesn't just lean on your instincts," says Martin, who has written books for several other publishing houses. "She grows the book with you, so it becomes more than the original idea.

"Part of being an editor is being a bulldog," Martin recognizes, "but Frances gets authors to blossom, so that it's more like a club than a job. You don't feel the pressures that come into writing a book, which can be so strenuous and awful."

Both Martin and Sara Stein recall little notes and friendly phone calls that kept them on track and inspired, rather than harried.

When Stein auctioned the manuscript for her ground-breaking *Noah's Garden*, Tenenbaum wasn't the original winner. "Then we began to feel uncomfortable and we broke the contract," Stein says of herself and her agent. "Frances had a deeper understanding of the book, and she helped me know what to throw away, what was too long, too technical, too difficult." On the other hand, she says, Tenenbaum also knew when the flow of a phrase would run aground on the rocks of botanical nomen-

clature. "She has a flexibility that I think comes with age and experience."

Stein put her finger on one of the trends so discouraging to garden book authors: Many publishers are letting veteran garden editors leave, and their replacements may know nothing about horticulture—and little more about editing.

The other trend is the marketplace itself, where independent publishers and independent bookstores are being replaced by giant publishing conglomerates and mega book chains. In this huge and impersonal new world, most garden books are thrown together with an eye toward quick profits and an equally quick oblivion.

Pam Lord, founder of the Garden Book Club and a member of the American Horticultural Society's Book Award Committee, respects Tenenbaum for bucking the trend. "She really cares, because she gardens herself," Lord says. "She can smell a phony a mile away, and she won't publish anything she can't be proud of."

A Day in the Life

In spite of Tenenbaum's long tenure at Houghton Mifflin, the receptionist frowns at the name as she runs her finger through a staff roster when we arrive for a visit. Tenenbaum explains that she's not on staff, but under contract. That keeps her life flexible, and from Independence Day through Labor Day, she can work from her summer home on Martha's Vineyard.

From her eighth-floor office at the corner of Boylston and Berkeley, Tenenbaum has an impressive view of the Boston cityscape but misses the birds that frequented a former Houghton Mifflin site. "The office there was even smaller though," she says. "If I had visitors, I had to arrange the chairs in a line, like in a classroom."

Tenenbaum quickly explains that her office is not always this tidy. She likes to spread her manuscripts and references all over the floor. But her daughter, Jane, who is in town from Madison, Wisconsin, has cleaned up for today's expected company. Tenenbaum says that both Jane, a graphic designer, and her son, David, who also lives in Madison and writes text for a children's science web site, inherited traits she lacks: They're both extremely organized and relatively tall. Tenenbaum will talk about her diminutive stature. "I'm definitely taller than Tovah Martin. She's under five foot." But not her age. "You can say that Jane is 50. David is...somewhat younger."

Tenenbaum's authors believe she's good at what she does because she is both a gardener and a writer herself. Quick to put illusions to rest, Tenenbaum denies that she was born to do either.

"My mother was a great gardener. When I was about five, she made me a little garden, as we will for our children. I told her, 'You like it, you take care of it.'"

As did both her children, she went to undergraduate school in the upper Midwest, but, unlike them, she couldn't resist the pull of her native New York. She "ended up" at the Columbia School of Journalism and got her first job writing features for the *New York Herald-Tribune*. When her children were small, she wrote a free-lance column for a suburban newspaper, "mostly covering the school board, which was contentious as only a suburban school board can be."

It wasn't until she got her first home, in Great Neck, Long Island, that Tenenbaum discovered gardening. Her delighted mother, gratification long delayed, donated some perennials. But designing the garden wasn't what Tenenbaum enjoyed most. "I found that I was addicted to weeding! It makes such a difference so quickly. And you can do it sitting down. But I think I prefer weeding to planting for the same reason that I prefer editing to writing."

Tenenbaum wrote her first gardening book after she and her husband, Frank—an engineer who died in 1972—built their summer home in the Gay Head section of Martha's Vineyard. Watching bulldozers plow through the natural landscape, she decided that other people should be more aware of wildflowers. "I didn't do it as an expert," she notes, "but as a journalist, through interviews." Scribner published *Gardening with Wild Flowers* in 1973; Ballantine republished it as a paperback, and it was in print for years.

That was rewarding from an author's point of view, but it became irritatingly restrictive to the budding gardener. In the book, says Tenenbaum, "I was insufferably pure about not tinkering with the natural landscape." As a result, the "garden" was little more than a sand dune sporting beach plum, bayberry, and brambles.

When *Gardening With Wild Flowers* disappeared from book stores, she threw off her self-imposed shackles and began planting everything that struck her fancy, no matter how inappropriate to the site. Eventually, though, she began to improve



the soil, and through both economy and pride, scrounged her own amendments. There were drives from Long Island with bags of homemade compost leaking from the roof of the car and one memorable Easter weekend spent digging manure by moonlight. "I realized that was nothing, though, when one of our Gay Head neighbors flew manure in with his private plane."

When she's not at Martha's Vineyard, Tenenbaum lives in a Cambridge apartment with little room for gardening. The balcony is the domain of Pumpkin, an 11-year-old miniature dachshund who uses the space for her "catbox." Says Tenenbaum: "I keep a few houseplants—until I kill them."

She does continue to experiment in Gay Head. "The best part of gardening on the island is scavenging, so I get eel grass and salt-marsh hay from the edges of Menemsha Pond, leaves from around my Cambridge apartment, compost from my brother's Connecticut garden, and shingles from the town dump to help plant a steep sandy slope." Even the celebrities who frequent the Vineyard have made unwitting contributions. The set for a Carly Simon concert yielded a featherweight faux log that Tenenbaum used to support part of a raised bed.

She's given up perennials that fail to satisfy, such as oriental poppies, which never flower when she's there, and bearded iris, which are easily tattered by island winds. Siberian irises flourish, though, and her mother's garden lives on there in daylilies and epimediums—"I have a lot of daylilies, including some wonderful tetraploids, in shades of rose and pink. Lavender is beau-



Tenenbaum's tidy garden in the Gay Head section of Martha's Vineyard, above and top, abounds in airy, graceful plants, including cleomes, coneflowers, daylilies, gaura, coral bells, lavender, liatris, and Shasta daisies.



Tenenbaum delights in scrounging garden supplies. This fake log was left over from the set of a Carly Simon concert.

tiful, and I love gaura." Baptisia, coral bells (*Heuchera sanguinea*), and Shasta daisies are happy, and now that a small oak tree has become a big one, so are astilbe and lady's mantle (*Alchemilla mollis*). A Vineyard neighbor let her dig up a lilac and an American pillar rose to transplant to her garden.

"But I don't do what my writers tell everybody else to do. I don't plan. I don't buy three of everything. What was it Henry Mitchell said? You should garden for fun, because you get enough of the other at the office." While she loves her work, Tenenbaum figures life holds enough duties without mowing and pruning and deadheading.

Encountering the Curmudgeon

Tenenbaum's eye for good garden writing is epitomized by her persistence in acquiring the rights to Henry Mitchell's gardening columns. Another publisher had nabbed Mitchell's first book of columns, published as *The Essential Earthman*, in 1981. Tenenbaum, who is tireless about keeping up with garden publishing and everyone in it, wrote him a fan letter and asked him to consider Houghton Mifflin if he ever did another book.

It wasn't until a decade later that Tenenbaum finally got a call from Mitchell's wife, Ginny. The *Washington Post* columnist had told his wife that no one would buy his old work, but that if she were able to get it published, she could have the royalties. (See "The Exuberant Pilgrim" in *The American Gardener*, September/October 1997.)

Tenenbaum wasted no time accepting the offer. She received a carton bulging with yellowed newspaper clippings and exuding the aroma of Mitchell's ever-present cigarettes. For weeks she read them in bed, sorting the best from the merely great, and had them typed and sent back. Then one day on the phone Ginny Mitchell said to her, "Henry wants to talk to you."

It had never crossed Tenenbaum's mind to change any of Mitchell's words. "Why would you?" she asks. Nevertheless, she was terrified. "I expected that curmudgeonly voice that you hear in his columns. Then he got on the phone with that wonderful southern accent and he was totally delightful. He spent nearly all of the time telling stories and hardly mentioned the book." The Mitchells stayed at Tenenbaum's Cambridge apartment while Henry was being treated for the colon cancer to which he eventually succumbed in 1993.

The Personal Touch

Tenenbaum loves e-mail, and her computer chirps frequently to signal the arrival of a new message. "The only problem is that when I get to the island and hear real birds, I think I have new e-mail," she says. The phone buzzer is busy, too. She takes a call from Mac Griswold, who's writing a book about gardening at George Washington's Mount Vernon estate in Virginia. We had just been looking at some of the gorgeous photography by Roger Foley, who lives in nearby Arlington, Virginia.

Does she ask Griswold how the book is coming? No, she waits until the author brings up business. "Some of us were wondering," Tenenbaum says. "Is 'Mac' an abbreviation for something, or is it your real name?" She's interested to learn that it's Griswold's real name, for a grandfather who was the last of nine children. Griswold's parents had wanted a boy.

Tenenbaum's close personal connection with her authors can bring an extra measure of pain when a book fails to sell well. Tenenbaum invested a piece of her heart in two recent little books of essays: *My Vegetable Love*, by Carl H. Klaus, and *Foxgloves and Hedgehog Days*, by Daniel Blajan. But in spite of warm reviews, neither one took off in bookstores.

Have television and the Internet left Americans with no attention span for mere text? Tenenbaum and others say it's not potential readers who lack patience, but the publishers. Something has been lost with the takeover of large publishing houses by non-

publishing corporations—Houghton Mifflin and Norton are now the only exceptions to this trend, according to Tenenbaum.

And remember that little bookstore on the corner, where the owner was always behind the counter and knew every book on the shelves? Stores like these now represent only 10 percent of the market. In the sprawling chain stores, a book that doesn't stand out doesn't move—except to the discount table.

So much more now than in the past, an editor has to not only be a wordsmith, bulldog, and hand-holder, but also be market-conscious. "It doesn't do any good to write a book that no one knows is out there," says Tovah Martin. "If you write a book that's text heavy, you're pitted against the packagers who are looking for something glitzy. Frances has the ability to sit up and listen in a world where people are getting a bit lazy."

Books That Last

Tenenbaum's cardinal rule is: "I don't want to do books that will disappear in three months."

A book with just such staying power is *An Island Garden*, written by New England poet Celia Thaxter and illustrated with paintings by Childe Hassam, an important American Impressionist. Originally published in 1894, the book went out of print in 1902 after only 2,000 copies had been published. After the book was discovered in Houghton Mifflin's basement archives by another editor with a passion for classics, Tenenbaum fell in love with it and championed its reprinting in 1988. Says Pam Lord: "She helped give Americans back their horticultural history—something they don't even realize they have."

Although Tenenbaum swears that she won't do another "literary" gardening book, she knows that if the right one comes along—and there aren't many—she will give in to her instincts.

A good editor can also be compared to a skilled surgeon. Fans say Tenenbaum's instincts are razor sharp in cutting through superficial cuteness and syrup. She knows how to find the heart of garden writing, if there is one to be found.

"She doesn't deal with malarkey," says Pam Lord, "and I'm respectful of any book she publishes. I would call her a little giant."

Former editor of The American Gardener, Kathleen Fisher is a free-lance writer living in Alexandria, Virginia.

The Genetics of Geography

Getting the species right isn't always a guarantee of success.



by Andy Wasowski

Gardeners can be divided into two groups.

The first belongs to the Evel Knievel school of gardening. They see gardening as an eternal challenge—an us-versus-Mother Nature situation where the environment must be overpowered and bent to one's will. These are the people who insist on growing azaleas in alkaline soil, banana trees in USDA Zone 8, and turfgrass in areas with annual rainfall a mere eight to 12 inches. Into this group I also lump bungee jumpers, people who build Spanish galleons inside aspirin bottles, and liberals running for office in Orange County, California.

The second category is the one I belong to. We consistently opt for the path of least resistance—the easiest way possible. Getting a plant to not only stay alive but actually thrive is an achievement that strikes us as being only slightly less intimidating than pulling off an orbital docking maneuver. Forget having green thumbs; ours range from beige to black!

Little wonder then that we gravitate toward native plants the way iron filings are drawn toward magnets. And the reason is simple: Native plants are genetically adapted to the growing conditions of their specific regions. They are at home in the local soil, they can survive on the local rainfall, and they have worked out a harmonious and cooperative relationship with the local wildlife. This didn't happen overnight, of course. It took many thousands of years; many natives have been evolving this way since the last ice age. Some have been at it for 30 million years or more. Having learned this bit of horticultural wisdom, you'd think that we would be well on our way to gardening success. All we have to do is find out which species are native where we live, stick 'em in the ground, and then wait for gardening magazines to start clamoring to immortalize our efforts.

Unfortunately, this is not always the case.



While getting the species right is a big part of successful gardening, it won't do you much good if you don't get the provenance right, as well.

Provenance? Isn't that a city in Rhode Island? No, it's the Anglicized version of a Latin word meaning, roughly, "from whence it came." According to the dictionary, provenance means "place of origin." Botanically, it means where the plant evolved. And where it evolved determines its genotype, or genetic composition.

You see, a specific plant can be native to a variety of places—not just within one state or vegetational zone, but often in very diverse sections of North America. Long, long ago, the seeds were distributed according to where the wind blew them or where birds or other animals carried them. They then slowly evolved to meet the conditions of those locales.

"Plants, like other living organisms, have varying amounts of adaptive flexibility built in," says Guy Sternberg, president of the International Oak Society and author of *Landscaping With Native Trees*. "We see red maples that prefer swampy soils, while others like upland, rocky soils. Some pin oaks seem much more tolerant of lime soils than most others of the same species. All of these factors relate to provenance, and the process involves much, much more than simple hardiness zones."

So, when we talk about the provenance of a specific plant, we are not talking about the species as a whole, we're talking about the genotype of a specific plant within that species—the one you may be thinking of buying for your yard. A plant with a local provenance will be genetically better suited to your local growing conditions than one that is indigenous to another part of the country with very different growing conditions.

Put another way, it's the provenance of a plant that truly determines whether or not it's native or indigenous to your region.

Case in Point

Let's use butterfly weed (*Asclepias tuberosa*) as an example. Native in sandhills, flatwoods, post oak woods, meadows, and pinelands throughout the eastern two-thirds of the United States, from eastern South Dakota down into Florida, this brilliant orange-flowered plant has a very long taproot, making it extremely drought-tolerant and long-lived. Even so, butterfly weed from Minnesota will die in a

"A plant with a local provenance will be genetically better suited to your local growing conditions than one that is indigenous to another part of the country with very different growing conditions."

Previous page: Snowberry is native to a broad swath of North America, from southern California to Virginia, so be sure you are buying one that originated near where you plan to grow it. Opposite: Two netleaf hackberries (*Celtis reticulata*) growing near Las Cruces, New Mexico. Related to elms, netleaf hackberry can attain heights of 50 feet, but because of the tough environment in which it usually grows, it often takes the form of a contorted shrub.



Louisiana summer, no matter how much water it is given. Likewise, butterfly weed indigenous to Georgia or Alabama would find Minnesota winters intolerable.

Then there's the southern live oak (*Quercus virginiana*). This tree is native from the southern Atlantic coast to central Texas and Oklahoma. If you live within that geographical range, you might figure any old live oak will do well in your landscape. But what if you live in Dallas, for example, and your nursery purchased its live oaks from some out-of-state grower. Well, if there's a repeat of the notorious winter of 1983-'84—when north central Texas was locked in a deep-freeze—your live oak could be in big trouble.

Back then, half the live oaks—the ones purchased from growers in southern Louisiana—popped their bark and died. Those that came through pretty much unscathed were the indigenous ones from local growers. These were genetically adapted to tolerate the kind of extreme winters that periodically hit that part of the state. Botanists have long differentiated the inland live oaks as *Q. virginiana* var. *fusiformis* or as *Q. fusiformis*—the name seems to get officially changed back and forth every few years—but the two trees form hybrids and nursery owners tend to lump them together as though it doesn't matter. Clearly, it does matter.

An interesting and widely known example of the importance of provenance on plant selection is our common native flowering dogwood (*Cornus florida*). Flowering dogwoods propagated from cuttings or seeds of trees that originated in mild southern climates tend to suffer damage to flower buds when grown much north of their original habitat. This is especially true of the pink-flowered variety (*C. florida* var. *rubra*), whose flower buds are more sensitive to frost than their white counterparts.

In the most recent edition of his *Manual of Woody Landscape Plants*, University of Georgia horticulturist Mike Dirr writes that although the flowering dogwood is known to be hardy to USDA Zone 5, "Plants which are sold in Zone 5 should be grown from seed collected from trees indigenous

to those areas." He adds, "I have observed far too many flowering dogwoods in the Midwest with minimal flower production, principally caused by lack of flower bud hardiness; if possible, always ask the nurserymen where the trees are grown."

If you live in Connecticut, you might want to add native snowberry (*Symphoricarpos albus*) to your landscape. This handsome shady ground cover, with its clusters of white berries in fall and winter, is native in your locale, but it's also native in a giant horseshoe-shaped range that stretches from Southern California—where it is



known as canyon snowberry—up to Alaska, then across to Quebec and on down to Virginia. Talk about a wide variety of growing conditions!

If the snowberry you buy is from a mail-order catalog out of, say, Oregon, or one your local nursery bought from a grower in California, it most likely won't do well for you in Darien or New Canaan!

Appearances are Deceptive

Now you might think that plants of the same species but very different provenances would look different. That a live oak from Georgia would be somehow visually set apart from one in Texas. No such luck;

Opposite: The flowerbuds of southern selections of our native flowering dogwood are not reliably hardy in northern gardens. **Above, left:** Goatnut, or jojoba, grows in the southwestern United States and northern Mexico. **Above:** Butterfly weed is common in the eastern two-thirds of the United States.

members of the same species sometimes look pretty much the same, no matter where they originated, or exhibit minor differences that are difficult to determine when you don't have examples from different provenances to compare. Of course botanists realize these plants are different, and they sometimes divide them into varieties. For example, *S. albus* var. *albus*, native from Quebec to Virginia, has leaves that are finely hairy underneath, while *S. albus* var. *laevigatus*, native to the Pacific slope, has leaves that are usually smooth—glabrous—underneath. But it's a very rare nursery that will label their stock this definitively.

You need to know, too, that provenance affects more than winter hardiness: Drought and heat tolerance are also critical considerations in selecting plants. Possumhaw (*Ilex decidua*) is a gorgeous ornamental tree native from Virginia and Illinois on down to the Gulf States. Female plants are ablaze with red berries from October through March, when new leaves appear.

But if you live in Tulsa and your nursery carries possumhaw that is native to the Carolinas, where the rainfall averages up to 30 inches more per year than it does in possumhaw's western range, those trees aren't going to be happy in your yard this coming summer. They will be drought-stressed and thus more vulnerable to insects and diseases.

Both the netleaf hackberry (*Celtis reticulata*)—also known as palo blanco or acibuche—and the popular evergreen shrub jojoba or goatnut (*Simmondsia chinensis*) are native from the Sonoran Desert of Mexico to Southern California. But if you live in San Diego and your nursery purchased these two natives from a grower in Phoenix, Arizona, their provenance would not be the coastal chaparral of San Diego County, but the Sonoran Desert. And even though San Diego and Phoenix may be similar in some respects, they do not share identical growing conditions. The hackberry and jojoba from San Diego will be used coastal temperatures and humidity and will not thrive in a torrid Phoenix summer.

Provenance is not just a matter of latitude; it is also important to be aware of the east and west provenances. Take big bluestem (*Andropogon gerardii*), more colorfully known as turkeyfoot. The most important grass in the tallgrass prairies, it has a very wide native range, from the Gulf of Mexico up into southern Canada, and from Florida to New Mexico. It can grow in moist areas out in

west Texas, on hillsides in Wisconsin, and in meadows in New York State. But if you think a big bluestem adapted to the high humidity around Baton Rouge, Louisiana, is going to do well in the high aridity of eastern New Mexico, think again.

Wise Investment

With annuals, provenance isn't such a big deal. But with longer-lived plants—especially trees—that are big enough to affect large parts of your landscape, it's important to choose a specimen that will withstand all of the vagaries that your climate might produce. Ideally these should be from the same latitude, altitude, and distance from the moderating influence of the ocean, and the same distance from mountains that might affect rainfall patterns. The soil should also have the same kind of porosity and the same range of alkalinity or acidity. Otherwise, a winter storm or drought is likely to damage the plant.

Bottom line: Before you purchase a native shrub or tree, don't check just the species; ask about the provenance as well. As a very general rule, if you buy a plant propagated from stock within 100 miles of where you live, it ought to do well. But even with such a plant, beware of significant differences in any of the characteristics listed above. And if the people at your nursery don't know and can't find out where the plant was grown, you risk buying and planting something that may be beautiful and even appropriate for local wildlife, but that may not be any more of a sure thing than an exotic plant from a dissimilar habitat.

Andy Wasowski and his wife, Sally, have co-authored six books on native landscaping, including Gardening with Native Plants of the South. He is also a commentator on National Public Radio's environmental program, Living on Earth.

“Before you purchase a native shrub or tree, don't check just the species; ask about the provenance as well.”



Top: Possumhaw (*Ilex decidua*) loaded with fruits in early fall. **Above:** Live oak (*Quercus virginiana*), an arboreal symbol of the American South. **Right:** Big bluestem grass (*Andropogon gerardii*) is a key component of the tallgrass prairie.



Defining Our Terms

No question about it, native, or indigenous, plants are becoming more popular and, as a result, more available in nurseries throughout the country. That's good. The bad news is that too many people—including some professionals—are using these terms without a full understanding of what they actually mean. Once, while giving a talk to a native plant society in another state, one of the members—an enthusiastic and otherwise knowledgeable gardener—described a certain plant that was native to that state and left the impression that it could be used throughout the state. That plant was indeed native, but only to a specific region within that state and would have been a poor choice almost everywhere else.

The term “native” is often used loosely to mean any plant that grows in the wild in a particular country or continent. But, obviously plants don't recognize geopolitical boundaries; most plants are native only within a finite area determined by a combination of factors such as genetic adaptability, climate, soil type, and habitat. Some native ranges encompass entire countries or continents, but others may be as small as a few acres.

One of the most basic mistakes made with regard to natives is to refer to them as being native to specific states. In 1988 my wife, Sally, and I wrote a book called *Native Texas Plants: Landscaping Region by Region*. In it we described the 10 distinct vegetational zones within that state, and the specific plants that were indigenous to each of those zones. Yet we still hear from people who think that a plant indigenous to West Texas, for example, can be used along the Gulf Coast. After all, it is a Texas native! We have to remember that a state is a political and artificial entity and can encompass many different vegetational zones. Our native plants were there long before state lines; they grow where conditions suit their needs.

The truth is, all plants—with the exception of certain cultivars—are native *somewhere*. The question is, native to where? Plants that are native to Australia or South Africa or Asia also have very specific needs, and while some of them may do well in similar conditions elsewhere, others do so well that, lacking the natural controls they had back home, they run amok in their new surroundings and create environmental problems. Crown vetch (*Coronilla varia*), purple loosestrife

(*Lythrum salicaria*), bird's foot trefoil (*Lotus corniculatus*), privet (*Ligustrum* spp.), Japanese honeysuckle, water hyacinth (*Eichhornia crassipes*), Chinese tallow (*Sapium sebiferum*), Norway maple, and that classic example of a noxious nonnative, kudzu, are just a few of the literally hundreds of foreign invaders that are wreaking havoc on our natural areas from coast to coast. To be fair, it is important to point out that these botanical invaders are not all coming our way. Lantana or calico bush (*Lantana camara*) became very popular in Australia several years ago. Now it is overrunning that continent and is a major pest!

Misuse of these words can have far-reaching consequences. A few years back I saw a television commercial for a popular home improvement chain that invited people to come in to see its stock of “indigenous plants.” I was pleasantly surprised, to

say the least. If this national chain was indeed carrying indigenous plants, this was a big step forward for the native-plant movement. So I called three of the nearest locations to find out which indigenous plants they carried.

The sales people in the gardening sections I did contact didn't have a clue what I was talking about. For one thing, they didn't know what indigenous meant. I explained that I was talking about plants that were native to that area. “Oh, yes,” one of them responded cheerily, “we carry natives. We have crape myrtles!” Well, yes, crape myrtles are natives—to China!

I finally called the advertising department of the chain's national headquarters in Atlanta and spoke to a nice young lady who informed me that what they'd meant by indigenous was, “plants that are grown locally.” In other words, if they were growing tulips and marigolds at or near the store, they considered these plants indigenous.

I explained what the word really meant—she seemed grateful for the information—and I haven't seen the commercial since. So perhaps I struck a small blow for truth in advertising—and botany!

So, what then is a good definition of a native plant? Simply a plant that has evolved in a specific locale and has become, over time, genetically adapted to those local conditions. The true native has never been genetically tampered with by us!

—A.W.



Lantana camara, above, is an example of an American native that has become an invasive menace in Australia.


INDIGENOUS—a plant that has originated and is found growing naturally in a particular region or habitat. The term “indigenous” is often used synonymously with “native.”


ENDEMIC—a plant that is restricted in the wild to a finite, and usually rather narrow, region or habitat. For example, Georgia plume (*Elliottia racemosa*) is endemic to 50 sites within Georgia.

NATURALIZED—a plant that has established itself in an area distant from its native habitat. Our common orange daylily (*Hemerocallis fulva*), a native of China, has naturalized in much of Eastern North America.




book reviews

 **tropicals**

 **North American trees**

 **California wildflowers**

 **gardening ideas**

THE TROPICAL LOOK: AN ENCYCLOPEDIA OF DRAMATIC LANDSCAPE PLANTS.

Robert Lee Riffle. Timber Press, Portland, Oregon, 1998. 524 pages. 8 1/2 x 11". Publisher's price: hardcover, \$49.95. AHS member price: \$45. **TIM 147**

In this timely, comprehensive, and beautifully produced encyclopedia, Riffle addresses the resurgence of interest in plants that convey a lush, exotic look to the garden. The author, who formerly managed a nursery specializing in tropical plants, describes nearly 2,000 tropical-looking plants and offers suggestions on ways to integrate them in the garden. The book's encyclopedic listings include plants ranging from truly tropical, heat-loving species, to subtropical and even temperate plants that can be grown by gardeners not blessed with a tropical climate.

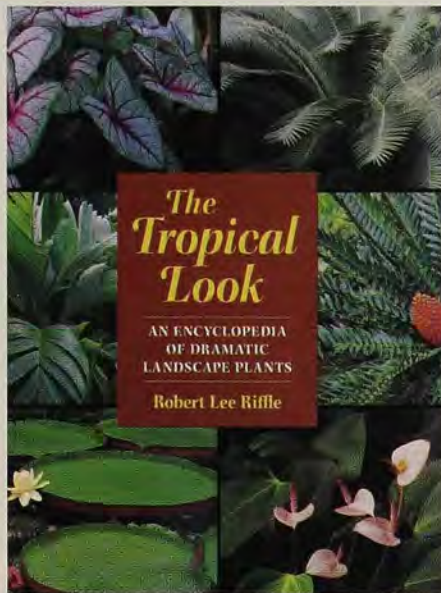
Riffle defines the central theme of the tropical look as "flamboyant form and contrast," which includes "plants with relatively large or boldly shaped foliage and flowers, and all plants with colored or variegated leaves and large and spectacular flowers or flower clusters."

Gardeners who want to introduce such exotic elements into a landscape plan will appreciate Riffle's thorough approach. Each entry in the section titled "Tropical Looking Plants A through Z" delivers detailed growing information and helpful

guidance. Plant hardiness is always clearly noted and Riffle is careful to point out those vigorous perennials such as *Thalia dealbata* and *Stenochlaena tenuifolia* that—although subject to die-back by sudden cold temperatures—can generally be expected to put out fresh growth from roots or stems.

Gardeners in temperate regions will be encouraged to learn about plants that impart the tropical look, yet have some degree of hardiness, such as the needle palm (*Rhapidophyllum hystrix*), which will grow in USDA Zone 6b with some minor protection. Riffle offers extensive advice on providing necessary protection for these tender plants. There is also a wealth of information on growing tropicals as houseplants or in greenhouses.

Readers can count upon the A-to-Z listings for pertinent information on soil preferences, light and moisture requirements, and propagation methods. More than 400 captivating photographs show details of fruit, leaves, and flowers, along with a tremendous variety of established woody, succulent, and herbaceous plant forms. Stunning images highlight eccentric bark



textures, structural branch patterns, and wonderfully bizarre habits associated with many of these rare and unusual species.

Gardeners and horticultural professionals alike will find much to be excited about in this expansive and significant resource. Riffle's effort will contribute immensely to the development of many fantastic indoor and outdoor displays around the country.

—Alice Joyce

Recently transplanted from the Windy City, Alice Joyce now writes and gardens in San Rafael, California.

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Peter R. Dallman

Preface by Robert Ornduff

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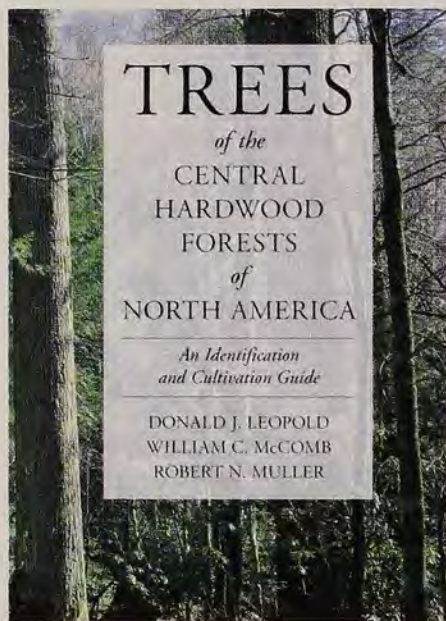
TREES OF THE CENTRAL HARDWOOD FORESTS OF NORTH AMERICA: AN IDENTIFICATION AND CULTIVATION GUIDE.

Donald J. Leopold, William C. McComb, and Robert N. Muller. Timber Press, Portland, Oregon, 1998. 509 pages. 6×9". Publisher's price, hardcover: \$49.95. AHS member price: \$45.

TIM 152

With *Trees of the Central Hardwood Forests of North America*, Leopold has joined forces with McComb and Muller, fellow foresters with impeccable credentials, to create a guide that will appeal to both the serious tree expert and nonexpert alike.

The book's introduction, a region-by-region ecological summary of the central hardwood forest, might be worth the price of the entire volume. It's too bad that so



many readers skip introductions; in this case, they will miss something special.

The book is very user-friendly, with good range maps and an alphabetical arrangement to help readers find species quickly. Each species is covered in a standard order—from habit to bark to twigs, and so forth—enabling the reader to make quick comparisons between species. Of course, botanical descriptions and dichotomous keys are included and seem to be done well.

Nearly every species is represented by monochromatic photos that show the tree as it appears out in the woods, at eye level, and in various sizes. These photos are strictly documentary, but Leopold also includes some of his inspirational color shots as well. The photos of the exfoliating bark of *Betula alleghaniensis* and the fall colors of *Nyssa*

sylvatica are especially spectacular. Unfortunately, the color photos are clumped in an arbitrary section with no relevance to nearby text.

In an attempt to be comprehensive, the authors unfortunately have perpetuated a few false assertions found in old literature, such as that Osage orange (*Maclura pomifera*) wood is orange; in fact, it is bright yellow. It also seems inconsistent that the authors discuss beech bark disease and Dutch elm disease but fail to mention dogwood anthracnose, butternut blight, and some other serious diseases of our native hardwoods.

The nomenclature—a frustrating aspect for any author—is not always current and occasionally uses newly accepted names without cross-referencing synonyms still in more common usage. The tricky distinction between trademarked names and cultivar names is not attempted, and one or two generally accepted species are treated as varieties or vice versa. But such is not the principal focus of this work, and these glitches no doubt will be corrected in the next printing.

While the authors have included some common naturalized species such as *Pyrus communis* and *Albizia julibrissin*—and skipped a few relatively obscure native ones—they nonetheless note that “the use of native trees... would be one step toward maintaining complexity in the structure and function of Central Hardwood Forests.” That's what this book really is about, and I like the ecological approach they have taken.

—Guy Sternberg

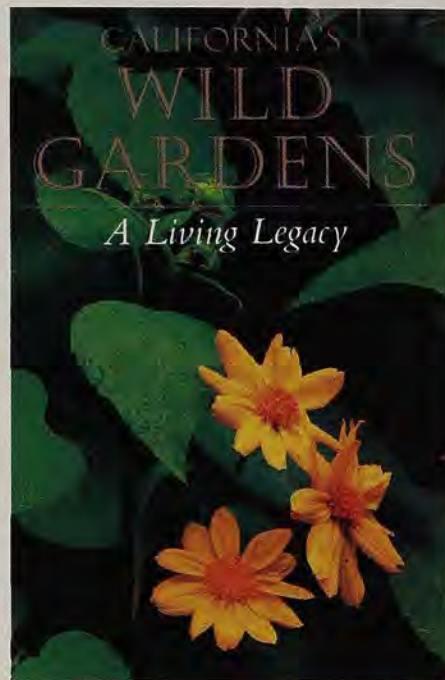
Guy Sternberg is president of the International Oak Society. He and his wife, Edie, own Starhill Forest Arboretum near Petersburg, Illinois.

CALIFORNIA'S WILD GARDENS: A LIVING LEGACY.

Phyllis Faber, editor. California Native Plant Society, Sacramento, California, 1997. 236 pages. 9×11 5/8". Publisher's price, softcover: \$29.95. To order, call California Native Plant Society (916) 444-2677.

If you enjoy seeing plants in their natural setting, and traveling to California is in your plans, you may want to pick up this book and some good maps. This stunningly photographed book features essays on more than 100 specialized plant communities found within 10 larger ecological regions of the state. Images include both closeups of individual plants and spectacular vistas that reveal the dynamic juxtaposition of plants within the different communities.

California's geologic and climatologic diversity make its flora especially rich. The state is home to more than 6,000 native plants, or nearly a quarter of all taxa found in North America. The state's ecological re-



gions run the gamut from coastal plain to mountain, and from desert to temperate rain forest. The localized plant communities profiled in the book are described as botanical “hot spots” where environmental conditions favor a specific ensemble of rare or endemic plants. The essays are written by botanists and ecologists who are intimately familiar with these unique habitats.

The book contains a wealth of information on conservation of native species and threats to various plant communities. Numerous sidebars cover related topics of interest, such as the role of fire in rejuvenating plant communities and bees whose speciality is pollinating plants found in vernal pools.

This is an inspiring book that celebrates the diversity of our native flora and the natural landscapes that support it.

—AHS Staff

JEFF COX'S 100 GREATEST GARDEN IDEAS: TIPS, TECHNIQUES, AND PROJECTS FOR A BOUNTIFUL GARDEN AND A BEAUTIFUL BACKYARD.

Jeff Cox. Rodale Press, Emmaus, Pennsylvania, 1998. 256 pages. 7 1/2×9 1/8". Publisher's price, softcover: \$15.95. AHS member price: \$14.25.

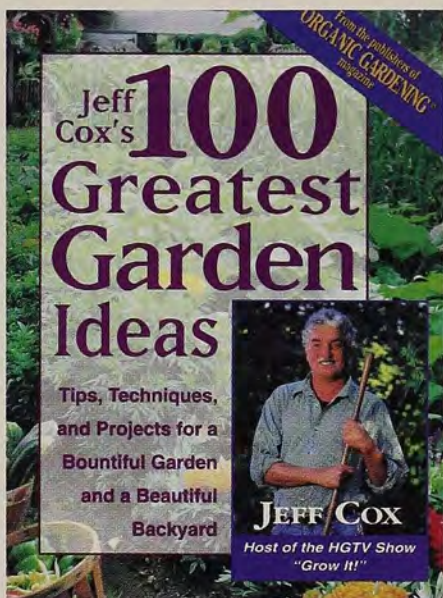
ROD 020

This latest book by the host of HGTV's “Grow It!” and contributing editor to *Organic Gardening*

magazine represents 30 years of coast-to-coast gardening experience. As the title indicates, Cox provides 100 tips that he promises will “make gardening easier and harvests better and more abundant.”

While the serious gardener may find some of the tips a bit simplistic, the novice gardener will pick up some great ideas. The ideas are categorized by season, so it is easy to find a project for any time of year. Each entry is accompanied by clearly labeled illustrations for further ease of use.

Cox covers a wide range of topics, from vegetable and ornamental gardening to hardscape construction. One of his more interesting tips involves making “bug juice” as a natural method of fighting pests. Following the assumption that some pests in any given population will be diseased, Cox provides a recipe that involves throwing half a cup of a troublesome pest into a blender with some water to make a wonderful concoction that you can spray onto your plants to spread diseases specific to that particular



pest. Another, less gruesome, tip involves soaking willow cuttings in water to create a solution of the natural rooting hormone contained in its branches. These tips are representative of Cox’s organic approach to growing healthy plants.

A list of sources for the plants and products mentioned in the book is included, as well as recommended readings for those who want to learn more about composting, insect and disease identification, and other topics.

If you haven’t been gardening long enough to have learned all these tricks of the trade on your own, this book makes the perfect “cheat sheet.”

—AHS Staff



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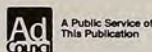
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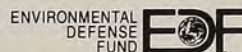


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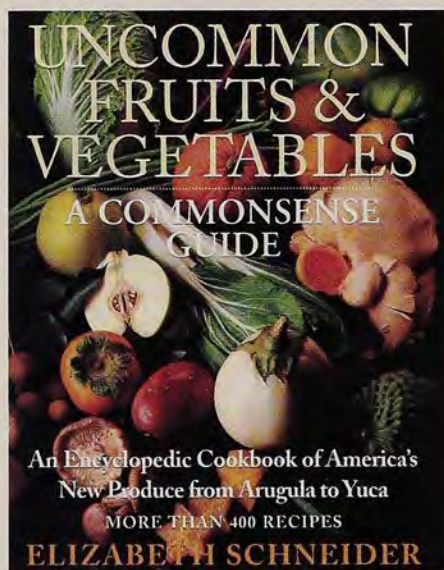
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EDIBLES



UNCOMMON FRUITS & VEGETABLES: A COMMONSENSE GUIDE.

Elizabeth Schneider. William Morrow, New York, 1998. 546 pages. Publisher's price, hardcover: \$28. AHS member price: \$25.

MOR 005

First published in 1986, *Uncommon Fruits & Vegetables* invites you to add some variety and excitement to your daily meals by describing the exotic produce that is appearing more and more in local grocery stores around the country. Among the nearly 100 fruits and vegetables Schneider covers are uncommon ones such as morels, salsify, carambolas, pummelos, and fiddlehead ferns, as well as more familiar ones such as arugula, jicamas, plantains, and shiitake mushrooms. Information on nomenclature, selection, storage, preparation, and nutrition is provided in each illustrated entry, as well as easy-to-follow recipes. A great book for fruit and vegetable gardeners and adventurous cooks.

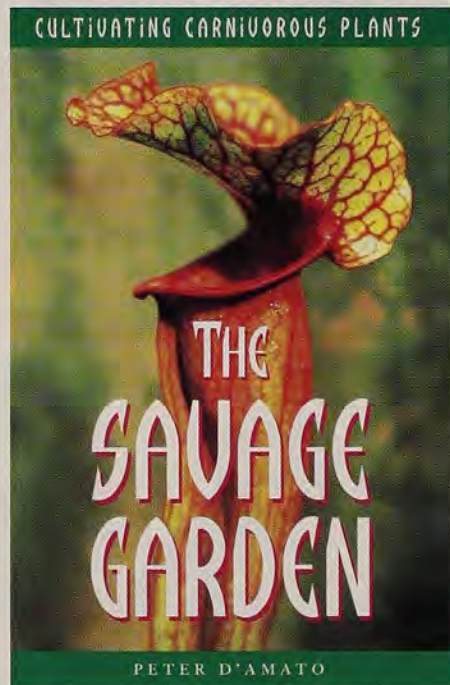
MARIA RODALE'S ORGANIC GARDENING: YOUR SEASONAL COMPANION TO CREATING A BEAUTIFUL AND DELICIOUS GARDEN.

Maria Rodale. Rodale Press, Emmaus, Pennsylvania, 1998. 352 pages. Publisher's price, hardcover: \$35. AHS member price: \$31.50.

ROD 022

Organic gardening is presented in a new light by one of the leading names in the field. Maria Rodale is Vice-Chairman of Rodale Press and the granddaughter of J.I. Rodale, originator of the organic gardening movement in the United States. With the help of a season-by-season gardening calendar, interviews with experts on such topics as composting and pruning, and 600 color photographs, Rodale addresses the planning, planting, and maintenance of the organic garden. In addition, Rodale includes many recipes to help readers enjoy the fruits—and vegetables—of their labor.

PLANT GUIDES



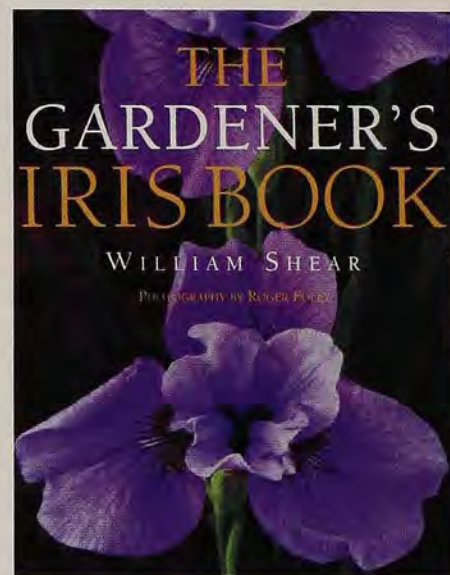
THE SAVAGE GARDEN: CULTIVATING CARNIVOROUS PLANTS.

Peter D'Amato. Ten Speed Press, Berkeley, California, 1998. 314 pages. Publisher's price, softcover: \$19.95. AHS member price: \$17.95.

TSP 008

The history and origins of hundreds of carnivorous plants are explored in this fascinating book by one of the leading cultivators of these plant oddities. D'Amato includes species descriptions, information on how and where to grow your own carnivorous plants, and a complete list of

resources to help get you started on your own little shop of horrors. Beautiful and—occasionally—delightfully morbid color photographs grace nearly every page.



THE GARDENER'S IRIS BOOK.

William Shear. Taunton Press, Newtown, Connecticut, 1998. 169 pages. Publisher's price, hardcover: \$25. AHS member price: \$22.50.

TAU 009

A practical reference for one of the most popular flowers in cultivation. Shear covers the most popular of the *Iris* genus—bearded, Siberian, and Louisiana—and then moves on to other sorts grouped by their major gardening characteristics. The book focuses on identification, culture, planting tips, division, hybridization, pest control, and choosing the right iris for the right spot. More than 150 color photographs by Roger Foley illustrate irises in their natural habitats and in garden settings. An up-to-date list of iris sources is also included.

THE GARDENER'S GUIDE TO GROWING PENSTEMONS.

David Way and Peter James. Timber Press, Portland, Oregon, 1998. 160 pages. Publisher's price, hardcover: \$29.95. AHS member price: \$26.

TIM 123

The first monograph of this increasingly popular genus of North American natives, this new book describes the botany and history of penstemons, as well as their cultivation and propagation, handling pests and diseases, and selecting companion plants for them in the garden. An exhaustive survey of species and an encyclopedic listing of all garden forms of penstemons currently in cultivation make this book an indispensable resource. Color photographs are included throughout.

FOR AND ABOUT CHILDREN



THE SECRET GARDEN.

Adapted from the original novel by Frances Hodgson Burnett. HarperCollins, Scranton, Pennsylvania, 1998. 32 pages. Publisher's price, hardcover: \$12.95. AHS member price: \$11.50. **HAR 016**

Young readers can now unlock the mystery of *The Secret Garden* with a new picture book, adapted from the 1912 children's classic. This abridged version, illustrated with colorful paintings by Mary Collier, tells the story of an orphaned girl in Edwardian England who learns the magic and wonder of bringing a garden to life. A wonderful gift for the young child in your life.

GARDENING WITH CHILDREN.

Beth Richardson. Taunton Press, Newtown, Connecticut, 1998. 160 pages. Publisher's price, softcover: \$19.95. AHS member price: \$17.95. **TAU 008**

This new full-color book aims to get children involved in gardening without overwhelming them with too much responsibility. It will help you create an adult-centered garden that includes and celebrates children's efforts. The book covers topics such as making gardening fun for children, theme gardens, and garden-related projects. Ninety-nine color photographs and 17 drawings help illustrate the joys of gardening with children.

MISCELLANEOUS

THE GARDENER'S COMPUTER COMPANION: HUNDREDS OF EASY WAYS TO USE YOUR COMPUTER FOR GARDENING.

Bob Boufford. No Starch Press, San Francisco, California, 1998. 302 pages. Publisher's price, softcover: \$39.95. AHS member price: \$36.95. **NSP 001**

Planning gardens with design software, researching plants using on-line resources, and calculating fertilizer and water requirements are just a few of the many topics covered in this timely reference book. The book includes a CD-ROM containing reference databases of plants and chemicals, garden calculators and cataloging programs, and garden organizers and planners. *The Gardener's Computer Companion* will help any gardener use a computer to its full gardening potential.

GARDEN ORNAMENT: FIVE HUNDRED YEARS OF HISTORY AND PRACTICE.

George Plumptre. Photographs by Hugh Palmer. Thames and Hudson, New York, 1998. 256 pages. Publisher's price, softcover: \$29.95. AHS member price: \$26.95. **THP 005**

As well as being a beautiful coffee table book, *Garden Ornament* is a serious study of the historic use of ornaments in Western landscaping. The author shows how over the last 500 years designers have used stone, wood, and metal to enhance and modify the natural features of gardens. A catalog of garden ornaments available to today's collector is included along with 506 illustrations, 150 in color.



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regional happenings

a look at what's happening around the nation

MID-ATLANTIC

NOV. 1-8 ■ Bonsai Fall Foliage Show.

U.S. National Arboretum, Washington, D.C. (202) 254-2726.

NOV. 1-23 ■ Peter Rabbit and Friends in the Garden.

Topiaries from literary works of Beatrix Potter, gardening tips, and cooking demonstrations. Longwood Gardens, Kennett Square, Pennsylvania. (800) 737-5500.

NOV. 12 ■ Lunar Gardening. Lecture by Michael Spencer. Brookside Gardens, Wheaton, Maryland. (301) 949-8230.

NOV. 26-JAN. 3 ■ Christmas at Longwood Gardens. Brilliant flower show in the Conservatory's crystal palace. Longwood Gardens, Kennett Square, Pennsylvania. (800) 737-5500.

NOV. 27-JAN. 3 ■ A Brandywine Christmas. Holiday displays and decor. Brandywine River Museum, Chadds Ford, Pennsylvania. (610) 388-2700.

NOV. 27-JAN. 10 ■ Some Enchanted Season. Winter flower show. Phipps Conservatory and Botanical Gardens, Pittsburgh, Pennsylvania. (412) 622-6914.

DEC. 3-5 ■ Holiday Splendor. Holiday decorations, displays, and greens sale. The Pittsburgh Civic Garden Center, Pittsburgh, Pennsylvania. (412) 441-4442.

DEC. 6 ■ Discovery Day. Holiday festival. American Horticultural Society. George Washington's River Farm, Alexandria, Virginia. (703) 768-5700 ext. 10.

DEC. 11 & 12 ■ Colonial Williamsburg Centerpiece. One-day floral workshop. Brookside Gardens, Wheaton, Maryland. (301) 949-8230.

NORTH CENTRAL

NOV. 3, 5, 10, 13 & 17 ■ Tulip Planting Days. Volunteer activity. Botanica: The Wichita Gardens, Wichita, Kansas. (316) 264-0448.

NOV. 7 ■ Madison Herb Society Annual Herb Fair. Olbrich Botanical Gardens, Madison, Wisconsin. (608) 246-4551.

NOV. 19 ■ The People Behind the Plants. Lecture by Tony Avent. Metropolitan Community College, Fort Omaha Campus, Omaha, Nebraska. (402) 472-2971.

NOV. 25-DEC. 27 ■ Holiday Flower Show. Ridgway Center, Missouri Botanical Garden, St. Louis, Missouri. (314) 577-9400.

NOV. 26-JAN. 3 ■ Holiday Show. Holiday decor and flora. Lincoln Park Conservatory, Chicago, Illinois. (312) 742-7737.

DEC. 5 ■ Science Saturday: Rain-forest Ecology. Workshop for adults and children. Olbrich Botanical Gardens, Madison, Wisconsin. (608) 246-4551.

DEC. 13 ■ Great Gardens of England. Lecture by Adam Lifton-Schwerner. Garfield Park Conservatory, Chicago, Illinois. (773) 638-1766.

JAN. 8-10 ■ St. Louis Flower Show. Display gardens, photography exhibitions, and silent auction. Junior League of St. Louis. America's Center, St. Louis, Missouri. (314) 569-3117 ext. 234.

JAN. 13 & 14 ■ Wood Waste Utilization National Conference. National Arbor Day Foundation. Arbor Day Farm/Lied Conference Center, Nebraska City, Nebraska. (402) 474-5655.

NORTHEAST

NOV. 7 & 8 ■ Holiday Sparkle. Flower show. Garden Club Federation of Massa-

chusetts. Tower Hill Botanic Garden, Boylston, Massachusetts. (508) 869-6111.

NOV. 10 ■ Greenhouses Tour. Westchester Fairfield Horticultural Society. Garden Education Center, Greenwich, Connecticut. (203) 869-8786.

NOV. 18 & 25 ■ Beginning Orchid Growing. Two-session elementary workshop. Lyman Estate Greenhouse, Waltham, Massachusetts. (781) 891-4882 ext. 244.

NOV. 19-JAN. 3 ■ Festival of Lights. Sonnenberg Gardens, Canandaigua, New York. (716) 394-4922.

NOV. 21 & 22 ■ Crosby Mansion Decked for the Holidays. Nauset Garden Club. Crosby Mansion, Brewster, Massachusetts. (508) 255-7921.

NOV. 27-JAN. 10 ■ Victorian Holiday and Holiday Train Show. Holiday displays. New York Botanical Garden, Bronx, New York. (718) 817-8700.

NOV. 28 & 29 ■ Garden to Garland—Wreaths and Swags. Decoration workshop. Wave Hill Botanical Garden, Bronx, New York. (718) 549-3200.

DEC. 4-JAN. 3 ■ Holly Days at Tower Hill. Holiday decorations. Tower Hill Botanic Garden, Boylston, Massachusetts. (508) 869-6111.

NORTHWEST

NOV. 27-29 ■ Holiday Open House. Garland Nursery, Corvallis, Oregon. (541) 753-6601.

DEC. 4 & 5 ■ Holiday Decoration Bazaar. Leach Botanical Garden, Portland, Oregon. (503) 761-9503.

DEC. 12 ■ Victorian Holiday. W. W. Seymour Botanical Conservatory, Tacoma, Washington. (253) 591-5330.

SOUTH CENTRAL

NOV. 12 ■ 9th Annual Powhatan Pansy Potpourri. Pansy sale and garden party. Powhatan House, Galveston, Texas. (409) 763-0077.

NOV. 26-JAN. 1 ■ Garden of Lights. Drive-through holiday tour. Muskogee Parks and Recreation, Muskogee, Oklahoma. (918) 684-6302.

The Envelope, Please...

A night of "Plant Hollywood" glamour awaits the stars of the native plant world when the spotlights shine at the Third Annual Academy Awards of Native Plants, sponsored by the DeKalb College Botanical Garden (DCBG), in conjunction with the Georgia Perennial Plant Association.



American cranberry won the award for best ground cover in 1996.

Winners in categories such as Best Sun Perennial, Best Shrub, and Best Plant of Promise will be announced at the event, to be held November 19th at the Atlanta History Center in Atlanta, Georgia. For the past five years the DCBG has been sponsoring events like the Academy Awards to introduce promising natives and other plants not commonly used by the Atlanta gardening community. "We are in a position to experiment with different plants because our purpose is not making a profit, so we can afford to take the chances that local nurseries cannot," explains award co-host George Sanko, who is co-director of the DCBG. Award nominees and winners are chosen by DCBG staff based on qualities such as hardiness, duration of bloom, foliage texture and color, and fragrance. Nominees are introduced to the audience in a slide show presentation given by the co-hosts.

Sanko, who dons black tie and a tux for the annual event, says the awards are "a fun way of fulfilling our mission of introducing natives to the gardening community. We hope people will like the plants they see and incorporate them into their own gardens."

One plant that has benefited from attention generated by the first awards ceremony in 1996 is the American cranberry (*Vaccinium macrocarpon*). Sanko points out that, contrary to popular belief, this useful ground cover does well in a reasonably moist garden setting. Additionally, it blooms in fall, is easy to propagate, and produces beautiful red berries in contrast to

its evergreen foliage. "By touting its attributes on local radio and television shows last year we sold 200 cranberry plants, and this year we'll sell 300 to 400," says Sanko. "Local nurseries are noticing the demand and are starting to pick it up as a regular part of their inventory."

Sanko hopes that the awards will spawn a similar success story for other little-known natives, including Virginia spiraea (*Spiraea virginiana*), nominated for the second straight year in the Best Rare Plant category. "It is a beautiful, hardy little plant and we are the only ones I know of propagating it," says Sanko.

At the conclusion of the awards ceremony, which begins at 7:30 p.m., more than 30 uncommon native plants—including native azaleas and trilliums—will be given away as door prizes. For more information, contact the DeKalb College Botanical Garden at (404) 244-5001.

—Mark C. Mollan, Communications Assistant

The nominees are...

BEST SUN PERENNIAL

1. Sweet grass
(*Muhlenbergia capillaris*)
2. Yellow wild indigo
(*Baptisia sphaerocarpa*)
3. Wild red hibiscus
(*Hibiscus coccineus*)

BEST SHADE PERENNIAL

1. Harper's wild ginger
(*Hexastylis speciosa*)
2. Tall meadow rue
(*Thalictrum pubescens*)
3. Plantain sedge
(*Carex plantaginea*)

BEST RARE PLANT

1. Royal catchfly
(*Silene regia*)
2. Sedum (*Sedum nevii*)

3. Virginia spiraea
(*Spiraea virginiana*)

BEST SHRUB

1. Nine bark
(*Physocarpus opulifolius*)
2. Leatherleaf
(*Cassandra calyculata*)

3. False indigo
(*Amorpha fruticosa*)

BEST PLANT OF PROMISE

1. Horsemint
(*Monarda russeliana*)
2. Red yucca
(*Hesperaloe parviflora*)
3. Zenobia
(*Zenobia pulverulenta*
'Thelma's Red')

DEC. 1 ■ Beaumont Botanical Gardens Plant Sale. Garden Center at Beaumont Botanical Gardens, Beaumont, Texas. (409) 898-3515.

DEC. 1-31 ■ Hermann-Grima Historic House and Gardens Holiday Decor. Mid-19th-century Christmas garden in the French Quarter. New Orleans, Louisiana. (504) 525-5661.

SOUTHEAST

NOV. 13-15 ■ Antiques and Garden Show. Birmingham-Jefferson Civic Center, Birmingham, Alabama. (205) 871-0840.

NOV. 14 & 15 ■ Bonsai Show. Riverbanks, Columbia, South Carolina. (803) 779-8717.

NOV. 14-17 ■ PGMS Conference and Green Industry Expo. Professional Grounds Management Society. Grand Ole Opry Hotel, Nashville, Tennessee. (410) 584-9754.

NOV. 20 ■ Holiday Topiary Workshop. The State Botanical Garden of Georgia, Athens, Georgia. (706) 542-1244.

NOV. 20-DEC. 27 ■ Fantasy in Lights. Christmas scenes tour. Callaway Gardens,

Pine Mountain, Georgia. (800) 282-8181.

NOV. 21-23 ■ Fall Plant Fair. Tropical and subtropical plants. Marie Selby Botanical Gardens, Sarasota, Florida. (941) 366-5731 ext. 10.

DEC. 6 ■ Country Christmas. Holiday decorations, arts, crafts, and children's activities. Atlanta Botanical Garden, Atlanta, Georgia. (404) 876-5859.

JAN. 1-3 ■ Holiday Celebration. Seasonal floral displays. Marie Selby Botanical Gardens, Sarasota, Florida. (941) 366-5731 ext. 10.

Arum-atic in Atlanta

Whether it inspired the Broadway play and subsequent movie *Little Shop of Horrors* is unknown, but the fabled titan arum (*Amorphophallus titanum*) surely could have landed the man-eating lead role. The blooming of the six-foot-three-inch-tall inflorescence with the scent of rotting meat tripled attendance records at the Atlanta Botanical Garden (ABG) for the first 10 days in July. It was the first titan arum to bloom in Georgia and only the seventh to flower in the



Titan arum in bloom at the Atlanta Botanical Garden in July. Its more common relatives include caladium, jack-in-the-pulpit, and philodendron.

United States since the plant was introduced from Indonesia as a natural curiosity in 1937. "It is a wonder what nature can do. The plant's just a fascinating darn thing!" exclaimed ABG visitor Carl Beck as he gazed at the plant amid children holding their noses. A rare native of the rain forests of Sumatra, an island in western Indonesia, the titan arum grows from a tuber that typically sprouts and sheds one massive palmlike leaf each year until it reaches a threshold weight of between 20 and 40 pounds. Once the ABG specimen reached that threshold on June 12, a flower shoot emerged from the tuber and grew at a rate of about four inches a day until it reached its fully erect flowering position on Independence Day. The flower—which lasts only a few days—collapsed on July 8.

Although it is often described as the largest flower in the world, *A. titanum* actually produces an inflorescence, or compound flower. The blossom emits a pungent odor similar to that of decaying flesh to attract the carrion-eating insects that pollinate it in its native habitat. ABG

staff attempted to artificially pollinate the arum using pollen obtained from a titan arum that bloomed in June at Fairchild Tropical Garden in Miami. According to Ron Gagliardo, curator of tropicals at ABG's Dorothy Chapman Fuqua Conservatory, "If the pollination is successful, it will be the first time in history a cultivated *Amorphophallus titanum* will have produced seed." In addition, pollen collected from the ABG plant was put in cold storage in readiness to be shipped around the world for the next inflorescence that blooms.

More of these otherworldly blooms are expected at ABG in late spring or early summer 1999 as other *A. titanum* tubers reach the threshold weight that begins the flowering cycle. For additional information, visit the ABG web site at www.atlantabotanicalgarden.org, or call the Atlanta Botanical Garden at (404) 876-5859.

—M.C.M.

JAN. 9 ■ Camellia Show. Tampa Bay Area Camellia Society. Tampa Women's Club, Tampa, Florida. (941) 688-0916.

SOUTHWEST

DEC. 4 & 5 ■ 11th Annual Holiday Fair. Albuquerque Garden Center, Los Altos Park, Albuquerque, New Mexico. (505) 296-6020.

DEC. 4-6 ■ Luminaria Lights. Garden

paths lined with luminaria. Tucson Botanical Gardens, Tucson, Arizona. (520) 326-9686.

DEC. 5 ■ Holiday Plant Sale. Unusual plants, herbs, and gift items. The Arboretum at Flagstaff, Flagstaff, Arizona. (520) 774-1442.

DEC. 5-JAN. 3 ■ Blossoms of Light. Illuminated displays. Denver Botanic Gardens, Denver, Colorado. (303) 331-4000.

JAN. 11-15 ■ 6th Annual ProGreen Expo. Educational seminars. Colorado Convention Center, Denver, Colorado. (303) 756-1079.

WEST COAST

NOV. 28 & 29 & DEC. 4-6 ■ Christmas Tree Sale. Kula Botanical Garden, Kula Maui, Hawaii. (808) 878-1715.

NOV. 28-DEC. 5 ■ Christmas at Filoli. Filoli, Woodside, California. (650) 364-8300.

DEC. 5 & 6 ■ 13th Annual Victorian Christmas Celebration. Banning Residence Museum, Wilmington, California. (310) 548-7777.

DEC. 5-13 ■ Annual Christmas Festival. Descanso Gardens, La Cañada, Flintridge, California. (818) 952-4401.

DEC. 5 & 19 ■ Ruth Bancroft Winter Garden Tour. The Ruth Bancroft Garden, Walnut Creek, California. (510) 210-9663.

DEC. 6 ■ Holidays in the Garden. The Arboretum of Los Angeles, Arcadia, California. (626) 447-8207.

DEC. 9 ■ Distinctive Holiday Designs. Floral demonstrations by Ron Morgan. Dean Leshner Regional Center for the Arts, Walnut Creek, California. (925) 943-7469.

CANADA

NOV. 5-14 ■ The Winter Garden Show at the Royal. The Coliseum/National Trade Center, Toronto, Ontario. (416) 393-6400.

NOV. 7-29 ■ 21st Annual Exhibition of Garden and Nature Photographs and Illustrations. Memorial University Botanical Garden, St. John's, Newfoundland. (709) 737-8590.

DEC. 11-JAN. 1 ■ Festival of Lights. VanDusen Botanical Garden, Vancouver, British Columbia. (604) 822-3928.

Reminder

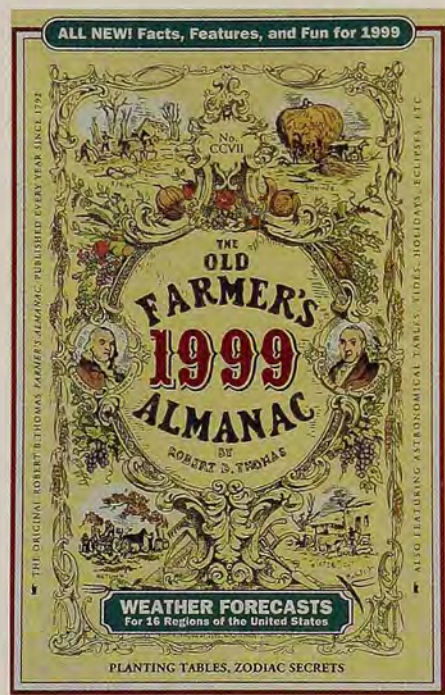
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(Continued from page 14)

this way, phenology serves the same purpose as integrated pest management: By anticipating the arrival of pests, gardeners can control infestations *before* they get out of hand, thus reducing or eliminating the need to use pesticides.

Scientists have been particularly interested in phenology in recent years because of the threat of global warming. Understanding how and when plants and animals respond to seasonal changes may provide clues to their response to major climatic changes such as global warming.

In addition to folklore, other means of predicting weather have had popular appeal over the centuries. Planting according to



lunar cycles has been practiced by the Chinese since at least 200 B.C. and still has adherents worldwide. The theory behind planting by lunar cycles is that the moon affects the circulation of plant fluids as much as it influences the level of tides.

ALMANACS

In the late 18th and early 19th centuries, almanacs of weather predictions and advice for farmers became popular. Among the most enduring of these was *The Farmer's Almanac*—"Old" wasn't officially added until 1848—first published by Robert B. Thomas in 1792. Today, the almanac contains information on such things as food and fashion trends, hot collectibles, and just good old-fashioned trivia, but its biggest selling point is still its legendary annual

weather forecast. The almanac's current authors still base their predictions on a secret weather forecasting formula that Thomas developed by analyzing natural cycles, enhanced now by modern calculations of solar activity. This original formula—which the almanac's publishers claim has maintained an accuracy rate of about 80 percent for more than 200 years—is safely tucked away in a black tin box at the almanac offices in Dublin, New Hampshire.

The almanac divides the country into 16 regions in order to provide a detailed forecast for each area, but it also gives a general nationwide weather forecast. So what should we expect for 1999? The almanac forecasts colder-than-normal winter temperatures for much of the nation as well as above-normal snowfall in the Northeast and Northwest. Spring is also expected to be cooler than usual, except in the Pacific Northwest. The summer months, according to the almanac, should be closer to normal for most of the country, although it warns of above-normal hurricane activity, particularly in the first half of September. Finally, fall is expected to bring warmer conditions to the central United States but near normal temperatures elsewhere.

Although we now have advanced technical methods of finding out the weather, almanacs, folklore, lunar cycles, and phenology are such an integral part of our horticultural history that they will surely never lose their place in the gardener's bag of weather-forecasting tricks.

Christina M. Scott is assistant editor of The American Gardener.

beating the heat

by David J. Ellis

If the global warming doomsayers are to be believed—and evidence is mounting to support their case—gardeners in North America and elsewhere are going to have to learn to cope with hotter summers, bitter winters, and drought. Even that bastion of gardening traditions, England, was hit with unseasonably warm weather and drought this year, and plants usually considered reliable there perished from the heat. In our own gardens, we've seen normally tough annuals wither away and

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A dogwood on the grounds of AHS headquarters at River Farm shows dramatic evidence of heat stress.

drooping leaves on both native and exotic woody plants.

According to the National Oceanic and Atmospheric Administration, this past August was the eighth consecutive month to set a record for average high worldwide temperature. Six of the 10 hottest years on record have come in this decade and it appears likely 1998 will surpass 1995 as the warmest year since weather records have been kept. With most forecasters predicting a continuation of this trend, gardeners need to be prepared to take steps to minimize damage and loss of plants.

TAKING THE HEAT

As he traveled the country this year lecturing about the AHS Plant Heat-Zone map, AHS's President Emeritus H. Marc Cathey had a perfect opportunity to see which plants were thriving in this summer's heat and which ones weren't. "The annuals were having a terrible time," he says. "Many of them were infested with spider mites, which thrive under hot, dry conditions."

Annuals and newly planted perennials often suffer from heat, because they don't have well-established root systems, but Cathey says what was particularly remarkable about this summer was "plants that have been in the ground for more than 20 years were dying." Among native plants that were particularly hard hit were dogwoods and redbuds, which in gardens are often planted in full sun rather than in the full or part shade that characterizes their native habitat.

On the other hand, Cathey observed that many tropical, subtropical, and Mediterranean plants seemed to thrive this past summer. "In Shreveport, Louisiana, bougainvillea, crape myrtles, and crotons were doing very well," he notes.

RESEARCH

Plant breeders have historically spent more time trying to develop plants with increased cold hardiness than they have working on heat tolerance, although continued evidence for global warming is likely to affect that dynamic. But Cathey points out that gardeners need to be alert to the availability of

some heat-tolerant plants. These range from lilacs—known as the Descanso hybrids—with reduced chilling requirements and heat tolerance, to lettuces bred to not set seed as quickly in hot weather, and heat-tolerant tomatoes such as 'Sunmaster' that will set fruit even at temperatures over 90 degrees. Several plant breeders, including Alabamans Tom Dodd Jr. and Eugene

Aromi, have successfully taken on the challenge of producing heat-tolerant azaleas for the Deep South.

Even if you can't find heat-tolerant selections of the particular plant you want to grow, choosing plants appropriate to your climate will be easier this coming spring, as more nurseries will be including heat-zone codes on their plant labels.

CHOOSING PLANTS WISELY

Re-evaluate the plant choices in your garden. Think back to last summer. Which plants suffered through the hot weather or required inordinate amounts of watering to survive? Look for more heat-tolerant plants to replace them with this spring. Plants native to your region or exotic plants from areas with similar climates to yours are the best bets. Also look for new cultivars or selections bred specifically for heat tolerance.

DEVELOPING SOUND CULTURAL PRACTICES

"Our watering and fertilizing practices need to be improved. We have been coddling our plants too much," says Cathey.

Once established, plants shouldn't have to be coddled. Encourage the development of deep and extensive root systems by watering new plants deeply two or three times a week at first, then slowly reducing frequency as they start putting out new growth. After one full growing season, most woody plants and herbaceous perennials shouldn't require supplemental watering except during an extended drought. Mulch with shredded leaves or bark to keep down weeds and reduce moisture loss.

Don't addict your plants to excessive rates of chemical fertilizers. Encourage plants to spread their feeder roots deep and wide into the soil in search of nutrients and beneficial associations with mycorrhizal fungi. Feed them a couple of times during the growing season with a balanced combination of nutrients in organic fertilizers such as blood meal, seaweed, and compost.

Avoid plant-stressing activities during the hottest months of the year. Do your pruning, transplanting, dividing, and other such tasks in spring or fall to prevent additional stresses on your plants.

This winter and spring, keep your eyes out for plants labeled with the new AHS Plant Heat-Zone codes and select plants appropriate for both your hardiness and heat zones.

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

(To order a copy of the AHS Heat-Zone Map, see page 64.)

Selected Plants

The following plants are proven performers in heat.

WOODY PLANTS

- Chaste tree (*Vitex agnus-castus*)
cultivar 'Silver Spire'
- Crape myrtle (*Lagerstroemia indica*)
cultivars 'Acoma' (white), 'Pecos' (pink), and 'Zuni' (lavender)
- Rose of Sharon (*Hibiscus syriacus*)
cultivars 'Blue Bird' and 'Helene'

PERENNIALS

- Butterfly weed (*Asclepias tuberosa*)
and other milkweeds
- Coneflowers (*Rudbeckia* spp.)
- Leadwort
(*Ceratostigma plumbaginoides*)

ANNUALS

- Blanket flower (*Gaillardia* spp.)
- Flowering tobacco (*Nicotiana* spp.)
- Globe amaranth (*Gomphrena* spp.)
- Lantana (*Lantana* spp.)
- Madagascar periwinkle
(*Catharanthus roseus*)
- Osteospermum (*Osteospermum* spp.)
- Pentas (*Pentas lanceolata*)
- Portulaca (*Portulaca* spp.)
- Spider flower (*Cleome hassleriana*)

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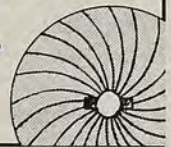
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hardiness and heat zones

a guide to USDA and AHS zones for plants found in this issue

For your convenience, the cultivated plants featured in each edition of the magazine are listed here with their USDA Plant Hardiness Zones and AHS Heat Zones. If 0 is listed in place of USDA hardiness zones, it means that plant is a true annual—it completes its life cycle and dies in a year or less. Tropical plants that require minimum temperatures warmer than 40 degrees Fahrenheit—the minimum average temperature in USDA Zone 11—will be listed by minimum average temperature rather than by zone numbers.

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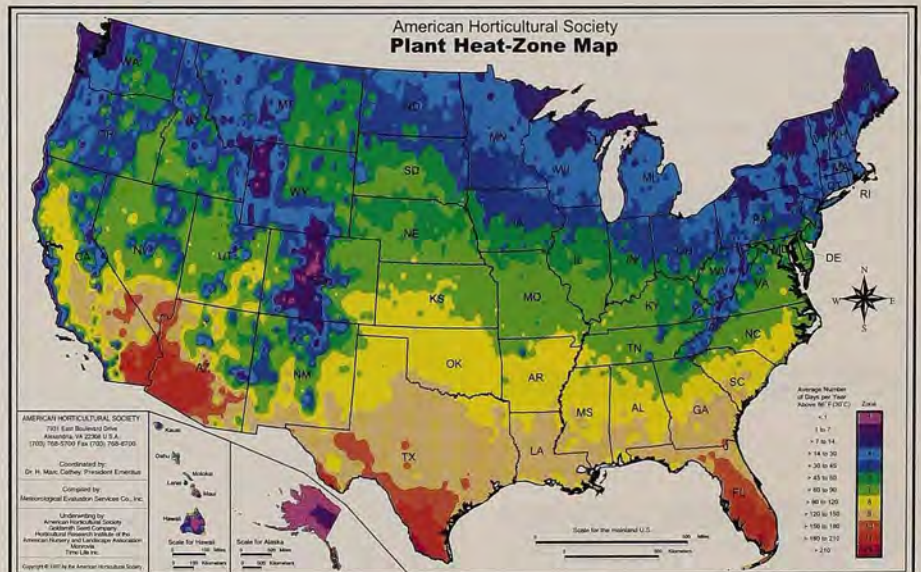
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The codes above are based on a number of commonly available references and are likely to be conservative. Factors such as microclimates, plant provenance, and use of mulch may affect individual gardeners' experiences. To purchase a durable two-by-three-foot poster of the AHS Heat-Zone Map, call (800) 777-7931 ext. 45.



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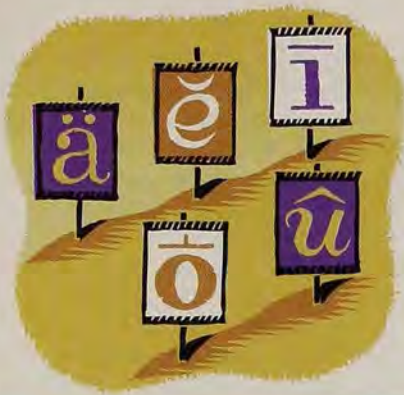
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pronunciations

a simple speaking guide to plants found in this issue

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ak-ROS-tih-kum dan-ee-eye-FO-lee-um

Albizia julibrissin

al-BEEZ-yuh jew-lih-BRISS-en

Amorphophallus titanum

uh-mor-fo-FAL-lus ty-TAN-um

Andropogon gerardii

an-dro-PO-gon jeh-RAR-dee-eye

Bambusa oldhamii

bam-BOO-suh old-HAM-ee-eye

Baptisia sphaerocarpa

bap-TIZ-yuh sfeer-o-KAR-puh

Betula alleghaniensis

BET-yew-luh al-luh-GAY-nee-EN-sis

Bursera simaruba

bur-SAIR-ruh sim-uh-REW-buh

Carex plantaginea

KAIR-eks plan-tah-JIN-ee-uh

Cassandra calyculata

kass-AN-druh kal-ik-yew-LAY-tuh

Ceratostigma plumbaginoides

sur-at-o-STIG-muh plum-baj-ih-NOY-deez

Chrysobalanus icaco

kris-o-buh-LAN-us ih-KAY-ko

Cimicifuga racemosa

sih-mih-SIF-yew-guh ras-eh-MO-suh

Cleome hassleriana

klee-O-mee has-ler-ee-AY-nuh

Conophytum burgeri

kon-o-FY-tum BUR-jur-eye

C. maughanii

C. maw-GAN-ee-eye

C. obcordellum

C. ob-kor-DEL-um

C. wettsteinii

C. wet-STEIN-ee-eye

Cucurbita pepo

kew-KER-bih-tuh PEH-po

Dalbergia ecastaphyllum

dal-BUR-jee-uh ek-kass-tuh-FIL-lum

Eichhornia crassipes

eyk-HOR-nee-uh KRAS-si-pee-z

Euphorbia millii

yew-FOR-bee-uh MIL-ee-eye

Ficus benghalensis

FY-kus ben-guh-LEN-sis

Franklinia alatamaha

frank-LIN-ee-uh uh-lah-tuh-

MAH-hah

Gilia rubra

GIL-ee-uh ROO-bruh

Gloxinia sylvatica

glok-SIN-ee-uh sil-VAT-ih-kuh

Harrisia aboriginum

har-RISS-ee-uh ah-bor-IJ-ih-num

Hesperaloe parviflora

hes-pur-AL-o par-vih-FLOR-uh

Heteromeles arbutifolia

het-ur-o-ME-leez ar-byew-tih-FO-lee-uh

Hexastylis shuttleworthii

hex-uh-STY-lis shut-ul-WORTH-ee-eye

Hydnophyllum papuanum

hyd-no-FIL-um pah-pew-AN-um

Ipomopsis aggregata

ip-o-MOP-sis ag-ruh-GAY-tuh

Juncus roemerianus

JUNG-kus rem-air-ee-AN-us

Lotus corniculatus

LOW-tus kor-nik-yew-LAY-tus

Maclura pomifera

muh-KLUR-uh pom-IF-ur-uh

Monarda russeliana

moh-NAR-duh ruh-sel-ee-AN-uh

Muhlenbergia capillaris

mew-len-BUR-jee-uh kap-ih-LAIR-iss

Paeonia cambessedisii

pee-O-nee-uh kam-bess-uh-DIS-ee-eye

P. clusii

P. kloo-see-eye

Physocarpus opulifolius

fie-so-KAR-pus op-yew-lih-FO-lee-us

Psychotria nervosa

sigh-KO-tree-uh ner-VO-suh

Purshia stansburiana

PUR-sha stanz-bur-ee-AN-uh

P. subintegra

P. sub-in-TEG-ruh

Rhapidophyllum hystrix

ruh-pid-o-FIL-um HISS-triks

Sapium sebiferum

SAY-pee-um suh-BIF-ur-um

Schlumbergera bridgesii

shlum-BUR-gur-uh brid-JEZ-ee-eye

Sedum nevii

SEE-dum NEV-ee-eye

Simmondsia chinensis

sim-MOND-see-uh chy-NEN-siss

Smilacina racemosa

smy-luh-SY-nuh rass-eh-MO-suh

Stenochlaena tenuifolia

sten-OK-lee-nuh ten-yew-ih-FO-lee-uh

Symphoricarpos albus

sim-fo-rih-KAR-poz AL-bus

Synadenium grantii

sin-uh-DEN-ee-um GRANT-ee-eye

Thalictrum pubescens

thal-IK-trum pyew-BESS-enz

Tillandsia fasciculata

tih-LAND-zee-uh fas-sik-yew-LAY-tuh

Trachelospermum jasminoides

tray-kel-o-SPUR-mum jaz-mih-NOY-deez

Umbilicus rupestris

um-BIL-ih-kus roo-PES-triss

Zenobia pulverulenta

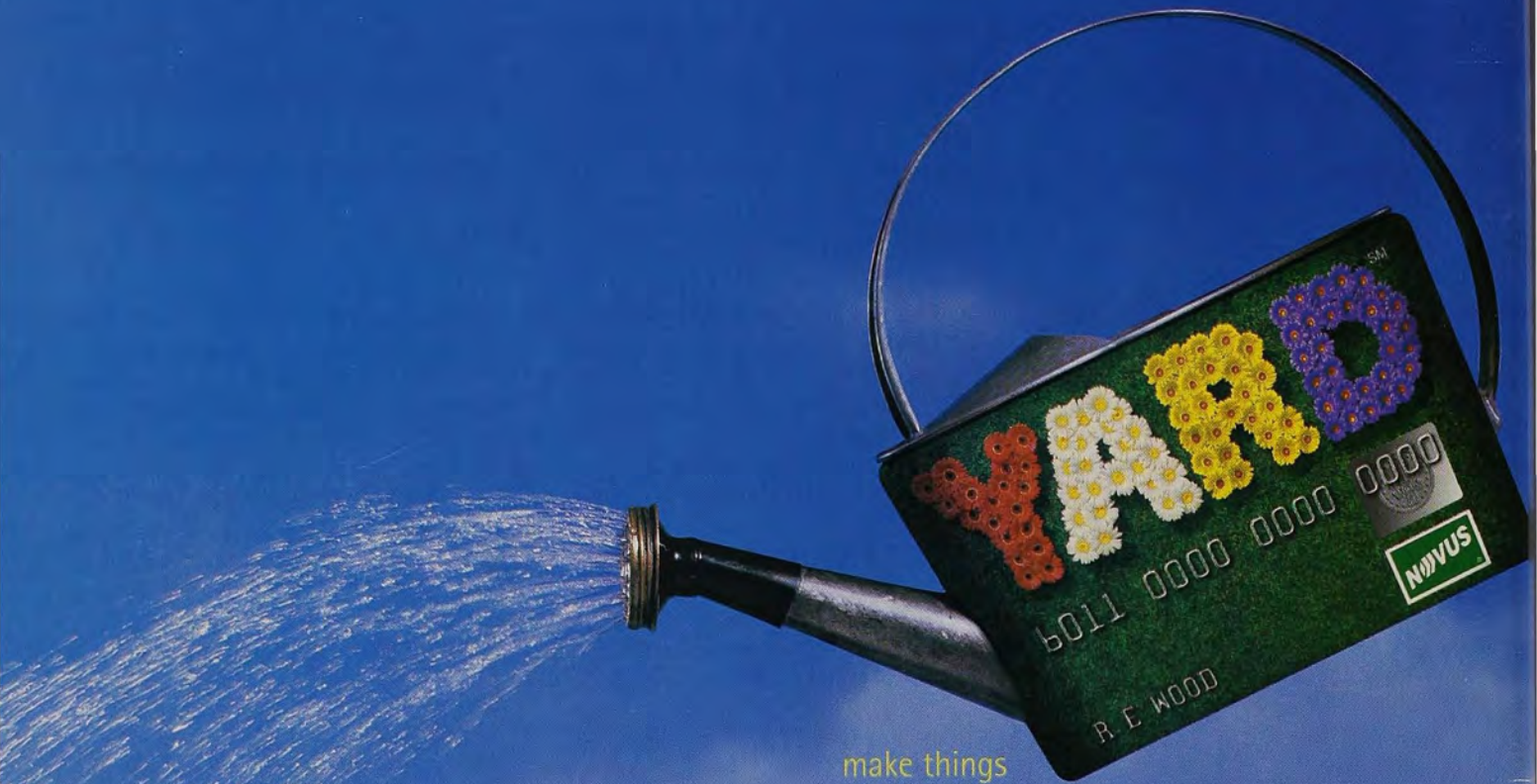
zeh-NO-bee-uh pul-vur-yew-LEN-tuh

What's in a Name: *Cimicifuga racemosa*

Commonly known as bugbane because of its early use as an insect repellent, *Cimicifuga racemosa* is a member of Ranunculaceae, the buttercup family. The generic name is derived from the Latin words *cimex* (a bug) and *fugo* (to chase away). The specific epithet refers to the flowers, which appear in racemes, and alludes to that part of this herbaceous perennial that is said to contain the plant's bug-repellent properties.

Native to eastern North American woodlands, the plant often grows to eight feet tall in the wild. Bugbane's large, lacy leaves serve as a home to Appalachian Azure butterfly larvae (*Celastrina neglecta* major) in spring before its six- to 24-inch candlelike white inflorescences steal the show in early to midsummer.

In addition to using it as a bug repellent, Native Americans considered *Cimicifuga racemosa* an antidote to snakebites, which explains its other commonly used name, black snakeroot.



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