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THE AMERICAN GARDENER

A Publication of the American Horticultural Society

March/April 1999 \$3.95

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On the cover: The showy, fragrant flowers of beebalm (Monarda didyma 'Garden View Scarlet'), native to eastern North America, are known for attracting butterflies. Photograph by Alan and Linda Detrick.

American Horticultural Society

7931 East Boulevard Drive
Alexandria, VA 22308-1300
(703) 768-5700
www.ahs.org

The American Horticultural Society (AHS) educates and inspires people of all ages to become successful and environmentally responsible gardeners by advancing the art and science of horticulture.

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commentary

The American Horticultural Society (AHS) celebrates the best in horticulture. Our President Emeritus, H. Marc Cathey, is truly one of the great horticulturists of our time—and his colorful anecdotes about his family and gardening are legendary. In this and future issues, Marc returns to this page of The American Gardener to share with you his vast experience and wonderful stories.

—Linda D. Hallman, *President & CEO*



My grandmother—Miss Nannie—arrived as a bride in Davidson, North Carolina, with the many gardening traditions, skills, and plants she inherited from her family, the McAuleys. Growing food was foremost, but beauty was always present in her mini-landscapes.

Nestled in her bride's luggage was a packet of "pinks" or "clove" seed (*Dianthus* spp.). The black saucer-shaped seeds germinated immediately once dry in the capsule and could be stored for several years without losing vitality. She used kettles of fresh water to get them to sprout, then transplanted the seedlings to well-drained spots around the edges of shrubs. The bright pink of the flowers and the tiny spiky blue-gray foliage were a cheery greeting to visitors. The intense spicy fragrance of the pinks in the '30s and '40s is still very much alive in my memory.

Today, the interest in growing sweet-smelling plants in the garden is greater than ever. And now we have horticultural research and dedicated nursery owners to help us propagate and grow fragrant native plants appropriate to gardens in different regions of both eastern and western North America. In this issue, landscape designers Jim Knopf and Paula Refi describe garden-worthy fragrant natives.

In addition, Rand B. Lee tells us about species pinks similar to the ones Miss Nannie grew. These charming perennials can be difficult to find amongst the proliferation of hybrid pinks, but they are worth seeking out for their graceful beauty and adaptability.

Gardeners throughout history have recognized the value of using water features in gardens to reflect plants, garden features, and buildings. Reflecting pools can double the value of beautiful garden scenes and provide a tranquil setting to offset the stresses of modern life. In Molly Dean's essay, we'll show you how to make the most of your water gardens.

Another way to bring peace and tranquility to the garden is by adapting techniques used in Japanese and Zen gardens. Kathleen Fisher profiles Jack Miller, an American garden designer who has created two very different Japanese-style gardens in the Philadelphia area.

It is our time to use our energy and talents to ensure that we hand down to future generations the "seeds" that we have identified as our own personal heritage. Let this issue add fragrance to your nose, shining laughter to your pools, and create an oasis for your life.

We are making final arrangements to greet you at two of our annual events this summer: our annual conference—with garden tours and award presentations—in Boston June 9 to 12; and our Youth Garden Symposium in Denver July 22 to 24. I hope you will make plans now to share your ideas and enthusiasm for gardening with us at these exciting AHS events.

H. Marc Cathey

—H. Marc Cathey, *AHS President Emeritus*



members'
forum



Left: The pink double flowers of *Prunus serrulata* 'Kwanzan' blooming in spring.

PRUNUS SERRULATA 'KWANZAN'

For years I dreamed of having a 'Kwanzan' pink-flowering cherry tree (*Prunus serrulata*)—ever since I saw one in a friend's garden. The tree was a cloud of pink, its branches loaded with clusters of fluffy pink blossoms.

After I retired from teaching, I built a new home in northern Michigan in the heart of cherry country overlooking Lake Michigan's Traverse Bay. In spring the hillsides are covered with white cherry blossoms. It's a beautiful sight, but it still doesn't compare with the pink 'Kwanzan'.

A few years ago I finally planted two of them outside my lower-level walkout. Their tops are just below my dining room windows, but eventually they can grow to 25 feet tall. Although still in their infancy, the trees bloomed beautifully in the spring. One day I looked out and saw an Eastern bluebird perched among the pink blossoms. What a beautiful sight! I savored the blooms every day they were in season.

When fall came, I had a great surprise. As autumn colors brightened our hillsides, I was amazed to see that my 'Kwanzan' cherries had the most brilliant leaves of all—a striking coral-red. I had been buying trees and shrubs especially for autumn interest, and nothing I had read of 'Kwanzan' cherries had mentioned their

outstanding fall color. What a bonus!

Our hilly neighborhood was once a cherry orchard, but all the old trees were removed when it was subdivided. Since moving here, planting trees has been my first priority. I am really twice blessed with my 'Kwanzan' cherry trees—great beauty in spring *and* fall.

*Kathleen E. Cigan
Suttons Bay, Michigan*

SPREAD THE WORD

I found Nancy Goodwin's article on little bulbs (September/October) delightful. I would like to point out, however, that our organization, the International Bulb Society, was not included among other organizations listed in a box of sources and resources for more information on bulbs that accompanied the article.

Founded in 1933, the International Bulb Society has been a source of information on bulbs for many years. I hope that in the future you include the society as one of your resources for bulbs. Our address is International Bulb Society, P.O. Box 92136, Pasadena, CA 91109-2136. You can call us at (318) 475-8812, or visit our Web site at www.bulbsociety.com. If we can be of assistance to you or your readers, please do not hesitate to contact us.

*Robert M. Turley
E-mail Bulb Forum Director
International Bulb Society*

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TIMELY TOPIC

Let me offer a thank you for the article "The Genetics of Geography" by Andy Wasowski in the November/December issue. This article emphasizes what I am trying to promote in Nevada—and what I wrote about in an article for *Pacific Coast Nurseryman*. The right plant for the right environment is a concept that will advance the horticulture industry, rather than be a detriment to it.

Margie Bemis Klein
Nevada Division of Agriculture
Las Vegas, Nevada

MORE ON PROVENANCE

Thank you for Andy Wasowski's fine article on provenance in the November/December issue. Though it is generally thoughtful and well reasoned, I have two comments about its assertions.

First, I believe native plant enthusiasts—like myself—must be realistic in our claims about the pros and cons of natives. While a local plant's genetic adaptation to its provenance *can* equate to horticultural fitness, the *reality* for many gardeners is that their residential properties have been so altered through long-term human activity that the soil, moisture, exposure, and other critical cultural characteristics are no

Correction

We owe a double apology to Samuel B. Jones Jr. and his wife, Carleen, co-owners of Piccadilly Farm, a wholesale/retail nursery in Bishop, Georgia. In the article on plant hunter Barry Yinger (January/February), we incorrectly identified the university at which Samuel Jones earned his doctorate and spent most of his career. He is professor emeritus of botany at the University of Georgia in Athens, where he worked for 24 years on the botany department faculty. He also served as director of the university's botanical garden and director of the herbarium during part of his tenure there.

In our article on hellebores in the same issue, we omitted to list Piccadilly Farm, the largest wholesale supplier of hellebores in North America, among the mail-order sources. A free price list of the nursery's retail offerings—which also include hostas, other herbaceous perennials, conifers, and shrubs—is available by sending a request to Piccadilly Farm, 1971 Whip-poorwill Road, Bishop, GA 30621, or calling (706) 769-6516.



Viburnum dentatum in fall color.

longer typical of what the locally native species are adapted to. In such circumstances, species from distant provenance may be more successful from a purely horticultural point of view. The plethora of highly invasive exotics now naturalized in North America is unfortunate proof of this. Gardeners interested in reading more on the biological adaptation of natives would be well served to consult Stephen Jay Gould's essay "An Evolutionary Perspective on Strengths, Fallacies, and Confusions in the Concept of Native Plants" (in *Nature and Ideology: Natural Garden Design in the Twentieth Century*, edited by Joachim Wolschke-Bulmahn, published in 1997 by Dumbarton Oaks Research Library and Collection).

Secondly, though the genetic difference due to provenance can be extremely subtle—as Wasowski states—sometimes it also can be obvious and quite beautiful. To give you an example: I am currently working with the state of Delaware on roadside vegetation studies utilizing the regional flora. In seeking commercial sources for arrowwood (*Viburnum dentatum*), we found plenty of nurseries growing the species from distant seed sources, but none growing plants representing local provenance. Fall color on the plants grown from non-indigenous seed is a solid, deep maroon, unlike local plants whose autumn tones are typically a vibrant mingling of chartreuse, pink, and bronze-purple. Happily, we've since found sympathetic, progressive nursery people willing to produce plants for us from local seed, allowing us to celebrate the unique beauty of provenance. ●

Rick Darke
Landenberg, Pennsylvania



news from ahs

AHS AWARDED FOR HEAT-ZONE MAP

For its development of the AHS Plant Heat-Zone Map—and ongoing programs to teach gardeners how to use the map to select plants appropriate to their region—AHS has been elected to the Associations Advance America (AAA) Honor Roll, a national awards competition sponsored by the American Society of Association Executives in Washington, D.C. The AAA awards recognize outstanding efforts—through education, economic development, business and social innovation, knowledge creation, standards, and community service—to make America a better place to live.

PLANT A ROW FOR THE HUNGRY

Once a working farm under the ownership of George Washington, River Farm—now the headquarters of AHS—has a long history of producing fruitful harvests. This spring, however, a section of ground at River Farm will be set aside for a rather special vegetable garden. The produce from this garden will be donated to Plant a Row for the Hungry, a nationwide campaign in which gardeners and gardening groups set aside space in their gardens to grow fresh vegetables and fruit to be donated to soup kitchens and shelters for the homeless.

The Plant a Row for the Hungry campaign, now in its fifth year, was developed by the Garden Writers Association of America (GWAA), a non-profit group headquartered in Manassas, Virginia. GWAA's members are spreading word about the campaign through newspaper columns, magazine articles, radio and television broadcasts, and lectures. The ultimate goal is for Plant a Row participants to pledge a million pounds of food by the Millennium.

James Wilson, a well-known garden writer and former co-host of the public television series "The Victory Garden," will talk about the Plant a Row campaign in one of the concurrent sessions at AHS's annual conference in Boston this summer.

According to Jacqui Heriteau, chair and coordinator of the Plant a Row campaign, major publicity will result from the recent-

ly announced sponsorship by Home and Garden Television Network of Knoxville, Tennessee.

To find out more, visit the GWAA Web site at www.gwaa.org, or e-mail Heriteau at jacquiheriteau@email.msn.com.

And this spring, we urge you to consider joining us in planting and harvesting an extra row of vegetables to help provide nutritious food for our nation's hungry.

RIVER FARM FIESTA

On Sunday, October 4, nearly 800 chili pepper fans from as far away as San Francisco converged on River Farm for the first annual AHS Chili Pepper Festival. Despite an overcast sky and a few rain sprinkles, the festival was a rousing success.

A flamenco guitar band provided music and set the mood for dancing, craft displays, raffles, prize give-aways, tours of River Farm's pepper display gardens, and plenty of spicy food tastings. Twenty seven varieties of *Capsicum* in a wide range of sizes, shapes, colors, and heat—including 'Habanero', 'Poblano', and 'Ancho'—were artfully displayed for visitors to sample and purchase.

Widespread publicity before the event, including a four-minute television spot on WJLA, Washington's ABC-affiliate, encouraged many newcomers to visit River Farm and introduced many to the Society. As one festival-goer put it, "This is one of the best-kept secrets in Washington!"

The date for this year's Chili Pepper

Festival will be announced in a future issue of the magazine.

ROCKEFELLER CENTER TREE PROJECT

AHS has joined several other organizations in the development of a series of children's educational projects offered through an interactive Web site. The site—initially developed to highlight the festivities associated with the annual Christmas tree display at the Rockefeller Center in New York City—has expanded to include a variety of projects centered on learning about trees. Other participants in the program include the Rockefeller Center, the U.S. Department of Education, the Eisenhower National Clearinghouse for Mathematics and Science Education, and the American Forest Foundation.

The Society's contribution to the Web site is a project that describes how to integrate trees into a schoolyard butterfly habitat. Butterfly gardens are one of the most popular garden-based activities at schools, but many such gardens focus on herbaceous plants and don't take into account the role woody plants play in the life cycles of butterflies. The information provided by AHS teaches school groups how to research, design, build, and maintain a sustainable butterfly habitat.

For more information about the Rockefeller Center Tree Project, visit www.nettech.org/treetopsience/index.html.

SOUTHERN LIVING GARDENING SCHOOL

AHS and *Southern Living* magazine are co-sponsoring a series of gardening schools to be held at some of the top botanical gardens and horticultural showplaces across the Southeast. The schools, taught by *Southern Living* gardening experts Bill Slack and Rick Ludwig, are hour-long lectures on topics such as landscape design, use of color in the garden, and four-season gardening.

Dates and locations of the upcoming gardening schools are listed on the back cover of this magazine. For more detailed



A vendor displays a colorful selection of chili pepper products at AHS's festival.

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information about schools at individual locations, call the host institution.

GREAT AMERICAN GARDENER LECTURE SERIES

As part of the Society's Great American Gardener lectures, in October AHS sponsored talks by prominent national horticulturists at Ponte Vedra Beach, Florida. Featured speakers for the event were John Alex Floyd Jr., vice president and editor of *Southern Living* magazine; John Elsley, vice president of product development at Wayside Gardens in Hodges, South Carolina; and Katy Moss Warner, director of horticultural and environmental initiatives at Walt Disney World and chairman of the AHS Board of Directors.

The event, held at the Ponte Vedra Inn and Club, was organized by Carolyn Marsh Lindsay, a Ponte Vedra resident and former chairman of the AHS Board of Directors.

WORLD'S OLDEST FLOWERING PLANT UNEARTHED

A team of Chinese and American scientists may have discovered fossil evidence of the world's oldest known flowering plant in Liaoning province in northeastern China. Radiometrically dated at between 142 and 148 million years old, this woody-stemmed plant dubbed *Archaeofructus liaoningensis*—with 35 pod-shaped fruits—predates by more than 20 million years what was previously regarded as the oldest angiosperm, or flowering plant.

But scientists are not only marveling about the fossil's age. Close study of the three-inch-long *Archaeofructus* specimen—



Fossilized imprint of *Archaeofructus liaoningensis* recently found in China.

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a fossilized imprint in which portions of the cellular structure are preserved—reveals the beginnings of several ovules, or seeds, enclosed in podlike fruits much like a pea pod. This is a trait absent from other claimants to the title of the oldest known angiosperm. “Some scientists on the discovery team originally thought this specimen was a legume,” says team member David Dilcher, a graduate research professor with the Florida Museum of Natural History and the University of Florida in Gainesville, but microscopic examination did not reveal any of the scars that would be expected to have been left by the sepals, stamens, or pistils of a legume. Because the surfaces of the podlike orbs are smooth and the seeds are enclosed in fruit, Dilcher and his fellow scientists conclude the fossil is the oldest known angiosperm found to date.

“The structures we today recognize as fruit developed 60 to 70 million years ago, when plants developed the covering of fleshy pulp that enticed birds and rodents to carry seeds great distances,” says Dilcher, who notes that this latest discovery elucidates an important step in the evolutionary process. “Without this development,” adds Dilcher, “the co-evolutionary relationship of flowers and animals, including our primate ancestors, would have been radically different.” The discovery was first reported in the November 27, 1998 issue of *Science* magazine.

GOODBYE ACG—HELLO NACGS

For the last five years we have enjoyed some of the best garden writing around in the pages of *The American Cottage Gardener*, a quarterly magazine edited—and mostly written—by garden writers Nancy McDonald and Rand B. Lee. Alas, this philosophical and informative magazine has ceased publication.

Lee is now trying to rally the magazine’s subscribers and others interested in American-style cottage gardening to join a fledgling North American Cottage Gardening Society (NACGS). “The goal of NACGS will be to provide North American gardeners with a forum for exploring the classic English cottage gardening style and adapting it to North American climate conditions and cultivars,” says Lee. He plans to publish a 12- to 16-page journal four times a year and organize an annual seed exchange. Publication of the first issue of the journal is slated for this coming May. Anyone interested in joining the NACGS should send a stamped, self-addressed envelope to Rand B. Lee, NACGS, P.O. Box 22232, Santa Fe, NM 87502-2232. You can also request details about the society by e-mail at randbear@nets.com.

BEAUTY FROM BULBS



Glorious spring gardens come alive with Beauty from Bulbs

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sun sense

OZONE IS NOT SOMETHING GARDENERS THINK ABOUT MUCH,

but it plays a role in two areas that are related to gardening: One is skin cancer, the other is damage to plants. Ozone is a form of oxygen that primarily exists in gaseous form in a thin layer of the stratosphere that surrounds earth. In this form, ozone is generally beneficial to humans because it helps screen out harmful ultraviolet radiation. But, through the release of certain chemical compounds



such as chlorofluorocarbons into the atmosphere in this century, earth's ozone layer has been depleted to the point that increasing amounts of ultraviolet radiation are reaching the earth. This puts humans and other animals at a greater risk of health problems such as skin cancer and cataracts. Skin cancer is on the rise in the United States and worldwide, and gardeners—who naturally tend to spend a lot of time outdoors—are increasingly at risk.

Ozone that is found at ground level—

sometimes termed “bad” ozone—is a leading element of urban smog. Ozone-laden smog can cause respiratory problems in humans, and it also can have detrimental effects on plants.

This special section on ozone is not intended to discourage gardening or other outdoor activities; rather it is meant to alert gardeners to the dangers of skin cancer and to the means of protecting themselves from sun exposure.

skin cancer

by Richard L. Bitner

On that first really warm day of spring, nothing feels better than being able to peel off layers of clothing to let the sun impart its warmth directly onto our winter-dulled skins. For gardeners, especially, having ruddy cheeks and farmer's tan lines by summer's end testifies to a season well spent. Many of us garden because we enjoy being outdoors, and, for the most part, because it enhances our health and quality of life.

But as we learn more and more about the harmful effects of unprotected exposure to sunlight, it becomes clear that all of us who are avid gardeners or horticultural professionals must take steps to protect ourselves—and our children—from ultraviolet radiation. This does not mean spending less time in the garden, it just means re-evaluating our gardening habits and taking some simple precautions before heading outside.

Today, skin cancer is the most common cancer in both men and women in the United States. About one million new cases of skin cancer will be diagnosed this year, and one in five Americans will develop some form of skin cancer in his or her lifetime. The number of cases discovered each year has been increasing for decades and gardeners are among those at highest risk. If predictions of continued depletion of the ozone layer prove valid, the incidence of these tumors will increase even more in the coming century.

TYPES OF CANCER

Skin cancer is not a single tumor with a single cause. There are three important types of skin cancer, each with specific characteristics, causes, and natural history. The two common skin cancers are basal cell and squamous cell carcinomas. A third, potentially fatal, form of skin cancer is melanoma (see sidebar on “Recognizing Skin Cancer,” page 55).

Sun Safety Guide

Although gardeners have no control over any hereditary predisposition they might have to skin cancer, we must educate ourselves and our children about protective measures. Here are some steps you can take to protect yourself:



- Limit your exposure to the sun: Do gardening chores before 10 a.m. or after 3 p.m., when the sun's rays are less intense.
- Wear a wide-brimmed hat and a long-sleeved shirt with a high collar. Specially made clothing is marketed for individuals at high risk (see "Sources," page 55).
- Wear sunglasses. Sun exposure is also related to the development of cataracts.
- Use a sunscreen. Select one with a sun protection factor (SPF) of 15 or higher and apply it 20 minutes before going outside. Reapply frequently and liberally.
- Check your medicine labels—some medicines increase sun sensitivity.
- Avoid suntanning parlors.
- Protect children. Get them used to wearing sunscreen so that it becomes as much a habit as brushing teeth or washing hands.

Most cases of basal cell and squamous cell carcinoma are caused by excessive exposure to the sun or to artificial sources of ultraviolet radiation. Prevention of these forms of skin cancer is possible by taking simple precautions such as those listed in the box above. Both of these types of skin cancer tend to stay put; that is, they cause problems in the immediate area they are growing but do not spread—metastasize—to other areas of the body. The third type of skin cancer, melanoma, is more serious, because it does spread readily to other parts of the body. Thus it is especially important that it be discovered and treated early.

DEADLY SUNLIGHT

Several factors increase a person's risk of developing skin cancer. Exposure to the sun is the main cause. It also follows that the degree of risk is related to where a person lives. Skin cancer is more common in Texas than in Minnesota. Worldwide, the highest rates of skin cancer are found in South Africa and Australia because of the high amounts of ultraviolet radiation these Southern-latitude countries receive. The risk is also related to a person's lifetime exposure to the sun. Most skin cancers appear after age 50, but the damaging effects begin years earlier—even in childhood.

Some people also have a hereditary predisposition. The dominant hereditary risk factor for all types of skin cancer is skin color.

These tumors occur most often in people from fair-skinned ethnic groups, particularly those who freckle easily and have red or blond hair. The incidence of skin cancer in people with dark skin—which has higher levels of a protective pigment called melanin—is much lower than it is among people with light skin. But having dark skin is *not* an exemption from sun protection; it is sometimes more difficult to see and diagnose the signs of skin cancer on darker skin.

Related to these factors is an individual's skin reaction to strong sunlight. People who say that they tan only and never burn when exposed to sunlight have lower rates of skin cancer than those who burn only and never tan. It should not be concluded, however, that a suntan is protection against skin cancer.

The nature of the exposure to sun necessary to develop skin cancer differs among the three types. The cumulative—or lifetime—exposure to sunlight is associated with the increased risk of basal cell and squamous cell skin cancers. These cancers tend to occur on the areas of the body more likely to be exposed to sunlight: the head, neck, arms, and hands. There is also an increased frequency of these cancers in outdoor workers compared with indoor workers.

The patterns noticed with melanoma are not so simple. Sunlight is considered a contributing factor, and there is an increased risk for this tumor associated with

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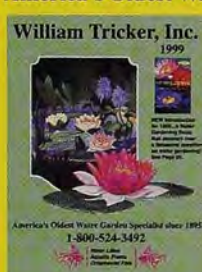
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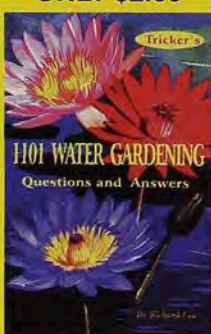


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Ozone Damage to Plants

Concern over air pollution, especially ozone pollution, has grown exponentially in recent years. Because ozone is the product of a photochemical reaction—hydrocarbons and nitrous oxides in the atmosphere react with ultraviolet light to produce the pollutant—it increases as the days get longer in summer. While it is well known that ozone can be a health risk to humans, there have been fewer studies of its potential threat to plants.

Researchers have known for decades that many plants are sensitive to ground-level "bad" ozone, which is different from the "good" stratospheric ozone layer that helps block out harmful ultraviolet wavelengths. Ozone enters plants through the leaves and can stunt plant growth, reduce crop yields, and—in extreme situations—can result in plant death. Symptoms vary with individual plants but often include a thickening of the cell walls, causing small, sharply defined, dotlike lesions. Other common symptoms are bleaching of the upper leaf surface, chlorosis (the absence of green pigmentation), and accelerated senescence, or tissue death. Unfortunately, ozone damage is easily mistaken for any number of other common maladies, including nutritional disorders or herbicide injury. Steven Britz, research leader at the USDA's Climate Stress Laboratory in Beltsville, Maryland, notes that ozone damage also increases a plant's susceptibility to insects. "Ozone restricts the movement of carbohydrates in the leaves, causing a greater level of sugar to build up," he explains. "This makes them more succulent and tasty to insects."



Hollies are known to be ozone tolerant.

Of course, not all plants are sensitive to ozone damage. And some studies have shown that populations of plants in areas with high ozone levels are sometimes able to adapt to the pollution; the same species in another location may not have the same ability to tolerate ozone. Different cultivars of plants may react differently as well. At this point, scientists don't have a definitive answer to what makes one plant sensitive to ozone while another can tolerate it. There are a number of variables that seem to affect a plant's tolerance. Research in Britz's lab focuses on plants' abilities to synthesize ascorbic acid (vitamin C)—plants with high levels of ascorbic acid appear to be more tolerant of ozone because the acid detoxifies the ozone. This understanding is critical in the USDA's attempts to create more resistant lines of crops.

A common misconception about air pollution is that it is only a problem in major urban areas. Certainly it is worse in the Northeast, with its sprawling megalopolis between Boston and Washington, D.C. The Southeast is also a bad spot due to greater amounts of sunlight combined with the nitrous oxides emitted from cars and the large number of trees in the region, which give off volatile hydrocarbons. But Britz points out that hydrocarbons and nitrous oxides—byproducts of the burning of fossil fuels—can travel long distances in the atmosphere before they react with ultraviolet light to produce ozone pollution. "It's quite a widespread problem," Britz says. "Just because you live in a rural area doesn't mean that ozone can't affect your plants."

According to recent studies, plants most susceptible to ozone damage include melons, soybeans, red maple (*Acer rubrum*) cultivars, butterfly bush (*Buddleia* spp.), and *Zinnia angustifolia* 'White Star'. Plants that have been identified as ozone tolerant include ginkgo (*Ginkgo biloba*), Norway maple (*Acer platanoides*), viburnums, and hollies.

Britz and many other researchers across the country will continue to study the why's and how's of ozone damage to ensure that farmers and gardeners will have ozone-tolerant plants if air pollution levels continue to worsen. Ultimately, Britz says, ozone damage of plants wouldn't even be an issue "if people would just spend more time gardening and less time driving."

—Christina M. Scott, Assistant Editor

Risk Factors

Below are some common risk factors for a person to develop basal cell carcinoma and squamous cell carcinoma of the skin:

- Prior sun-induced skin cancer
- Sun-induced skin cancer in a first-degree blood relative
- Sun-induced freckles
- Sun sensitivity
- Relative inability to tan after repeated exposure to ultraviolet radiation
- Excessive chronic exposure to ultraviolet radiation, occupational or recreational
- Sun-damaged skin
- Eye color blue or green, hair color red or blond, light skin

a history of sunburns, particularly in childhood. There is also an increased risk for developing melanoma if one has already had the other kinds of skin cancer. However, melanoma occurs more frequently in indoor workers than in outdoor workers, and it does not tend to be found on those parts of the body that get the most sun exposure. Some researchers suggest that infrequent exposure to sunlight—but of a nature to cause sunburn—may be an important contributing element for melanoma. Unlike the other skin cancers, melanomas are more common in the 20-to-50 age group. A change in a pre-existing mole is the presenting sign of a melanoma in almost all cases.

Most skin cancers are self-discovered or noticed by friends and relatives. Developing a regular habit of self-examination—and having an annual total body surface inspection by a primary-care physician or dermatologist—is essential for every gardener.

Treatment of skin cancers is determined by the dermatologist or plastic surgeon consulted and depends on the cell type, their location, and their extent. Most cases of squamous cell and basal cell skin cancer can be treated successfully in an outpatient setting with a minimum of discomfort, cost, and inconvenience. Melanomas need to be completely excised and analyzed under a microscope to determine further treatment.

PREVENTION

It is important to understand the dangers of sun exposure and to develop habits neces-

(Continued on page 55)



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offshoots

SPRING SERENDIPITIES

by Jane E. Donnelly

Today, a battered bugbane (*Cimicifuga racemosa*) pushed its little head one inch above the earth. It was one more pleasant surprise in two decades of surprises my gardens have given me. Last April we were having our house repainted when my western garden, the one that gets so little sun and has required so much work to coax along, was just beginning its annual rebirth. The painters really did try to be careful not to step on anything that had already broken through the soil when they were working. But the lilies, the astilbes, and the two bugbanes that had just been planted the previous year hadn't yet made themselves known—and the earth above them was trodden solid by the workers.

That western garden was the first I planted when we moved to this house seven years ago. Aesthetically, the placement of the garden was perfect—to the west of a lovely, columned, open porch—but the location presented challenges: The earth was covered with grass and weeds; there were no worms; the soil was nutrient-poor; and there was little sun. But I was naive and determined, and I had the bed rototilled. That done, I replaced with a truckload of compost the hundreds of rocks that had heaved up, and I double-dug the bed.

There have been a lot of failures in that garden—which has been fickle—but the successes are therefore even more sweet. One year, it produced award-winning lupines alongside incredible peonies in the one sunny spot. The next year, the lupines were completely gone. I have learned very well what grows in shade. Astilbes are in heaven there. Siberian irises do fine. There are some very happy hostas. There is also a spectacular bleeding heart that produces numerous offspring every year. The biggest surprise has been the lilies—dozens of unknown varieties planted at random—that put on an astonishing show in July, when the newer eastern garden is quiet. The bugbane was added to the garden the year before last. It didn't do much, and I was looking forward to its second year.

Everything was fine until last year, when those lilies, the astilbes, and the poor bugbane weren't able to even break through the earth after the painters' work was done. The garden was in pretty sad shape, and as I put it to bed in the fall, I decided that it would require a major overhaul in spring—a daunting task. But the early warm days this year beckoned me out again, to be renewed along with my plants by spring-time's promise.

The old standbys in the western garden looked okay, but I held little hope for the plants that never had a chance to renew themselves last year. Yet as March gave way to April and longer days—and warmer rains—the garden came back. The lilies seem to have doubled after their year off. The bleeding heart was enormous, as were the astilbes. Two weeks ago, one of the two bugbanes I had planted two years ago broke through. I couldn't believe it and gave it a silent “welcome back” as I worked fertilizer into the soil. However, there was no sign of its partner, which was planted close to the corner of the house and had no doubt been trampled by the painters many times. I gave that one up for lost and figured I'd have to return to the specialty nursery for another.

Last weekend, I was having one of those out-of-sorts-for-no-reason weekends when I feel like everyone *else* needs an attitude check. I couldn't shake off my mood and went to work on Monday in the same funk. After coming home from work, I stole an hour or so in the garden before supper to renew my spirit.

As I strolled around the yard, with the dog prancing alongside, and the cat threading herself back and forth through my legs, I glanced back at the western garden, which was lit by the low afternoon sun. I went through my mental inventory of what was there and how everything was coming along: *That's doing fine. That one's doing great. I really have to move those where they can get more sun. The lilies are going to be spectacular again. And look at that one bugbane. It's already a foot tall.*

I walked around to the end of the house. Eternal optimist, I gazed at the spot where the second bugbane should be. It *is* there. It's only an inch above the soil, so dark and red it's almost invisible, but there's no doubt it has come back. It has withstood last year's battering and will be cared for this year beyond imagining. I found a nearby stick and placed it in the ground an inch away so no one will step on it.

This is what gardening is all about. Much like life, the product is a nice consequence of the process. When all is done, I want to know that I've not only lived a long life, but one with breadth. Being in the garden gives breadth to moments in life, and the moments are truly all we have. ♣

Jane E. Donnelly is a freelance writer living in Barrington, Rhode Island.



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POLARIS SCHOOLYARD HABITAT

by Mark C. Mollan

Clad in hip-waders on a cool Alaska afternoon, seventh grader Gina Turrini and 11th grader Kyra Rice squat in mud on a pond bank replanting cattails rescued an hour earlier from a nearby highway expansion project. Across the field—a five-acre plot rescued from developers—rubber-booted seventh grader Kevin Mauri helps schoolmates Josh Schraer and Ty Wardell move tree stumps and branches to create a haven of brush for birds and small animals. These students at the Polaris K–12 School in Anchorage are all working in their Schoolyard Habitat, an innovative program supported by the Alaska office of the National Wildlife Federation (NWF) as part of the Backyard Wildlife Habitat Program.

Of the thousands of backyard habitats certified by the NWF in schools, corporate parks, and homes nationwide, the Polaris Schoolyard Habitat is unusual because it involves students in every stage of the habitat's development. Teachers guide classroom discussions on how to design harmonious environments for animals and reestablish native plant species in the habitat, while extra-curricular student and teacher planning committees put these ideas into practice.

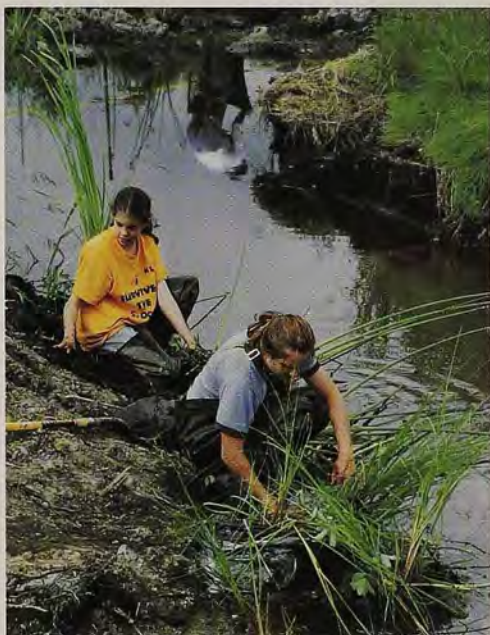
A DIFFERENT KIND OF SCHOOL

The development of the schoolyard habitat is typical of Polaris K–12 School's innovative approach to education. An alternative

education facility for Anchorage school children, Polaris was founded in response to requests by parents for holistic—or all-embracing interdisciplinary—educational programs. Because few buildings were available to the emerging school, Polaris founders renovated an old movie theater. When the school opened in 1994, the surrounding industrial park offered little space for outdoor activity. But in 1996, the school was able to purchase five acres of wetlands that had once been targeted for development. The school initially planned to use the site for a multi-purpose sports facility, but the NWF came forward with an intriguing counter-offer.

“We had been looking for a school in Anchorage to create Alaska's first schoolyard habitat, and Polaris couldn't have been more ideal. The school's flexible curriculum and community involvement, combined with the wetland ecosystem right out their back door, are the perfect mix,” recalls Kristin Siemann, the NWF coordinator for the project. “We wanted to highlight the values of Alaska's wetlands not only for the environment, but also for education and recreation.”

Polaris teachers, students, and parents met to consider the NWF proposal. After much discussion, they voted to set aside half of the land for the habitat and use the remainder to build a sports field. Once the decision was made, the school called on students, parents, and local businesses for support. “Parental and student participation is a fundamental principle behind the school,” explains Mark Lyke, a Polaris science teacher and director of the habitat. “Parents must apply with their children to enroll in the school and demonstrate that they will take an active part in their kids' education, as well as support and engage in school activities.



As part of Alaska's first Schoolyard Habitat project, students replant vegetation along a pond bank, left, and prepare the ground for gardens, above, to grow potatoes, carrots, and other vegetables to be donated to a local soup kitchen.

Also, we really didn't have a budget for the habitat, so community donations of time and supplies were imperative."

The community response was overwhelming—Polaris received donations, grants, and in-kind contributions worth more than \$115,000. Landscaping companies donated plants, trucking companies delivered heavy supplies and trees, and a fence company provided the perimeter enclosure.

HANDS-ON EDUCATION

Short courses called "intensives" that are held between semesters at Polaris have provided extra labor for the habitat and a unique educational opportunity for the students. Students in intensives take a class several hours a day for three weeks to study subjects not offered in the standard curriculum. Last year, almost 50 students took the habitat intensive. "I had to get a second instructor because more than twice the number of expected students signed up," Lyke says.

Students in the habitat intensive toured several gardens in the Anchorage area to get ideas for their own gardens. "The first two weeks of the intensive we spent learning to design a garden," says Janet Willis, a ninth grade student. "We then designed one for the habitat and put it together ourselves."

Lyke ensures that educational uses of the habitat span every subject. "Science instructors take advantage of the living laboratory by teaching about wetland ecosystems, water quality and biofiltration, wildlife adaptation, native plant botany, and regional weather patterns and microclimates," he says. Students also use their mathematics skills to run the financially self-sustaining charity garden, which produces vegetables and potatoes to be donated to Bean's Cafe, a local soup kitchen.

And instead of ignoring the harsh Alaskan winter, Polaris designed its curriculum to take advantage of the short, frigid days. "We never would have started this project if it were only a summer fling," says NWF coordinator Siemann. "Alaska's wetlands are buzzing with animals and activity all through the winter. There are great natural events for students to be able to study and document over time." Some wintertime studies include sub-snow photosynthesis, winter pond ecology, animal tracking, and the physics of snowshoes.

Some nearby schools are keeping a watchful eye on the progress of the habitat. Inlet View Elementary, an Anchorage neighbor, is planning to develop a similar program. When that habitat opens, Inlet and Polaris students will share their experiences via e-mail. "Being the first habitat in Alaska, we realized we had a certain responsibility to do the project well so that our experience could serve as a model for future school programs," says Lyke. "But our situation is also quite unique. Because we are a K-12 school, students that start and finish their primary and secondary schooling here will spend a large part of their lives growing up with the habitat. This will not just be an outdoor laboratory for the school, but a daily enhancement in these kids' lives." ♣

Mark C. Mollan is communications assistant at the American Horticultural Society.

For more information on the National Wildlife Federation's Backyard Habitat Program, write to the Backyard Wildlife Habitat Program Office, 8925 Leesburg Pike, Vienna, VA 22184-0001, or call (703) 790-4434. Visit the NWF Web site at www.nwf.org/habitats/

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mail-order explorer

HIGH COUNTRY GARDENS: SUCCESS IN THE SOUTHWEST

by Christina M. Scott

When David Salman started his own nursery in 1984, he did so out of frustration. Born and raised in the Southwest, Salman was tired of watching gardeners force eastern plants into their western gardens—an often futile activity that results in dead plants and disappointed gardeners. “Many of the perennials offered in the industry are from an eastern palette,” Salman explains. “Those plants just don’t work out here.”

So with the help of his father, Salman opened Santa Fe Greenhouses, Inc., a full-service retail nursery in Santa Fe, New Mexico, specializing in plants that thrive in cool mountain climates. Nine years later, in 1993, he expanded into the mail-order business under the name High Country Gardens. The mail-order catalog features the nursery’s more uncommon offerings, which, because of Santa Fe’s small population, didn’t always sell as quickly as Salman would have liked. “Sometimes I felt like I had a plant museum,” Salman recalls with a laugh. “I had a lot of interesting plants that people came to look at, but not to buy.” Sales are no longer a problem, however; today High Country Gardens is one of the leading mail-order nurseries for introducing new western plants into gardens around the country.

UNCOMMON SELECTIONS

One reason for High Country Gardens’ success is its dedication to bringing new and exciting plants into the market. Salman describes himself as a “collector by nature,” and a quick look through his catalog provides a visual testimony of that description. The catalog features many uncommon southwestern natives, including flame flower (*Talinum calycinum*) and dwarf sundrops (*Calylophus serrulatus*)—both native to the short grass prairies of the western Great Plains—and the endangered redbirds-in-a-tree (*Scrophularia macrantha*), a penstemon relative grown from seed collected on Cooke Peak near Deming, New Mexico.

In addition to southwestern natives, many plants native to the mountainous regions of South Africa have also found their way into the catalog. For this, Salman has Panayoti Kelaidis, curator of environmental gardens at the Denver Botanic Gardens, to thank. Many of Kelaidis’s South African introductions, including the winter-hardy gazania (*Gazania linearis* ‘Colorado Gold’) and the African daisy (*Osteospermum ecklonis* ‘Lavender Mist’), were first offered in North America by High Country Gardens. Purple ice plant (*Delosperma cooperi*), another Kelaidis introduction that was tested and then offered by High Country Gardens, has since become the top-selling ground cover in the Rocky Mountain region. “The widespread success of these plants surprises me sometimes,” Kelaidis says. “I introduced *D. cooperi* for us here in Denver, but people from California to Florida are growing it now.” Kelaidis credits High Country Gardens for bringing these plants into the



Nearly all of High Country Gardens’ offerings are grown in the nursery’s large display gardens. Left: A clump of ‘Pink Mist’ pincushion flowers, rear, draws attention to *Penstemon pinifolius* ‘Mersea Yellow’. In the foreground, the succulent ‘Gold Nugget’ ice plant grows over and around a group of rocks. Above: The threadlike gray-green leaves of *Agastache rupestris* give this best-selling plant a graceful, airy look.

To receive a free catalog, contact High Country Gardens at 2902 Rufina Street, Santa Fe, NM 87505-2929, (800) 925-9387. The nursery also maintains an informative Web site at www.highcountrygardens.com. Guided tours of the nursery's extensive display gardens are offered in June, July, and August. Call ahead for group tours.

public eye. "David has been at the forefront of launching major new plants into cultivation," he says. "It's very rewarding for me to know that these plants are grown throughout the country."

Salman's favorite offering, and the nursery's top seller, is the fragrant southwestern native sunset hyssop (*Agastache rupestris*), started from a single packet of seeds donated by a private collector six years ago. "I've always had a keen interest in hummingbird gardens," says Salman, "and this agastache attracts hummingbirds in droves."

The nursery also carries 17 penstemon species, including the unusu-

al yellow-flowered pineleaf penstemon (*Penstemon pinifolius* 'Mersea Yellow'). And Salman is excited about *P. pinifolius* 'Mango', a new cultivar with soft apricot-colored flowers that he will release in 2000.

NOT JUST FOR THE SOUTHWEST

Although High Country Gardens specializes in plants native to cool mountain climates, gardeners from most areas of North America can enjoy at least a few of the nursery's unusual offerings. The one exception is the Southeast, where high temperatures and humidity are fatal to many of these plants. Gardeners in the Northeast and Northwest, however, can successfully grow most of the plants, and Salman and his staff are always glad to help gardeners select the right plants for their region.

One of Salman's eastern customers is Isa Catto, an artist living in New York City. Catto, who gardens on a 25-square-foot rooftop, moved East from Colorado two and a half years ago. "I missed my western garden," she says, "so I decided to start one here." One of Catto's most recent purchases is lion's-ear (*Leonotis leonurus*), a South African native with fuzzy, orange sherbet-colored flowers. This drought-tolerant plant, along with the others she has purchased from High Country Gardens, fits in perfectly with Catto's busy lifestyle. Because she does a lot of traveling, she has little time to pamper plants. "For me, it's a matter of practicality," she explains. "But even in the East we have water problems, so xeric plants make sense to me."

For many western gardeners, High Country Gardens has been the answer to their prayers. When Virginia Ancin moved from Pennsylvania to the high plains of Colorado seven years ago, she was shocked the first season by the death toll in her garden. "I was at a loss," she recalls. "I'd just never thought about the differences between eastern and western gardening." Now, instead of slaving over delicate primroses—which inevitably suffered a horrible death—she grows such vigorous plants as Mexican hat (*Ratibida columnifera*), Turkish speedwell (*Veronica liwanensis*), and snow-in-summer (*Cerastium tomentosum*). "It's a matter of adjusting to a different style of gardening," she says. "You won't find any dainty plants here, just very hardy, robust plants."

It is this growing embracement of a western style of gardening that Kelaidis finds so exciting. "David is really pioneering a different aesthetic," he says. "It's a style of gardening that was not handed down to us from the English. This is a truly American way of gardening." ♣

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

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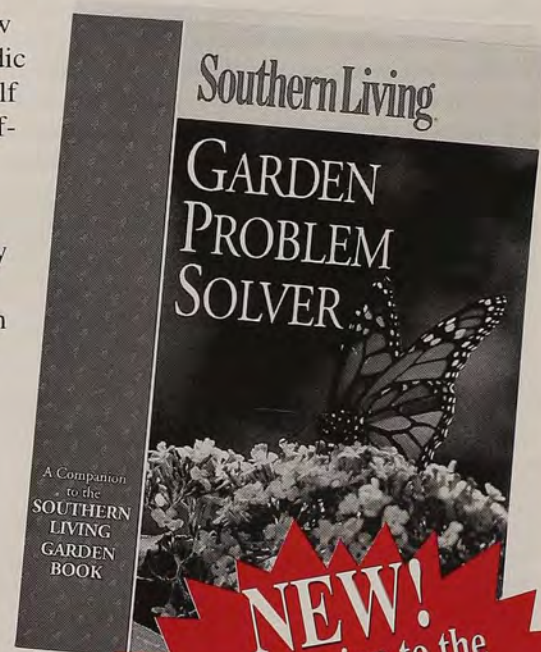
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Every year in May when my Annabelle hydrangeas are leafing out, a little caterpillar “glues” the edges of the top two opposing leaves together to make itself a “house,” which damages the leaves and distorts the subsequent growth and flower buds. Sometimes it merely folds the leaf vertically and seals those edges together. I try to pull the leaf apart gently and remove the caterpillar, but often just have to pinch off the whole thing, which makes the plant lose flower buds. I cannot find any mention of this critter in my references. What is it, and what can I do about it? —M.O., Wilmington, VT

Hydrangea arborescens ‘Annabelle’ is generally a pest-free plant. However, it sounds like your plant probably has a problem with a leaf roller or a leaf tier. Leaf rollers twist or

roll a portion of a leaf over themselves and leaf tiers fasten the leaves together with silk threads. Both feed on the leaf, and—when full grown—they pupate inside the roll. A small moth emerges after about one week, mates, and begins the cycle again.

Left unchecked, these pests can cause significant damage to plants. Inspect your plant periodically in the spring for the first sign of infestation. Pull off and destroy all affected leaves—caterpillar and all—and be sure to keep the area beneath the plant free of leaf litter. The most successful control is obtained with the use of an oil-based spray insecticide applied to each of the brownish egg masses on the bark or twigs. In late winter, prune the hydrangea to the ground to get rid of any remaining pests, and to promote regrowth and flowering the following year.

I’ve heard that corn gluten meal can be used to control crabgrass. I have looked in both feed and health food stores for it, but no one around here has even heard of it. Can you tell me where to find it and how to apply it?

—C.S., New York, NY

Corn gluten meal, a by-product of the milling process that yields corn starch, is an effective, non-toxic, pre-emergent herbicide. It is particularly effective against annual weeds such as crabgrass, but it also prevents germination of perennial weeds such as dandelions,

clover, and curly dock. As with most pre-emergent herbicides, corn gluten meal must be applied *before* weed seeds germinate. Using a standard fertilizer spreader, apply corn gluten in spring, just before weed seeds normally begin sprouting in your area. Reapply sometime after August 15 but before first frost to control weeds germinating in fall. Twenty pounds of corn gluten will treat about 1,000 square feet.

Corn gluten meal can also be spread on flower beds to control weeds. Be aware, however, that for several months after application it will *also* prevent grass seeds or other purposefully planted seeds from germinating. Don’t use it on newly seeded lawns or on beds where you would like to plant flower or vegetable seeds.

A side benefit of corn gluten is that it contains about 10 percent nitrogen by volume, so it also acts as a slow-release fertilizer. Corn gluten meal is available from Gardens Alive!, 5100 Schenley Place, 776 Rudolph Way, Lawrenceburg, IN 47025; (812) 537-8650; e-mail: gardener@gardens-alive.com. A comprehensive list of suppliers throughout the U.S. is available on the Internet at www.hort.iastate.edu/gluten/home.html.

A good friend of mine named Melissa recently passed away. I read somewhere about a plant called Melissa, which I would like to obtain to commemorate her grave. Can you please tell me about this plant, and where I can find it?

—G.R., San Diego, CA

The plant you are referring to is probably *Melissa officinalis*, also known as lemon balm. The generic name is derived from the Greek word *melissa*, which means “honey bee” and refers to the plant’s bee-attracting flowers. Lemon balm, a member of the mint family (Lamiaceae), is a lemon-scented perennial herb native to Europe but naturalized in most parts of the world. The plant is grown primarily for its sweet-scented foliage, although it does produce small white, yellowish, or pinkish flowers that bloom from June to October on erect stems up to 24 inches tall.

This plant is easy to grow from seed, but many nurseries and garden centers carry reasonably priced starter plants in the spring. V.J. Billings, owner of Mountain Valley Growers, Inc., in Squaw Valley, California, notes that lemon balm does best in full sun and well-drained soil and warns, “This plant readily re-seeds itself, so cut it back severely two to three times throughout the season to keep it from spreading out of control.” For lemon balm seeds, call Shepherd’s Garden Seeds in Torrington, Connecticut, at (860) 482-3638. To order plants by mail, contact Mountain Valley Growers, Inc. at (209) 338-2775, or check out its Web site at www.mountainvalleygrowers.com.

—Melanie Bonacorsa, Information Specialist

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natural connections

ANTS 'N' PLANTS

by Jennifer M. Wang

In Central America, ants swarm in and out of the hollow thorns located on the stems of the bull's-horn or swollen thorn acacia (*Acacia cornigera*). They're busy tending their colony, keeping the food stores stocked with nectar supplied by the tree and, of course, defending their home. What is not obvious at first sight is that in doing this the ants also benefit the tree by protecting it from herbivores—killing or driving off other insects and even attacking and stinging other animals. The ants also chew off leaves of other plants that touch the host tree or grow underneath it, preventing it from being shaded or having to share soil nutrients.

Although it is the best-known example of ant-plant symbiosis, the acacia and ant partnership is not unique; many plant species in North America also profit from ant activity. While plants provide ants with shelter, sustenance, or both, ants provide many services in return, including pollination, seed dispersal, and protection from herbivores. So the next time you curse the ants in your garden, take a closer look: They just may be doing some good.

POLLINATION

Although ants are generally "nectar thieves," feeding in flowers without serving to disperse pollen to other blossoms, a few plants have adapted to ant pollination. "Typically these are prostrate or low-growing plants that have small inconspicuous flowers close to the stem," note authors Michael Proctor, Peter Yeo, and Andrew Lack in *The Natural History of Pollination*. In the western Cascades of the Pacific Northwest, the Cascade knotweed (*Polygonum cascadense*) is regularly visited by *Formica* ants, which pollinate the dense stands as they forage for nectar. In the southeastern United States, another *Formica* ant species helps pollinate elf orpine (*Diamorpha smallii*), a tiny succulent endemic to hot, dry granite outcrops.

In general, though, ants are not good pollinators because they don't travel long distances. Moreover, many ants secrete antibiotic substances that destroy pollen on contact. Some plants have



Red carpenter ants tend a colony of aphids on this leaf. In return for protection from predators, the aphids provide the ants with a nutritious sugary excretion called honeydew.

adapted ways to discourage or exclude ants and other nectar-stealing organisms. These adaptations usually take the form of barriers between the ground and flowers, or an extra set of nectaries—known as extrafloral nectaries—which serve as decoys to keep ants away from the flowers. The leaves of teasel (*Dipsacus* spp.) clasp tightly around the stem to form catchpockets for rain or dew, thus excluding ants. Catchfly (*Silene* spp.), as its name indicates, features sticky areas on the upper part of its stems that sometimes trap flies, ants, and other small insects attempting to reach its flowers.

Common plants with extrafloral nectaries include peonies and legumes such as cowpeas (*Vigna unguiculata*) and broad beans (*Vicia faba*). In Michigan, the black cherry (*Prunus serotina*) has evolved perfect timing: Its nectaries, located near the base of its leaves, come into full production during the few weeks when its major defoliator, the eastern tent caterpillar, is still small enough to be killed by ants. As the ants exploit the newfound food source, they help drive away the would-be leaf-eaters.

Deterring Ants

In *Pests of the West*, author Whitney Cranshaw notes that "little direct damage is sustained by garden plants because of ants." He points out, however, that large ant colonies around the base of established plants can be problematic because of disruption to the root system and the buildup of formic acid, which is exuded by many ants. To prevent ants from guarding aphid colonies, he recommends the use of sticky barriers such as Tanglefoot. Ants can be discouraged from nesting around garden plants by flooding colonies with water as frequently as necessary.

Ants can also disrupt the use of biological controls to manage pests. If aphids or aphid relatives, such as treehoppers, spittlebugs, scale insects, and mealybugs in your garden are being protected by ants, the introduction of beneficial insects may not be effective.

"In many cases, the best control of aphids is the control of their ant protectors," writes Cranshaw.

—David J. Ellis, Editor

SEED DISPERSAL

In contrast to their minimal contributions to pollination, ants play a major role in seed dispersal. Research has shown that ants spread the seeds of about 30 percent of the herbaceous plants in West Virginia and central New York forests. These plants include Dutchman's breeches (*Dicentra cucullaria*), wild ginger (*Asarum canadense*), white trillium (*Trillium grandiflorum*), and liverleaf (*Hepatica nobilis* var. *acuta*). In the Sonoran Desert, ants help disperse the seeds of desert thornapple (*Datura discolor*).

Relocation of these seeds by ants is critical for preventing rodent predation and for ensuring germination—ant nests often harbor higher levels of nutrients and minerals than surrounding soil. For this reason many seeds have evolved fleshy, nutritive structures—called elaiosomes—specifically to attract ants. “Almost any ant, encountering one of these [elaiosome-bearing] seeds, would take it, drag it back to the nest, strip the elaiosome part off, and suddenly the seed’s in a different location,” says Ted Schultz, a research entomologist at the Smithsonian Institution’s National Museum of Natural History in Washington, D.C. Common garden plants with elaiosome-bearing seeds include violets (*Viola* spp.), white trillium (*Trillium grandiflorum*), and bleeding heart (*Dicentra spectabilis*), according to Steven N. Handel, a professor of ecology and evolution at Rutgers University.

As is seen in the example of the acacia, in addition to providing ants with nectar for their services, plants sometimes provide the physical structure and shelter needed for colonies. Ants are opportunists that will make their homes in hollow sedges; weeds, branches, and stems hollowed out by boring insects; and preformed bark cavities. Some ants have even been known to take over galls abandoned by wasp larvae.

TENDING FLOCKS

An unusual behavior particular to ants is their practice of tending colonies of aphids or other homopterans—the insect order that includes aphids, treehoppers, spittlebugs, scale insects, and mealybugs—much as farmers tend cows or sheep. As aphids suck sap out of plants, they excrete a sugary fluid called honeydew. The ants guarantee themselves continued access to this nutritious food source by protecting the aphids from potential predators such as lady beetles and parasitic wasps.

Although an aphid colony usually spells bad news for a host plant, when ants are present, it can sometimes be a different story. In guarding homopterans from predators, the ants also drive away other insects that prey on the plant. If plant-eating pests more voracious than aphids abound in your garden, the ants’ vigilance in protecting their turf may outweigh the damage caused by the aphids. If, on the other hand, the aphids are doing a number on your plants, controlling or disrupting the activity of their ant guardians may be enough to encourage aphid predators to reduce aphid populations to manageable levels.

The fascinating interaction between ants and homopterans can sometimes be witnessed on goldenrod (*Solidago* spp.) plants in an old field or at the edge of a woodland. According to Andy Zink, a Cornell University student studying insect relationships, goldenrods are often hosts to treehoppers and their guardian ants. If you can find a plant hosting both ants and treehoppers, try adding a beetle or other insect to the mix. Watching the ants’ defensive reaction to the intruder may make you look at them in a whole new light. ●

An assistant editor with Science Scope journal, published by the National Science Teachers Association, Jennifer M. Wang lives in Alexandria, Virginia.

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A Passion for Pinks

Dianthus hybrids are all the rage, but don't pass up the opportunity to try some of these versatile and time-tested species pinks.

by R a n d B . L e e

Many gardeners are surprised to learn that carnations (*Dianthus caryophyllus*), sweet Williams (*D. barbatus*), and cottage pinks (*D. plumarius*) all belong to the same genus. In fact, carnations (once known as gillyflowers) and sweet Williams (once called London tufties) have been cultivated for so long—and hybridized so often—that only garden escapes now exist in the wild.

But of the nearly 300 genuine wildings that do remain, there are many treasures for the home gardener. Some of these are quite difficult to grow, requiring perfect drainage or the sorts of scree-and-trough combos that rock gardeners are so adept at manipulating. The focus here, however, is on the biennial and perennial species pinks that are relatively easy to manage—as well as those that are readily available from retail sources.

Garden History

Our cultivated dianthus are derived from some 300 low-growing evergreen annuals, biennials, perennials, and subshrubs that hail mostly from northern temperate regions of Europe and Asia. Pinks were being grown in Britain at least as early as the 13th century and were among the first ornamentals to appear in the gardens of early settlers of North America. In a study of hardy herbaceous plants listed in 19th-century nursery catalogs, researcher Denise Adams of Ohio State University found that sweet William was the plant most available to gardeners in the

northeastern United States at that time. Other *Dianthus* species ranked in the top 100 plants in the study are *D. caryophyllus* (3), *D. plumarius* (38), and *D. chinensis* (51).

Opinions differ on the origin of the name “pinks,” but—despite popular belief—it is *not* because so many of them are pink; in fact, the reverse may be true. In her book *100 Flowers and How They Got Their Names*, Diana Wells notes that the word “pink” was not used to describe a color until the 18th century. Wells suggests the name may be linked to the Middle English *pinken*, “which originally meant

With its deep blue flowers and lobed green leaves, *Geranium 'Johnson's Blue'* offers a perfect foil to the pink flowers and spiky foliage of maiden pink (*Dianthus deltoides*). Photograph by Lynne Harrison.



Dianthus superbis var. *longicalycinus*, below, has striking pink filagreed flowers with white centers. The pale yellow flowers of Knapp's pink, bottom, belies its common name.



‘to pierce holes in’ leather or cloth, and then came to mean decorating the edges—in a similar manner to the pinked edges of dianthus petals.” It has also been argued that the name derives from the German word *Pinksten*, or Pentecost, the Christian feast-day around which some of the garden types may have bloomed; other sources suggest a link to an old Dutch term *pinck oog*, which translates to “small eye,” possibly a reference to the contrasting central circular markings found on the flowers of many pinks.

Growing Pinks

Like most of the genera in the pink family (Caryophyllaceae)—which includes such standard garden genera as *Arenaria*, *Gypsophila*, *Lychnis*, and *Silene*—pinks are more or less adapted to neutral or slightly alkaline soils. All detest having wet feet, however, particularly in winter, and thus require well-aerated soil. Most are hardy to USDA Zone 3 or 4, but despite needing full sun for best growth, not all are very heat tolerant. Planting pinks where they will receive afternoon shade in summer is recommended in AHS Zone 9 or higher.

Species pinks bloom in white and a range of rosy hues—from pink to magenta and deep red. One notable exception is *D. knappii*, which belies the genus’s common name by having pale yellow flowers. Some species pinks also exhibit a contrasting color at the center or on the underside of the petals; breeders have developed a wider range of flower color patterns on hybrid pinks.

Most wild pinks are short, roughly four

to 18 inches tall depending on the species, with very few—such as *D. giganteus*—attaining heights of up to three and a half feet. The best pinks form mounds, pools, or piles of narrow, needly, gray- to blue-green leaves that continue to grace the border or rockery long after the flowers have faded. The flowers—carried one or two per stem or in loose bunches—are almost always five-petaled and range from slightly notched to deeply cut. The clusterhead pinks—a distinct group of which sweet William is the best-known example—carry their flowers in tight little group-hugs at the top of a stem. Frequently, clusterhead flowers are ringed with little leaflets or bracts.

Each flower emerges from a more or less cylindrical bud protected by a toothed calyx—a sheath of sepals. Once the flower has opened, the calyx thenceforth acts as a kind of bouquet-holder for the petals. In some species, the calyx is not simply green but is also stained brown or buff or burgundy. Another toothed calyx, technically an epicalyx, protects the base of the true calyx. Very often the only difference between a species of pink and its subspecies, or between two closely related species, is the shape and length of the calyx and epicalyx.

When the flower is pollinated—hawk moths are a big culprit out here in the West—the petals shrivel and drop off, and the calyx-tube expands with the growth of the seeds within. Eventually it turns papery and the tip opens to release the seed.

Propagation

Growing pinks from seed is very easy, but named cultivars do not come true to type. Sow seeds, barely covered, in moist, well-drained, soilless potting mix. Bottom heat will speed up germination, which will occur within one to four weeks. Annual species such as *D. chinensis* should be sown in late winter; biennials and perennials can be started in a cold frame in fall or sown outdoors in summer to bloom the following season. Move seeds to a cool place once they have sprouted—next to a leaky south-facing window or under a grow light in the basement is ideal. Once seedlings have developed true leaves, they can be transplanted to cell packs or plastic pots; for convenience, I sow my seeds directly into cell packs.

The only way to ensure the your named pinks come true to type is to propagate them by division or cuttings. Most species pinks are short-lived perennials that need to be divided every two or three years anyway. Division can be done in early spring or



fall. Use a sharp knife or shears to cut clumps into pieces three or four inches in diameter—make sure each section has a healthy root system and new shoots or stem buds. Take stem cuttings in the cool of the day from vigorous plants in active growth—right after flowering is ideal. Take the cuttings right below the swollen stem-nodes of non-flowering shoots. Remove the lower leaves and insert cuttings in moistened vermiculite. Keep humidity high around cuttings by covering the container they are in with a plastic bag supported by stakes. Bottom heat will expedite rooting, which should occur within three months.

Perfumed Pinks

Some early garden writers called pinks “clove pinks” or “clove gillyflower” because of the spicy fragrance that characterizes some species. Of the scented pinks, *Dianthus plumarius*—the pink everybody thinks of when they think “pink”—is the most famous. Its common name is feathered pink, but it is also called cottage pink, grass pink, snow pink, and—my favorite—small honesties. Feathered pink is the parent of many cultivated pinks—often loosely grouped under terms such as garden, antique border, or old-fashioned pinks—and seed of the true wild form is now difficult to find (See “Sources” on page 28). About 16 inches tall when in blossom, this perennial species bears loose clusters of small, sweetly scented, five-petaled, pink or white flowers, sometimes with a darker eye-zone.

Similar in appearance to feathered pink is *D. serotinus*, a native of east central Europe that forms a blue-green clump of basal leaves and in summer bears one to five fragrant, cream-colored, fringed flowers per stem. The flowering stems of *D. serotinus* are more slender than those of *D. plumarius*, however, and reach only six to 12 inches tall. This hard-to-find perennial does best in a somewhat sandy soil.

The famous Cheddar pink (*D. gratianopolitanus*) is named for the Cheddar Gorge in Somerset, England, where an ancient population still exists. A perennial, it forms low, blue-gray mats four to six inches tall covered in spring with strongly scented rose-colored blossoms that will bloom through late summer if you deadhead regularly. Cheddar pinks are quite drought and heat tolerant once established and are by far the most successful of the dianthus I grow here in dry, clayey Santa Fe. University of Georgia horticulturist Allan Armitage also recommends them for the Southeast.



Superb pink (*D. superbus*) is widely distributed in mountainous regions of Europe and Asia. This short-lived perennial species is extremely cold tolerant and will bloom the first year from seed sown indoors under lights in February. From tufts of tender, narrow, green foliage arise branched, rather lax stems that can reach up to two feet tall. Loose clusters of softly scented, very deeply fringed, white or pale lilac-pink flowers bloom in summer.

Sand pink (*D. arenarius*), has a fine scent, too. It is hardy to Zone 3, and, despite its common name, does not need sandy soil to thrive. One of the first pinks to bloom in my garden each spring, this perennial forms lovely grassy emerald tufts to about a foot high, topped with deeply fringed white flowers in early to midsummer. In areas with cooler climates, if the dead flowers are regularly cut off, it may bloom again in late summer to early autumn.

Dianthus petraeus, a perennial Croatian wildflower hardy to at least Zone 4, forms a loose, green, prickly basal mat about an inch high. Its six- to 10-inch leafless stems support fragrant white or, rarely, pink single flowers with deeply notched petals.

Unscented Pinks

Of the unscented species, maiden pink (*Dianthus deltooides*) is one of the most foolproof. This loosely tufted perennial has slender mid- to dark green leaves and spreads via a creeping rootstock to form loose mats that make a good ground cover in full sun or part shade. In the wild, maiden pinks produce flowering shoots up to 15 inches tall; cultivated strains tend to be shorter. Numerous smallish, sharp-toothed,



Cheddar pink (*D. gratianopolitanus*), top, is a ground-hugging species with highly fragrant blossoms. Above: The ‘Laced Romeo’ cultivar of feathered pink (*D. plumarius*) has burgundy petals marked and outlined in white.

OPPOSITE TOP: JESSIE W. HARRIS; BOTTOM: JEFFREY GRACE; BOTTOM: MICHAEL S. THOMPSON

Sources

ALPAINS SEEDS, 32315 Pine Crest Court, P.O. Box 489, Kiowa CO, 80117-0489. (303) 621-2247. Catalog \$2.

- *Dianthus amurensis*
- *D. knappii*
- *D. petraeus*
- *D. plumarius* (wild form)

CHILTERN SEEDS, Bortree Stile, Ulverston, Cumbria LA12 7PB, England. 00 (44) 01229-581137. E-mail: chilternseeds@compuserve.com.

- *Dianthus arenarius*
- *D. carthusianorum*
- *D. deltoides* (wild form)
- *D. gratianopolitanus* (wild form)
- *D. plumarius* (wild form)
- *D. serotinus*
- *D. superbus*

THE FRAGRANT PATH, Route 32, Box 156A, Omaha, NE 68122-9504. Catalog \$2.

- *Dianthus arenarius*
- *D. gratianopolitanus*
- *D. seguieri*
- *D. superbus*

GARDENS NORTH, 5984 Third Line Road North, RR #3, North Gower, Ontario, K0A 2T0, Canada. (613) 489-0065. Fax: (613) 489-1208. E-mail: garnorth@istar.com.

- *Dianthus amurensis*
- *D. arenarius*
- *D. barbatus*
- *D. carthusianorum*
- *D. knappii*
- *D. plumarius*
- *D. sylvestris*

GLASSHOUSE WORKS, P.O. Box 97, Church Street, Stewart, OH 45778-0097. (800) 837-2142. E-mail: plants@glasshouseworks.com. Catalog \$2.

- *Dianthus giganteus*

J. L. HUDSON, SEEDSMAN, P.O. Box 1058, Redwood City, CA 94064. Catalog \$1.

- *Dianthus carthusianorum*
- *D. deltoides* (wild form)
- *D. knappii*
- *D. superbus*

PORTERHOWSE FARMS, 41370 SE Thomas Road, Sandy, OR 97055. (503) 668-5834. E-mail: Phfarm@aol.com.

- *Dianthus arenarius*
- *D. petraeus*

Resources

BORDER PINKS by Richard Bird, Timber Press, Portland, Oregon, 1994. AHS price: \$29.95. TIM 007



pinkish-red flowers bloom on these stems in June and July, each featuring a minute ring of purple dots—and a few long hairs—at the throat.

Sometimes the flowers are more pink than red, or vice versa. Very occasionally they are white. Maiden pinks require regular watering but will flower even in light shade and have been known to rebloom in the fall in some climates. Native to Scandinavia and northern Europe, they have been known to withstand Zone 3 winters, but will also tolerate a good bit of summer heat.

I have had very good luck with Amur pink (*D. amurensis*). This perennial species is sometimes erroneously described as the “blue” pink, although the bearded flowers are actually rose-purple with a cool bluish cast. For a reason that I have never fully understood, in some years or seasons the flowers appear bluer than they do at other times. They are very striking, however, borne on branchlets adorning upright, smooth, bright green, slender stems. Amur pink is long-blooming—flowering from June through August if well treated—and adapts well to part shade. It is said to reach 15 to 17 inches tall in cultivation, but the plants I have grown have been much shorter, reaching no more than eight to 10 inches. I grow mine in a half-barrel of well-drained, loamy soil approximating that of the dry turfy slopes and meadows of the species’s native habitat in eastern Asia.

Another floriferous long-bloomer is woodland pink (*D. sylvestris*, formerly *D. inodorus*). This is a gorgeous little alpine

perennial that can be grown effortlessly from seed. Blooming in July and August, it forms densely tufted hummocks from which spout arcing, branching stems of large, bright, clear to muddy pink flowers that look much like Cheddar pink blossoms. Woodland pinks can reach about 15 inches tall—unless starved—and seem to bloom forever, adapting well to part shade with regular moisture and moderate feeding. They are hardy to about Zone 5 and a little more heat tolerant than some pinks thanks to their Mediterranean heritage.

My favorite clusterhead is bloody pink (*D. cruentus*). This Balkan native makes bluish-green spreading mounds of bristly, downy foliage. From late May into early July, the plants erupt in stems six to 12 inches tall or more, topped with striking burgundy-green buds held in tight, globular, awned heads. When the buds open—and they don’t do this all at once—they reveal numerous bright blood-red flowers, all toothed, with bluish anthers. The effect is inexpressibly cheerful. Bloody pink is one of the most long-blooming of the clusterheads; if you carefully snip off the fading florets, others will erupt in their places. The plant requires a sunny, well-drained site, but it also needs fairly regular moisture. A perennial, it is hardy to at least Zone 5 and reasonably heat tolerant if the earlier caveat is taken to heart.

Another of my favorite clusterhead pinks is *D. giganteus*. This is a robust perennial that will grow 20 to 40 inches tall, bearing flat, narrow, pointed leaves that are often

Companion Plants

Generally speaking, compact, cool-colored flowers with dark green, gray-green, or silvery foliage go best with dianthus species. *Lavandula angustifolia*, the common English lavender, is a traditional backer for pinks. Hardy—with good drainage—to Zone 5, the cultivar ‘Bowles Early’ has particularly fine gray leaves and blooms early on compact plants. Another cultivar, ‘Sawyers’, has similar foliage and deep purple blossoms.

The long-blooming, compact polyantha rose ‘Jean Mermoz’ is another good dianthus companion. At two to three feet tall, it bears tiny, flat-quartered, button-eyed blossoms in warm pink. *Rosa* ‘Baby Faurax’, which grows one to two feet tall, has two-inch, dark blue-purple flowers that are said to be the bluest in the genus. I also like the hardy miniature rose ‘Scentsational’, which bears very fragrant urn-shaped pale mauve flowers on hardy two-foot plants.

Less traditional companions for pinks are the smaller bellflowers (*Campanula* spp.), yarrows (*Achillea* spp.), and penstemons. *Campanula rotundifolia* ‘Olympica’, the so-called “Scotch” harebell, is a very long bloomer that forms loose mats eight inches square or wider. It features the typical pale lavender, bell-shaped flowers of the genus and makes a good foil for the more alarming colors of *Dianthus deltooides*.

Greek yarrow (*Achillea ageratifolia*) is hardy in Zones 3 to 9 and grows about four inches wide and 18 inches tall. The bright white clustered flowers and the finely divided foliage make a nice contrast with the spikey leaves of most pinks. *Penstemon pinifolius* ‘Mersea Yellow’, 12 to 15 inches tall and hardy to the warmer parts of Zone 4 with good drainage, bears soft yellow blooms for six weeks or more and fine, pinelike foliage.

Penstemon barbatus ‘Elfin Pink’ (Zones 4–8) can take more humidity than *P. pinifolius* can and, with regular watering, will produce many two-foot-tall spikes of bright rose flowers all summer. Veronicas, too, go well with pinks. Any of the compact forms will do, but I am a nut for ground-huggers. The Rocky Mountain mat-former *Veronica livanensis*, which is hardy from Zones 4 to 8, makes shining pools of dark green and pure cobalt blue for three months from late spring onward.

—R.B.L.



frosted with the powdery bloom botanists term glaucous. From May to July, *D. giganteus* bears dense heads of small, single, toothed purplish-red flowers on long unbranched stems. A good stand of these plants can stop traffic. A native of south-central Europe, *D. giganteus* is hardy to Zone 4 and appears to have a decided preference for sandy soil.

Similar in habit and appearance is Carthusian pink (*D. carthusianorum*), a tufted clusterhead pink that is a very long summer bloomer. Its magenta to pink flowers bloom in flattened clusters on one- to two-foot stems.

The Yellow Pink

Knapp’s pink (*D. knappii*) is one of the few yellow-flowered dianthus species and probably the species responsible for adding yellow, gold, and orange tones to the bloodlines of florists’ carnations. This innocuous, pretty little perennial wilding is usually dismissed by horticulturists as more of a novelty than a good garden plant. One pundit wrote of it, “Quite frankly one could get a far better show from a dandelion,” but this is unfair. Knapp’s pink, also known as hairy garden pink, is simply sweet. It has pointed green leaves, not very tufted, and straight green stems anywhere from eight to 20 inches tall. In June or July these stems bear small single sulfur-yellow blossoms in clustered heads. Each petal is shallowly jagged or toothed, with a brownish to purple central marking. Native to Hungary, Herzegovina, and the western region of the

former Yugoslavia, Knapp’s pink does best with full sun in dry, sandy, or pebbly soil. It will not overwinter reliably in heavy clay, though it is cold hardy to about Zone 3. I love it interplanted in masses with *D. cruentus* and plants with blue and pink-to-magenta flowers.

To paraphrase Scripture, of the making of pinks there is no end, and I have barely grazed the upper surface of the delights this genus has to offer. As you can tell if you have come this far, those delights are rather understated. But in a world where every two-bit actor is a star, and where only the biggest, brightest, and showiest plants seem to engage the attention of the popular media, there is something to be said for small honesties. 🌸

Rand B. Lee is founder and co-president of the American Dianthus Society.



‘Bath’s Pink’, a cultivar of Cheddar pink, fronts Iberian cranesbill.

Opposite: The deeply notched petals of *D. petraeus* are a shimmering silvery white. The clustered flowers of *D. giganteus*, above left, are pink with paler centers.



Garden Reflections

Designed artfully, still water features mirror plantings and provide an air of tranquility in a garden.

by Molly Dean

At the heart of our mostly semi-shaded family garden lies a grassy area, south-facing and open to the sun. Here, we have put in a large curving pool. Because we've left most of its surface unobscured by a profusion of aquatic plants, it gives the effect of a large, silvery green mirror. People are usually more drawn to this spot than to any other in the garden, perhaps because of its air of tranquility. The water's calm surface invites contemplation. Here, one can pause on a bench and gaze into gently rippling patterns of leaf and sky. The reflections are especially magical at dusk, with deepening sunset hues, flitting bats, and occasional glimpses of a full moon suspended in the water.

Water has been a feature of gardens ever since humans began forming settled communities more than 5,000 years ago. Controlling and guiding water through irrigation channels was essential to the development of food and ornamental gardens. "In the Ancient World water fulfilled both practical and symbolic roles; once controlled and contained in channels and basins, it could give both life and aesthetic pleasure," writes George Plumptre in *The Water Garden*. The importance of water in Persian gardens, beginning as early as the 6th century B.C., is thought to have carried over into Greek and Islamic culture. This influence eventually spread throughout much of Asia, Europe, and North Africa.

Although water features for gardens range from the simplicity of a still pond to



fountains, waterfalls, and combinations thereof, perhaps the most classic use of water in the garden is in reflecting pools, which can serve a number of purposes. Designers throughout the ages have recognized that reflecting pools can complement or enhance the architectural lines of buildings, statues, and other man-made structures. One of the best-known examples of this can be seen in the gardens around the Taj Mahal in Agra, India, where mirrorlike pools double the visual impact of the majestic shimmering white edifice, built in 1654 as a tomb for the favorite wife of em-

Opposite: A nearly flawless reflection of palm and architecture in a pond in Balboa Park in San Diego. Above: The water's edge offers a double vision of a neatly trimmed azalea hedge in its spring glory in Washington Park Arboretum in Washington State.



The beauty of water in various settings: top, the sunken garden reflecting pool in Butchart Gardens, British Columbia; above, autumn color mirrored in a beaver pond in Ontario; opposite: echoes of the Old South at Drayton Hall in South Carolina.

peror Shah Jahan. In much the same way, thin sheets of pristine water highlight a host of stately 17th-century European palaces and parks. In a more contemporary setting, the famous carillon of Bok Tower Gardens in Lake Wales, Florida—wrought of pink marble and coquina—stands at the end of a long rectangular reflecting pool. A photograph of its reflected image taken on a still day is difficult to distinguish from a picture of the tower itself.

In addition to highlighting architectural wonders, reflecting pools mirror and enhance natural scenes. Garden designers have taken inspiration from images of mountains, cliffs, and trees reflected in lakes and replicated them in miniature in the garden, where graceful plant forms and blossom colors can do double duty. The tranquil water-based gardens of the Caroli-

na Low Country, many of which were once part of rice plantations, are good examples of such use. In typical Low Country gardens, shallow lagoons serve as dark mirrors to multiply the effect of dazzling masses of exotic-colored flowers or statuesque live oaks. Inspired by Magnolia Plantation Gardens near Charleston, South Carolina, British novelist John Galsworthy wrote, “Brilliant with azaleas and magnolias, it centers around a pool of dreamy water overhung by tall trunks wanly festooned by gray Florida moss. Beyond anything I have seen, it is otherworldly.”

One of the most famous reflecting pools, Impressionist painter Claude Monet’s Oriental pond at Giverny, France, mirrors not only the artist’s famous water lilies, but also reeds, irises, and willows growing along the shoreline. Monet’s



OPPOSITE TOP: JEFFREY GRACZ; BOTTOM: DON JOHNSTON.
THIS PAGE: GUY AND EDITH STERNBERG.

pond included a wooden bridge, but Chinese gardeners of the Ming Dynasty period (1348–1644) appreciated the reflective quality of water so much they were reluctant to mar open surfaces of pools with even the most ornamental of bridges. Revered lotuses and water lilies were contained in corners or to one side so as not to interfere with reflected images—such as the the passage of a silver-edged cloud—or obscure the flash of a golden carp.

Water Lilies and Lotuses

Perhaps no other plants are as much associated with reflections as are water lilies (*Nymphaea* spp.)—the flowers Scottish poet Thomas Campbell saw as “loved little islands, twice seen in their lakes.” The image of the water lily has grown to be synonymous with Monet, who became so ob-

essed with the ever-changing surface of water in his later life that he painted 236 canvases of his Giverny pond.

Of course, small garden pools can’t hold the profusion of water lilies that Monet’s did, but most gardeners find it difficult to limit their choices to a few. To enhance the overall composition, however, it’s best to stick to a single color theme or to use subtle variations within a color family, such as peaches and golds, light to dark pink, or pale pinks and white. Hardy water lilies are found in every color but blue.

If you must have blue, tropical water lilies—which are grown as annuals in most regions of North America—span every color of the rainbow and are also exceptionally fragrant. You can find bold, amazing blues ranging in hue from sky shades to turquoise, navy, plum, and deep blue-violets. Certain

“Designers throughout the ages have recognized that reflecting pools can complement or enhance ... man-made structures.”

Creating a Pond

Even though golden carp and Monet-style bridges are beyond the scope of most gardeners, small garden pools are not. Liner-based pools can easily be constructed in one or two days. The basic process involves digging a hole with sloping sides to the desired shape and size; leveling the upper edge of the hole to avoid a lopsided appearance; lining the hole with a two-inch layer of sand and a protective underlay such as newspaper or old carpet; and then unrolling a plastic or rubber liner over the hole. The liner should be smoothed to remove wrinkles and will probably have to be folded in places to match the shape of the hole. Secure the liner along the top edge with rocks or concrete blocks, then start filling the pool using a garden hose. The weight of the water will help conform the liner to the excavation. Liner edges can eventually be concealed with paving stones or other material. Or you can



Dark water peeks from the openings between water lilies in this pool garden.

follow the directions in a good water gardening book (see "Resources," page 35.)

As well as adding an aura of tranquility to a garden, a pool opens a new dimension, making the garden seem larger in the same way that a mirror opens up and illuminates a room. The reflections of tall plants at the side of a pool can also lend an illusion of distance. The style of your pool should blend with the overall ambience of your garden. A formal garden, for instance, calls for a pool with a bold and simple shape—such as a rectangle or an ellipse—and clean, uncluttered edges. An irregularly shaped pool works best with informal garden spaces. Informal pools should resemble those found in nature, their perimeters softened by occasional plantings. For reflective purposes, keep the water surface as open as possible, avoiding highly invasive aquatic plants. A good general rule for both aesthetic and pond-health reasons is to keep at least one-third to one-half of the pool's surface open.

If you want to keep your pool largely free of plants, it is best not to have fish in the pool. Without plants to provide shade, the pool will get very hot in summer and aquatic creatures will have fewer places to hide from predators. With fewer oxygenating plants, algae may also become a problem and you may need to install a heavy-duty filter. Also, many of the dyes sold for use in ponds are toxic to water creatures—and sometimes to plants—so make sure that use of a dye is compatible with the other features you would like in your pool. —M.D.

varieties even wait until dusk to unfurl their blossoms. Tropical lilies create elegant reflections because they hold their blossoms well above the surface of the water.

If planted in full sun and kept free of too much competition from other aquatic plants, water lilies are easy to grow. They do best planted in containers filled with a heavy garden loam and topped with an inch of gravel. Keep the top of the planter only about six inches below the water surface until active growth has started. At that point, the planter can be submerged to the recommended depth for that particular species.

The sacred lotus (*Nelumbo nucifera*) is a satisfying plant for a clear pond, especially along its shallow margins; make sure the crown is covered by between two inches and a foot of water. One of this plant's most distinctive characteristics is its form: The reflected shape of the lotus's long stem topped with a ruffled, bluish-green leaf pad, sometimes two feet across, resembles an upside-down parasol. A lotus stem tipped with a tapering, pointed bud, on the other hand, has a swordlike appearance. Buds unfurl into five- to 12-inch-wide flowers that resemble huge airborne peonies, tulips, or roses. After the petals drop, curiously-shaped seedpods—visually intriguing in their own right—form.

Vertical Effect

Tall marginal plants, such as reeds, rushes, or ornamental grasses, create elegant vertical reflections. These often require only their roots to be immersed in water; creating a shallow shelf along the edge of the pool during construction will provide a place for such plants to grow. Other poolside classics include pickerel weed (*Pontederia cordata*), a native of eastern North America that bears four- to six-inch-tall blue or purple flower spikes amid dark, elongated, heart-shaped leaves; cattails (*Typha* spp.), the childhood favorite with velvety poker-shaped heads; feathery dwarf bamboo (*Dulichium arundinaceum*); and green and white banded zebra rush (*Schoenoplectus lacustris* subsp. *tabernaemontani* 'Zebrinus'). Various water-loving irises, such as Japanese, Louisiana, and Siberian, also create strong vertical accents with their blue-green foliage. Iris blossoms in a waterside setting are particularly enhanced in early morning mist and reflected light.

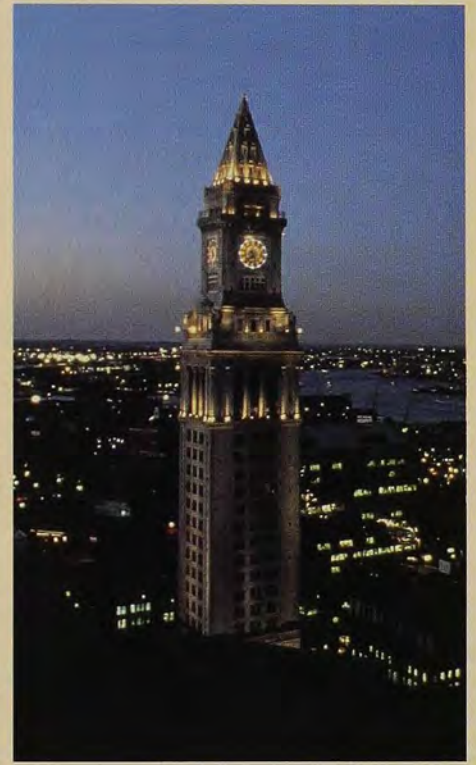
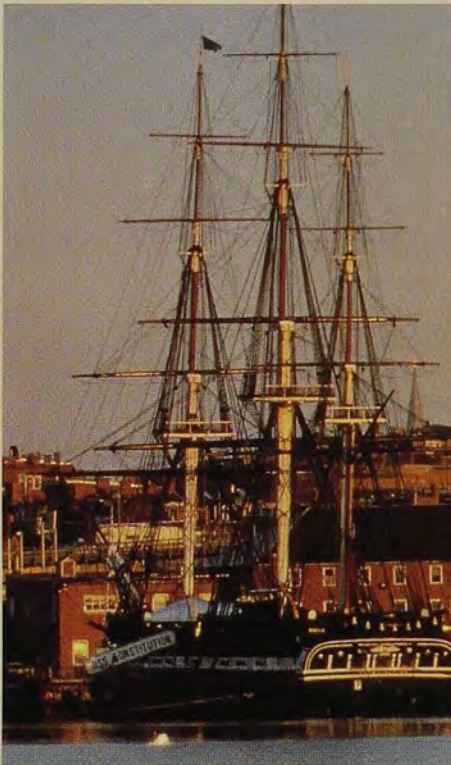
Floating and Submerged Plants

Keeping the water in your pool pure is important, not only to intensify reflection, but



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WEDNESDAY, JUNE 9

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The woody plant collections at the Arnold Arboretum—on 265 acres in Boston—comprise a national and international resource for research in botany and horticulture.

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Founded in 1831, Mt. Auburn in Cambridge is the oldest garden cemetery in America. It is beautifully landscaped with more than 2,500 trees, three lakes, and colorful beds of flowering plants.

THURSDAY, JUNE 10

EMERALD NECKLACE

Frederick Law Olmsted designed this legendary system of parks and green spaces in and around Boston. The informal natural settings reflect his compelling vision of the American landscape.



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The charm of this historic property lies in its rich art collections and beautiful gardens planted with flowering jasmines, freesias, orchids, camellias, and orange trees.

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The museum's Garden of the Heart of Heaven is a public Japanese garden designed in the dry landscape style inspired by Zen temple gardens in 15th-century Japan.

For more information, call Janet Daniels
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FRIDAY, JUNE 11

GARDEN IN THE WOODS

Home to the New England Wildflower Society, this 45-acre botanical garden and sanctuary features woodland trails and a plant collection that includes more than 200 rare and endangered species.



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SATURDAY, JUNE 12

NORTH SHORE

A short, scenic drive from Boston, the North Shore tour will include guided ecological walks through a variety of coastal habitats and native preserves, and visits to private estates and gardens.

Speakers

THURSDAY

MICHAEL VAN VALKENBURGH

"The Accent is on Design but the Emphasis is on Plants"



Winner of this year's AHS Landscape Award, Michael Van Valkenburgh is founder and proprietor of a landscape architecture firm in Cambridge and Charles Eliot professor of landscape architecture at Harvard University. He has been active in many projects in the Boston area, including work at Wellesley College, Polly Hill Arboretum, Harvard University, and Peabody Essex Museum.

DAVID LIITTSCHWAGER AND SUSAN MIDDLETON

"Here Today—Gone Tomorrow"



These two San Francisco-based photographers have spent the last 12 years photographing endangered plants and animals. Their work has appeared in two books, *Here Today: Portraits of Our Vanishing Species* (1991) and *Witness: Endangered Species of North America* (1994). Middleton and Liittschwager's photographs are not only documentations of North America's endangered plants and wildlife—they are captivating

works of art that also impress upon us the importance of our relationship to the world around us.

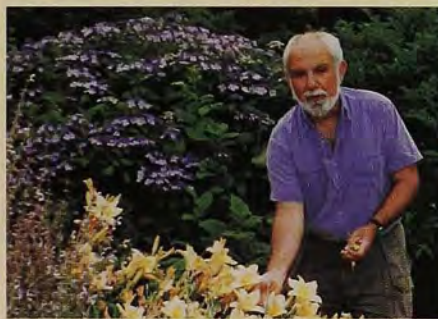
OTHER SPEAKERS

PETER ASHTON
Charles Bullard Professor of Forestry, Harvard University
PETER DEL TREDICI
Director of living collections, Arnold Arboretum
NORMAN LOWNDS
Curator, 4-H Children's Garden and assistant professor for the Department of Horticulture at Michigan State University
THOMAS MENINO
1999 AHS Urban Beautification Award Winner and mayor of Boston
KIRK MEYER
Executive director of the Boston Schoolyard Initiative
FELDER RUSHING
Author, radio and television host

FRIDAY

MARCO POLO STUFANO

"Gardens that Inspire"



Marco Polo Stufano, this year's recipient of the AHS Professional Award, is director of horticulture at Wave Hill, a public garden and cultural institution in the Bronx, where he has worked for the last 32 years. He has been instrumental in transforming Wave Hill from a little-known garden into a setting where more than 100,000 visitors a year can enjoy an intimacy with nature amid a vast cityscape.

OTHER SPEAKERS

DAN HINKLEY
Proprietor, Heronswood Nursery

JOSEPH HUDAK
1999 AHS Meritorious Service Award Winner and landscape architect
ROGER RAICHE
Horticulturist and plant collector

SATURDAY

THOMAS POWELL

Examples of Thomas Powell's floral artistry will be featured at the closing banquet for the conference. Powell, the recipient of AHS's Frances Jones Poetker Award for floral design, is proprietor of the Flower Gallery in Washington, D.C. and founder of the National Center for Floral Studies in Alexandria, Virginia. His résumé includes designing floral arrangements for every presidential inauguration since President Kennedy, coordinating floral displays for the 1985 rededication of the Statue of Liberty, and pioneering the use of foam boards in floral arranging.



OTHER SPEAKERS

DOUGLAS BRENNER
Editor, Garden Design magazine
THOMAS COOPER
Editor, Horticulture magazine
PAT GRAY
Food Projects
ADRIAN HIGGINS
Writer and editor, The Washington Post
MARIAN MORASH
Co-host, "The Victory Garden"
SHEPHERD OGDEN
President, The Cook's Garden
FRANCES TENENBAUM
1999 AHS Horticultural Communication Award Winner and editor, Houghton Mifflin Company
KATY MOSS WARNER
Chairman of the AHS Board of Directors and director of horticultural and environmental initiatives at Walt Disney World
KENT WHEALY
Co-founder, Seed Savers Exchange
JIM WILSON
Garden writer, lecturer, and television personality



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Return this form to: AHS Annual Meeting, 7931 East Boulevard Drive, Alexandria, VA 22308-1300.

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Resources

- AHS COMPLETE GUIDE TO WATER GARDENING** by Peter Robinson. DK Publishing, New York, 1997. AHS Price: \$25. DK 017
- THE COMPLETE POND BUILDER** by Helen Nash. Sterling Publishing Company, New York, 1995. AHS Price: \$14.50. STE 048
- THE WATER GARDEN** by George Plumptre. Thames and Hudson, London, 1993. (Out of print.)
- THE WATER GARDEN: A PRACTICAL GUIDE TO PLANNING AND PLANTING** by Peter Robinson. Sterling Publishing Company, New York, 1995. AHS Price: \$13.50. STE 002
- WATER GARDENING: WATER LILIES AND LOTUSES** by Perry D. Slocum and Peter Robinson. Timber Press, Portland, Oregon, 1996. AHS Price: \$42. TIM 056

to promote general healthiness of your water feature. Underwater oxygenating plants play important roles here by supplying oxygen, providing shelter for fish and other organisms, and absorbing excess nutrients, which thus limits algae growth. Floating plants also promote clear waters and serve as food for fish. Some, including cloverlike duckweed (*Lemna* sp.) and the miniature fern azolla, which turns red in fall, are tiny.

Another means of aerating pool water is to re-circulate it by means of an artificial waterfall or fountain. While moving water does not offer the same tranquility as a still pond, it creates reflections that are scintillating and always changing. Certain fountains discharge water in droplets that refract light like miniature prisms. Others send out water in sheets resembling walls of glass. Symmetrical "bell" or "tulip" fountains have the sheer iridescence of soap bubbles. But water agitation, however minor, can disturb the growth of water lilies. It's important to remember to keep fountains and water lilies well apart. You will need a pool large enough to accommodate both.

Lighting

Creative lighting also enhances a pool's reflective ambience. To employ a technique called mirror lighting, hide subtle lights at the bases of tall plants, such as ornamental grasses, along the edge of water. The plants' uplit forms, when viewed from the opposite side of the pool, will etch perfect reflections, creating a golden-mirror effect. Create complex nighttime water patterns of dark plant forms against luminous water by placing underwater spotlights beneath water lily or lotus plants. Or simply enjoy gentle candlelit reflections by placing candles in tall, torchlike outdoor holders along the edge of a pool.

For Smaller Gardens

If your garden is too small or crowded to allow construction of even a small in-ground pool, consider a water mirror or stone trough. Water mirrors can be elaborate and ornate, or as simple as a bird bath. These can either be wide, shallow basins or deep urns; the mirrorlike effect of such features is often enhanced by painting the bottom of the container a dark color or adding a dark dye to the water. Stone troughs, which blend in best in informal or Asian-style gardens, can be elevated on a boulder or placed at ground level.

Reflective surfaces in the garden need not be limited to water. Some gardeners

use large sheets of outdoor mirror, partially concealed by foliage, to add an illusion of space or to suggest a false entrance or exit in a wall. As Graham Rose writes in *The Romantic Garden*, "...the value of mirrors in a romantic garden has less to do with trickery than it has with the strange and sometimes exciting ways in which they can reflect sunlight into unexpected places."

Although they are not to everyone's taste, crystal or glass "gazing balls," which were very popular in some 17th-century pleasure gardens, can also provide an air of whimsy or mystery in the garden. Mounted on pedestals or suspended from a tree, gazing balls add pale shimmer on a cloudy day or random sparkles of light when the sun hits them. These objects also provide fascinating, changing patterns of light and color, like those of a kaleidoscope. These ornaments should be used subtly, however; a little glass



and glitter goes a long way. I recently read a description of a late 14th- or early 15th-century Persian garden that sported a six-foot tree with silver and gold leaves and fruits of precious stones, such as diamonds, rubies, and pearls. What an amazing sight this must have been, sparkling in the sun!

While most of us can't afford—and probably wouldn't want—a garden of gilded, jeweled trees, we can enjoy a few "sparkles" of our own with the shimmer of a small garden pool or a tiny fountain. In both a literal and figurative sense, reflections can double our gardening pleasure. ♣

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

Opposite: The seamless meeting of water and sky in a natural tableau in Washington State. **Above:** In this garden designed by Ann Clark Holt, a stone trough captures the spirit of water on a much smaller scale.

Scentsational

Fragrances trigger perhaps the most mysterious of the five senses, sometimes evoking intriguing recollections of past experiences and places. Fragrant native plants, for example, can summon vivid flashbacks to favorite vacations in natural landscapes. Fragrances are often puzzling, too. Why can the same scent be so appealing to one person, and so appalling to another? For example, some people find the smell of night-blooming cactus (*Epiphyllum oxypetalum*) flowers to be pleasantly musky, while others consider the odor sickly sweet. Some people love the smell of Asian lilies; others find it overwhelming in a closed room.

Because both temperature and humidity affect the volatility—and therefore the emission—of scent molecules, scents tend to come and go with fluctuations in temperature, humidity, and seasons. Scents are carried best in humid air. They are also detected best on damp surfaces, which is why the noses of animals with keen senses of smell are so often moist.

Because we enjoy many plant fragrances, we tend to forget that they are there to serve a variety of critical biological functions for

plants and animals. Scent, for example, is reported to be even more important than sight in guiding honeybees to the right flowers at the right time. For night-pollinated flowers like sacred datura, sweet four o'clock (*Mirabilis longiflora*), and various evening primroses (*Oenothera* spp.), scented flowers are especially important.

The scented foliage of plants can also play a role in pest and disease control by discouraging excessive attacks by browsing animals and insects. Observant gardeners often discover that scent is an even better deterrent than taste for discouraging deer damage. Commercial repellents based on scent, for example, typically work better than those based on taste: Deer don't need to *eat* the plants for the repellent to work, and the repellent often protects nearby plants, too.

The fragrance of some North American native plants plays a significant part in the appealing, distinct character of different geographic regions. The extensive Ponderosa pine forests of the Rocky Mountain region, for example, smell very different during warm summer days than they do on cool damp evenings. Warm

Highlighted here against a sandstone cliff face in John's Canyon, Utah, cliffrose (*Purshia mexicana*) has pale yellow, roselike flowers that give off a delicate fragrance.



No matter where you live in North America, suitable fragrant native plants can be found for almost any garden setting.

Natives

summer weather brings out a clear vanilla scent. Cool damp conditions—which often follow the frequent afternoon thunderstorms—bring out the refreshing scent of pine needles. Sniffing the bark of Ponderosa pines reveals even more wonders. In warm summer weather, most Ponderosa pine bark smells like vanilla, while a few trees smell like chocolate and vanilla combined, and *really* rare trees smell like cherry mixed with vanilla!

Another memorable western fragrance comes from the beautiful blue-green big sagebrush (*Artemisia tridentata*). The fresh fragrance of this western native shrub is a major part of the emotional appeal of the cattle country we so often see portrayed on cigarette advertising billboards. In the East, swamp azalea (*Rhododendron viscosum*) lends its spicy fragrance to moist woodlands from Maine to Alabama.

It's worth noting that the naturally repellent scents and flavors of native plants are often enhanced when these plants are grown without excessive irrigation or application of synthetic fertilizers. Thus, it is especially important for gardeners who live in areas

where local deer do considerable damage to avoid over-watering and over-fertilizing.

Clever gardeners can savor fond recollections of favorite landscapes in their own gardens by growing plants with the foliage, flowers, and bark that offer some of the characteristic scents of these places. Of course, the great diversity of habitats and climates in North America mean that you can't always grow that wonderfully fragrant plant you remember from your childhood. In eastern North America, many plants are widely adaptable to large areas, such as along the coastal plain or along the crest of the Appalachians. But in the West, many plants are confined in the wild to specific regional ecosystems and may require extraordinary measures to grow in a garden setting even a few hundred miles from their natural habitat.

In the following articles, we've highlighted fragrant native plants suitable for a range of garden settings in eastern North America and for specific habitats in the Rocky Mountains and the desert Southwest.



Fragrant beebalm (*Monarda didyma*) is the centerpiece of this colorful planting with black-eyed Susan (*Rudbeckia hirta*) and white garden phlox (*Phlox paniculata*).

Fragrant Natives for the Rockies and the Southwest

by Jim Knopf

Trying to cover the entire West in one short article would be impossible—there are too many ecoregions and microclimates. So, to illustrate the potential to enhance local gardens in any region with fragrant, regionally native plants, I am focusing on selected areas of the Rocky Mountains and the desert Southwest.

The Rocky Mountain West

Don't expect "average" in the Rocky Mountain West. Average is only the result of mathematical computations. The Wild West is a land of extremes, where normal is abnormal, and abnormal is normal. This is especially the case where climate is concerned. The USDA plant-hardiness zone system, which bases predictions of plant success on average—not record—minimum winter

temperature, works amazingly well in the eastern North America. In most of the West, however, USDA zones are worth little. Throughout the Great Plains and Rocky Mountain West, it's not so much how cold it gets, but *how* it gets cold that matters most. It is sudden freezes late in spring, after lots of warm weather, that regularly destroy many fruit tree crops. Likewise, early fall freezes often limit success with some plants, especially those that depend on gradually cooling weather, rather than shorter day length, to begin dormancy. Also, some plants need a warm summer and don't mind really cold winters. Rocky Mountain piñon pines (*Pinus edulis*), for example, are more limited at high altitude by cool summers than by cold winters, whereas the similar-looking Mugo pine (*P. mugo*) grows very well at both high and low elevations. The

West is too complex for the USDA zones to be helpful in predicting a plant's success. Instead, it is more helpful to predict plant success by noting places where a plant is known to grow well.

Intermountain and High Plains Grasslands

The high grasslands habitat includes cities such as Denver, Colorado; Salt Lake City, Utah; Spokane, Washington; and Reno, Nevada. These are areas where water needs are low.

BIG SAGEBRUSH (*Artemisia tridentata*).

The distinct, fresh scent of the blue-green foliage fills the air in many western landscapes. With its attractive foliage, it is surprising big sagebrush is not used more in non-irrigated, urban landscaping. If not pruned, it grows into nice natural "bonsai" forms. With some pruning, more regular forms are easy to develop. This shrub appears to grow well in most soils, with the exception of clay. Grows best in full sun. Height: 1–10 feet and over. Width: 2–8 feet and over. Water zone: VL–M.

CHOCOLATE FLOWER (*Berlandiera lyrata*).

The irresistible fragrance of this flower—a rare example of a scent that nearly everyone agrees on—is very much like milk chocolate. The yellow daisylike flowers open only in the morning in hot weather, but in Boulder, Colorado, where I live, it blooms from late May to November. It grows well to at least 6,500 feet in Boulder—to 7,500 feet near Santa Fe, New Mexico—and is not bothered by deer. Grows best in full sun but thrives in all kinds of soil. Height: 1 foot. Width: 18 inches. Water zone: L.

GOLDEN CURRANT (*Ribes aureum*).

The distinctive spicy clove scent of the flowers is remarkable and drifts considerable distances from the plant at times. Contrary to much written material, not all plants have scented flowers, and there seems to be no meaningful way to distinguish *R. aureum* from what some botanists consider its eastern cousin, clove currant (*R. odoratum*). However, purchasing grafted cultivars, such as *R. odoratum* 'Crandall' and *R. aureum* 'Gwen's Buffalo Currant', eliminates the gamble about getting a scented plant. The tiny fruits vary from orange to black, with a flavor that ranges from wonderful to bland. Fall color is variable, but can be a beautiful burgundy-red. Grows best in full sun to part shade. Height: 2–5 feet. Width: 2–4 feet. Water zone: M.



Spanish missionaries burned the fragrant foliage of brittlebrush as incense.

THREE-LEAF SUMAC OR SKUNKBUSH (*Rhus trilobata*). The fragrant leaves of this woody shrub produce a strong, fresh scent that is pleasant to most people, so I'm puzzled as to how it earned the name skunkbush. The yellow spring flowers also produce a nice, delicate, sweet scent, and the berries have a wonderful lemonlike taste. Fall color is variable, but can be a spectacular yellow or red-orange. Full sun to very light shade. Height: 2–5 feet, but variable. Width: extremely variable; suckers to eventually form thickets up to 25 feet across. Water zone: L–M.

Other Choices

EVENING PRIMROSE (*Oenothera* spp.). This perennial has flowers that exude a light sweet scent at night. (VL–M)

SAND VERBENA (*Abronia fragrans*). Perennial with very sweet scented flowers. (VL–L)

SHOWY MILKWEED (*Asclepias speciosa*). Perennial with sweet scented flowers. (L–M)

WILD CUCUMBER (*Echinocystis lobata*). A perennial whose flowers have a delicate, exotic scent. (M–H)

Piñon-Juniper Woodlands

In areas where the piñon-juniper woodland ecosystem dominates—including Santa Fe, New Mexico; Trinidad, Colorado; Blandin, Utah; and Reno, Nevada—water needs of most native plants are generally very low (VL).



The large, sweet-scented flowers of sacred datura, above left, bloom near dusk. Wild beebalm, above right, naturalizes well with black-eyed Susan.

CLIFFROSE (*Purshia mexicana*). The fragrance of the light yellow flowers on this evergreen woody shrub is delicate and wonderful. Most of the bloom is in May and June, but it can bloom anytime until mid-fall. Cliffroses are often picturesquely irregular in shape, but pruning will allow a more controlled suburban appearance. Grows best in full sun. Height: 5–15 feet. Width: 3–5 feet. Water zones: VL–L.

CREeping MAHONIA (*Mahonia repens*). The pretty yellow flower clusters on this low-growing woody shrub produce a light, delicate, sweet fragrance. At 6,000 feet in Boulder, Colorado, blooming occurs from early March to late May, depending on the

microclimate. The leaves are evergreen in shady locations but typically turn reddish in sunny locations. With moderately fertile soil, the plants will spread into an attractive ground cover. Established plants will grow well under very dry conditions. Height: 1–2 feet. Width: 4–5 feet. Water zone: M.

SACRED DATURA (*Datura innoxia*). The spectacular white night-opening flowers on this short-lived perennial have a delicate sweet scent. Hawkmoths are drawn to them in significant numbers and, according to rumor, can become intoxicated by the legendary “visionary” properties of the nectar. This species is perennial in Boulder, Colorado, and also multiplies moderately

Water Requirements for Western Natives

Because the Rocky Mountains and the Southwest are predominately dry, it is important to take into account the relative water needs of any plants you are considering for your garden. Typically, more than half of the water supplied to western cities is applied to landscaping. With water supplies fast diminishing, water conservation is an increasingly critical issue in the West.

The following watering guidelines are based on the relative needs of plants, rather than the exact amounts needed, and are useful throughout the arid and semi-arid West. Contrary to much horticultural writing, the exact amount of water needed by individual plants can never be determined accurately, because weather conditions are always changing, and because variations in soils, slopes, and light exposure all affect water requirements. By grouping plants with similar water needs, however, watering levels can be modified to meet prevailing conditions. The guidelines for water zones are broken out into both weekly (inches per week in midsummer) and seasonal (total gallons per square foot from

April through October) water requirements. The numbers, based on typical conditions in Denver, assume that little or no rain has fallen in either time period. The following landscape water zones can be used for grouping plants of similar water needs anywhere in the Rocky Mountain region or the southwestern deserts, recognizing that the actual amounts of water applied needs to be adjusted for local conditions.

HIGH WATER ZONE PLANTS (H) These plants need 18 to 20 gallons per square foot per season, or a half inch of water three times a week.

MODERATE WATER ZONE PLANTS (M) These need 10 or more gallons per square foot per season, or three-quarters inch of water once a week.

LOW WATER ZONE PLANTS (L) These need zero to 3 gallons per square foot per season, or a half inch of water every two weeks.

VERY LOW WATER ZONE PLANTS (VL) These need no irrigation at all.



The needles of Ponderosa pine, top, exude a piney scent in damp weather, while the bark smells like vanilla in warm summer weather. Cold hardy and heat tolerant, fragrant sand verbena, above, has musky-scented flowers that open late in the day.

from seed. Height: 1½–3 feet. Width: 2–6 feet. Water zone: L. *Caution: All parts of the plant are highly toxic if ingested.*

Other Choices

CURL-LEAF MOUNTAIN MAHOGANY (*Cercocarpus ledifolius*). The foliage on this shrubby tree has an intriguing, pleasant scent. (VL–L)

FERNBUSH (*Chamaebatiaria millefolium*). The fernlike foliage on this shrub gives off a spicy or resinous scent. (VL–L)

GOLDEN CURRANT (*Ribes aureum*). See description on page 38.

ONE-SEED JUNIPER (*Juniperus monosperma*). This tree's foliage has a fresh resinous scent. (VL–L)

PIÑON PINE (*Pinus edulis*). The needles on this evergreen tree give off a fresh resinous scent. (VL–M)

ROCKY MOUNTAIN JUNIPER (*Juniperus scopulorum*). Foliage has a fresh resinous scent. (VL–L)

THREE-LEAF SUMAC (*Rhus trilobata*). See description on page 39.

WILD CUCUMBER (*Echinocystis lobata*). The flowers on this perennial vine have a delicate, exotic scent. (M–H)

Ponderosa-Gambel's Oak Forests

Cities in this ecoregion, which encompasses generally low to moderate water zones, include Flagstaff, Arizona; Durango and Colorado Springs, Colorado; and Couer d'Alene, Idaho.

BUBBLE GUM MINT (*Agastache cana*). The fragrance of the leaves and flowers on this perennial is truly reminiscent of bubble gum, and the showy flowers are close to bubble-gum pink. Though this plant is rare in nature, it's easy to grow in gardens in places like Denver, Santa Fe, or Albuquerque. Deer don't bother it, but both hawkmoths and hummingbirds love it. It grows best in full sun. Height: to 3 feet. Width: about 2 feet. Water zone: M.

PONDEROSA PINE (*Pinus ponderosa*). The unmistakable vanilla scent of the bark in warm weather is amazing. Alternately, the needles provide a delightful pine scent in cool, damp conditions. The lower branches typically die, providing more space at ground level. In isolated landscape situations, Ponderosa pines are likely to attract a variety of birds, including several species of nuthatches, chickadees, and Stellar's jays. Grows best in soil that never becomes soggy. Height: 60–100 feet. Width: 25–30 feet. Water zone: M.

Other Choices

FRAGRANT ASH (*Fraxinus cuspidata*). This tree's paniced white flowers exude a pleasant scent. (M)

GOLDEN CURRANT (*Ribes aureum*). See description on page 38.

LEWIS'S MOCK ORANGE (*Philadelphus lewisii*). The flowers of this deciduous shrub are scented like orange blossoms. (M)

NATIVE YARROW (*Achillea millefolium* var. *occidentalis*). The foliage of this perennial ground cover has a strong, fresh scent. (M)

ROCK SPRAY (*Holodiscus dumosus*). The foliage of this deciduous shrub is fragrant. (L–M)

THREE-LEAF SUMAC (*Rhus trilobata*). See description on page 39.

WILD BEEBALM (*Monarda fistulosa*). This perennial's foliage smells like Earl Grey tea. (M-H)

Aspen-Spruce-Fir Forests

Cities in this ecoregion of moderate to high rainfall levels include Aspen and Telluride, Colorado; Jackson, Wyoming; and Lake Tahoe, California.

AMERICAN ASPEN (*Populus tremuloides*). The fragrance of the wood is distinctive and interesting, especially in wet weather. Aspens grow best in moist soils, and they are most attractive when some of the "volunteer" trunks are allowed to grow. Underplanting with a natural ground cover such as creeping mahonia (*Mahonia repens*) eliminates the need to mow and trim around lots of trunks. The leaves' yellow fall color is legendary, and their fluttering in summer, together with the tree's beautiful white bark, are additional ornamental qualities. This tree will sucker to form colonies. Grow in sun or dappled shade. Height: 20–60 feet. Width: to 40 feet. Water zone: H.

Other Choices

ENGELMANN'S SPRUCE (*Picea engelmannii*). The foliage on this conifer smells like pine needles. (H)

NARROW-LEAF COTTONWOOD (*Populus angustifolia*). The foliage and wood on this deciduous tree have a scent similar to aspen. (H)

SUBALPINE FIR (*Abies lasiocarpa*). The foliage on this conifer smells like pine needles. (H)

Warm-Winter Deserts of the Southwest: Sonoran, Mojave, and Chihuahuan

Summers in all of these deserts are notoriously hot, with intense sunlight and temperatures that fluctuate widely between day and night. Humidity is extremely low, and evaporation exceeds scanty precipitation by as much as 10 to 30 times. In the Sonoran Desert, for example, annual rainfall is as low as three inches in some places, while annual evaporation can be as much as 90 inches. The timing of annual rainfall varies enough in these three southwestern deserts

to affect native vegetation significantly, giving each a distinctive visual character.

Desert gardening is definitely challenging, but it offers unequaled rewards. Each desert—and each garden—presents a unique pattern of precipitation, soil, sun and shade, cold and heat, humidity and wind. Microclimates offer opportunities for delightful contrasts.

Desert gardeners also face several significant choices. They can embrace the desert, by enhancing their favorite aspects of the natural landscape, or they can challenge prevailing conditions by creating what amounts to an oasis. Combining both approaches usually offers the greatest satisfaction. On the other hand, it is futile, wasteful, and never particularly rewarding to defy the desert by attempting to convert it to eastern "lawnsapes."

Sonoran Desert

The Sonoran Desert, which covers 120,000 square miles of northwest Mexico and adjacent areas of Arizona and California, has the warmest winters of the three deserts. Freezing temperatures seldom last more than a few hours; summer high temperatures frequently exceed 115 degrees Fahrenheit. Elevations range from below sea level to about 4,500 feet. Precipitation averages from less than two inches to about 12 inches a year, with distinct summer and winter rainy seasons. Though the temper-

“Desert gardening is definitely challenging, but it offers unequaled rewards. Each desert—and each garden—presents a unique pattern of precipitation, soil, sun and shade, cold and heat, humidity and wind.”



The daisylike blooms of chocolate flower (*Berlandiera lyrata*), above left, offer a delicious fragrance that earned the plant its common name. Palmer's penstemon, above right, has sweetly scented pink flowers that bloom in dramatic spikes.



Creosote bush, above left, blooms at the base of a Saguaro cactus. Purple sage, above right, puts on a show with its royal purple flowers and silver-blue leaves. Opposite: The scarlet blossoms of autumn sage light up this perennial garden.

atures are high and the rainfall scant, distribution into two seasons results in extraordinarily dramatic vegetation; in April and May, the Sonoran often provides the greatest display of annual wildflowers in the three deserts.

Water zones are generally very low, except in arroyos—dry gullies that are periodically flooded. Cities in this region include Phoenix and Tucson, Arizona; and Palm Springs, California.

BLUE PALO VERDE (*Parkinsonia florida*).

The state tree of Arizona is a major contributor to the soft, dusty green look of the Sonoran Desert, where temperatures rarely drop below 15 degrees, and summers are hot. Its sweet, golden blossoms burst on the scene by March and cover the bare green stems, which are leafless most of the year. Its low-branching habit and multi-trunk form grace a variety of landscapes—from freeway plantings to courtyards—in low desert cities. It becomes sculptural with age, requiring only minor pruning to open up the branches. It grows best in loose, well-drained soil in full sun. Height: 20 feet. Width: 25 feet. Water zone: L.

BRITTLEBUSH OR INCIENSO (*Encelia farinosa*). Vast areas of the warmest desert regions are covered with this gray-leaved shrub, which reaches its upper limit below 3,000 feet in the searing inner gorge of the Grand Canyon. Early Spanish missionaries burned the foliage as incense in place of their familiar frankincense. Its yellow, daisy-shaped flowers add to the color display in many landscapes where it is adapted, in-

cluding highway medians, erosion-control plantings, and in resorts. Full sun. Height: 3 feet. Width: 3 feet. Water zone: L.

Other Choices

DESERT LAVENDER (*Hyptis emoryi*). This perennial exudes a fresh lavender scent after a rain or when foliage is bruised. (L–M)

SCARLET HEDGENETTLE (*Stachys coccinea*). The foliage on this perennial in the mint family has a strong intriguing scent. (H)

Mojave Desert

The Mojave Desert covers about 35,000 square miles in southern California, Nevada, and Utah, with elevations ranging from about 280 feet below sea level to 4,000 feet above. The temperature reading of 134 degrees in Death Valley is the highest recorded in North America. Winters, however, are colder than in the Sonoran Desert, with temperatures in some valley floors recording zero degrees. Rainfall, which occurs mostly during winter, averages three to four inches on the desert floor, increasing to about 11 inches at higher elevations.

As with the Sonoran Desert, water zones are very low, except in arroyos. Cities in the Mojave include Barstow, Victorville, and Yucca Valley, California; Las Vegas, Nevada; and St. George, Utah.

CREOSOTE BUSH (*Larrea tridentata*).

Dominating vast areas of the Mojave Desert, this open, olive-green evergreen shrub is also fairly common on gravelly soils

in the Chihuahuan and Sonoran deserts. It is hardy to any extreme of heat and can usually take brief cold spells to –10 degrees. The leaves have a sticky resin that exudes an amazing smell similar to that of fresh rain. I never walk through a stand without rubbing my hands against the foliage. Strong wind, aided by humidity, often carries the fragrance miles from where plants grow. Although seldom planted in warm desert landscapes, this shrub deserves more use in revegetation projects, mass plantings, and in fragrance gardens. Grows best in full sun and prefers a firm or gravelly soil to pure sand. Height: 4–9 feet. Width: 3–10 feet. Water zone: L.

DESERT OR BLUEBALL SAGE (*Salvia dorrii*).

This small gray shrub blends in with many others in the upper Mojave and lower Great Basin deserts—including parts of Nevada and Utah—most of the year, except during its spring bloom. Then, small, round balls of deep blue flowers cover the plant. These complement the fragrance of the foliage, which smells like a pungent, tart basil. Desert sage is the most drought-tolerant salvia, surviving on four to six inches of annual precipitation and enduring cold to at least –10 degrees. It is not yet commonly used in landscapes and looks great under a yucca clump or against a dark wall. Full sun, any soil. Height: 1½–3 feet. Width: 2 feet. Water zone: VL–M.

Other Choices

GREEN BRITTLEBUSH (*Encelia frutescens*).

The green foliage on this hardy shrub—which can grow in locations to 6,000 feet



It behaves as an herbaceous perennial below 5 degrees but is evergreen above 15 degrees. Grows in any soil and does best in full sun or dappled shade. Height: 2–3 feet. Width: 2–3 feet. Water zone: M.

BROOM DALEA (*Psoralea scoparius*). In areas where creosote bush can't germinate because of unstable soils, this broomlike shrub commands areas of shifting blow sands of the Chihuahuan Desert region. From El Paso, Texas, to just north of Albuquerque, New Mexico, it is just a mass of tight, wiry, blue-gray stems until the summer rains arrive. Then the whole land is covered in a haze of honey-scented blue flowers. The plant's stems also exude a fresh smell when crushed. Two notable relatives are indigo bush (*P. fremontii*), a loose shrub from the upper Mojave Desert, and smoke tree (*P. spinosus*), a gnarled tree native to washes in the nearly frost-free areas of the Sonoran

Desert. Grows best in full sun and sandy soil. Height: 3–5 feet. Width: 4–6 feet. Water zone: VL only.

MARIOLA (*Parthenium incanum*). This compact, gray shrub seems to grow naturally where the soil is rocky or gravelly, but it also readily adapts to clay. The small leaves, which shed during dry periods, are shaped like those of an oak and smell like a blend of musk and mint when crushed. In the landscape, this is an ideal plant for small spaces, and its pale yellow flowers add interest in fall, when they also seem to glow in the full moon. Native from western Texas to Albuquerque and far south into Mexico, it tolerates heat and cold to –10 degrees. Grows best in full sun and any soil. Height: 2–3 feet. Width: 2–3 feet. Water zone: L–M.

SAND OR THREADLEAF SAGEBRUSH (*Artemisia filifolia*). From a distance, this blue-gray shrub looks like a loosely structured, windswept version of its relative, big

elevation—smells like incense. (VL–M)

MESQUITE (*Prosopis* spp.). Flowers have a sweet fragrance during sporadic spring and summer flowering. (VL–M)

Chihuahuan Desert

The Chihuahuan Desert covers more than 200,000 square miles in north central Mexico and adjacent regions of southern New Mexico and western Texas, with elevations ranging from 2,000 to over 6,000 feet. Freezing winter weather is common, often lasting several days, making this desert less “Mediterranean” and semi-tropical than the other two. Also, the summer “monsoon” produces most of the annual precipitation—and the greatest summer perennial floral display of the three deserts.

Water zones are generally very low or low, except in arroyos. Cities include Albuquerque and Las Cruces, New Mexico; and El Paso, Texas.

AUTUMN SAGE (*Salvia greggii*). Naturally found in the mountains above the desert in northern Mexico and western Texas, this low green shrub is very popular in landscaping. In places like Albuquerque, Las Vegas, Phoenix, and Tucson, it is common in small courtyards, along streets, and in front of businesses. The scent of basil is released when the small green leaves are crushed, and hummingbirds love the tubular flowers. Red and pink flowers are most common, but whites are being grown too.

Resources

■ **LANDSCAPE PLANTS FOR WESTERN REGIONS** by Bob Perry. Land Design Publishing, Claremont, California, 1992. AHS price: \$44. LDP 001

■ **NATIVE PLANTS FOR SOUTHWESTERN LANDSCAPES** by Judy Mielke. University of Texas Press, Austin, 1993. AHS price: \$20. UTP 001

■ **NATURAL BY DESIGN: BEAUTY AND BALANCE IN SOUTHWEST GARDENS** by Judith Phillips. Museum of New Mexico Press, Santa Fe, 1995. AHS price: \$28. MNM 001

■ **PLANTS FOR NATURAL GARDENS: SOUTHWESTERN NATIVE AND ADAPTIVE TREES, SHRUBS WILDFLOWERS AND GRASSES** by Judith Phillips. Museum of New Mexico Press, Santa Fe, 1995. AHS price: \$22. MNM 002

■ **SHRUBS AND TREES OF THE SOUTHWEST DESERTS** by Janice Emily Bowers. Southwest Parks and Monuments Association, Tucson, Arizona, 1993. AHS price: \$11. SPM 001

■ **WILD PLANTS AND NATIVE PEOPLES OF THE FOUR CORNER.** Museum of New Mexico Press, Santa Fe, New Mexico, 1997. AHS price: \$18. NMP 001

■ **WILD PLANTS OF THE PUEBLO PROVINCE.** Museum of New Mexico

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■ **THE XERISCAPE FLOWER GARDENER: A WATERWISE GUIDE FOR THE ROCKY MOUNTAIN REGION** by Jim Knopf. Johnson Books, Boulder, Colorado, 1991. AHS price: \$14. JOH 001

Sources

AMERICAN DESERT PLANTS, INC., 961 Starr Pass Boulevard, Tucson, AZ 85713. (520) 792-2041. Price list free. www.DesertPlants.com

FORESTFARM, 990 Tetherow Road, Williams, OR 97544-9599. (541) 846-7269. Catalog \$4. www.forestfarm.com

HIGH COUNTRY GARDENS, 2902 Rufina Street, Santa Fe, NM 87505. (505) 438-3031; (800) 925-9387. Catalog free.

LAS PILITAS, 3232 Las Pilitas, Santa Margarita, CA 97453. (805) 438-5992. Catalog on the Web site at www.LasPilitas.com

PLANTS OF THE SOUTHWEST, Agua Fria Road, Route 6 Box 11A, Santa Fe, NM 87501. (505) 867-1322; (800) 788-7333. Catalog \$3.50. www.PlantsoftheSouthwest.com

sagebrush. An evergreen, its native habitat ranges from the central Great Plains region into the Great Basin and Mojave Deserts, and well into Mexico. However, unlike big sage brush, this plant grows on more unstable sandy soils, takes more heat and dryness, and has smaller leaves. When the needlelike leaves are bruised or when the air is moist, it gives off an almost minty fragrance. It is at its best spaced about six feet apart so plants retain their individual form and looks great in contrast to a dark green ground cover. Grow in full sun and well-drained soil. Height: 4 feet. Width: 4 feet. Water zone: L.

TEXAS MOUNTAIN LAUREL OR MESCALBEAN (*Sophora secundiflora*). This evergreen shrub or small tree resembles wisteria in leaf and flower. The first time I smelled it was near Carlsbad Caverns in early April, and the breezes saturated the air with its sweet scent, which is reminiscent of grape bubblegum! Native from far southeastern New Mexico into central Texas and northern Mexico, it takes heat and some cold—down to zero degrees, briefly. Popular in landscapes just about everywhere from San Antonio to Phoenix. Grows best in part shade to full sun and in neutral to alkaline soils. Height: 8–18 feet. Width: 6–20 feet. Water zone: L–M.

Other Choices

DAMIANITA (*Chrysactinia mexicana*). The foliage of this small evergreen shrub has a pungent minty scent when crushed or when it rains. (VL–L)

PALMER'S PENSTEMON (*Penstemon palmeri*). This perennial's flowers have a delightfully sweet scent in spring. (L)

SAND VERBENA (*Abronia fragrans*). The flowers on this sprawling perennial have an intense and delightful sweet scent. (L)

SWEET FOUR O'CLOCK (*Mirabilis longiflora*). The white, night-blooming flowers of this sprawling perennial are sweetly scented. (L–M)

A landscape architect in Boulder, Colorado, Jim Knopf is author of The Xeriscape Flower Gardener: A Waterwise Guide for the Rocky Mountain Region, and is completing a companion book, Waterwise Landscaping with Trees, Shrubs and Vines: A Xeriscape Guide for the Rocky Mountain Region, California and the Desert Southwest.

David Cristiani, a landscape designer living in Albuquerque, New Mexico, contributed information about desert gardening.

Fragrant Natives for Eastern Gardens

by Paula ReFi

Fragrant plants have always been in vogue, but many of the fragrant plants native to eastern North America have been overlooked or underused by designers and gardeners. If a garden's components, fragrant and otherwise, are drawn from nature's palette, then its design should also take inspiration from the plant communities that occur in nature. That means integrating trees, shrubs, and vines that thrive in similar environments. When plants are selected for their appropriateness to the site, they not only appear in context, but their chances for long-term success are enhanced. For gardeners east of the Mississippi, there are fragrant native species available in every plant category and for a variety of soil types and cultural conditions.

Trees

The average residential property has room for one or more small to medium-sized

trees with ornamental value. Such specimens cast a bit of shade, bloom attractively in season, and—if chosen carefully—can even boast the bonus of fragrance.

AMERICAN SNOWBELL OR STORAX (*Styrax americanus*). Around Atlanta, where I live, the fragrant white, bell-shaped flowers bloom in April, just after those of dogwood (*Cornus florida*). Growing singly in shallow water and along stream banks in USDA Zones 6 to 8, this small tree adapts to acidic soils in full sun or light shade. An ideal garden location would be on a slope where the suspended flowers can be enjoyed from below.

AMERICAN YELLOWWOOD (*Cladrastis kentukea*, formerly *C. lutea*). This is a low-branching, vase-shaped tree native to well-drained limestone soils in river valleys, slopes, and ridges along streams. It is also perfectly content in either moderately acidic or alkaline soils in the landscape. It succeeds



American wisteria is less likely than its Asian counterparts to escape its bounds.

in Zones 4 to 8, producing a full canopy of bright green foliage in summer that turns yellow or golden yellow in fall. Yellowwood is notorious for failing to bloom when young, and it flowers abundantly only in alternate years. But the effect of its 12-inch-long fragrant panicles is spectacular in late May or early June. The best bloom is produced in full sun, but yellowwood will flower adequately at the edge of woodlands.

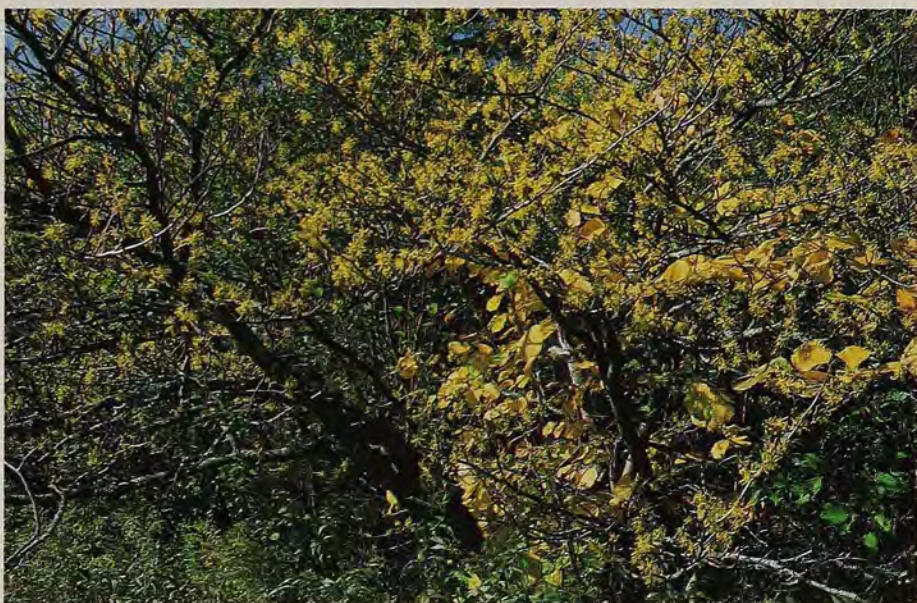
SOUTHERN CRABAPPLE (*Malus angustifolia*). A large shrub or small tree that occurs in Zones 5 to 8 in valleys, lower slopes, fence rows, and old fields, Southern crabapple frequently forms thickets from sprouting roots. It is unforgettable in spring, with flowers that resemble small single roses, opening pink and later fading to white. The foliage emerges an appealing red but may become seriously disfigured by fungal diseases such as fireblight. If not completely defoliated, the leaves turn orange-red in autumn. The bark is scaly and quite colorful, and the fruit is unrivaled for wildlife habitat gardens. Crabapples require full sun and resent poor drainage.

SWEETBAY MAGNOLIA (*Magnolia virginiana*). Though native to stream banks and boggy places, this tree adapts to typical garden situations as long as the soil is acidic. In particularly dry soils, it may require supplemental water during droughts. Mature height is about 20 feet in the North, but in the South it can reach 60 feet. Sweetbay is deciduous at the northern limit of its range (Zone 5) and semi-evergreen farther south (Zone 9). *M. virginiana* var. *australis* is an evergreen southern form. Sweetbay is tolerant of shade and produces three-inch-wide, waxy, white, lemon-scented blooms late in spring. These give way to conelike structures bearing bright red seeds. With the slightest breeze, sweetbay's leaves reveal their silvery underside, and its narrow, upright habit permits siting it against a fence or close to a building.

Shrubs

Shrubs are the workhorses of the landscape. They fill in gaps between trees, screen unwanted views, and act as backdrops for perennials and annuals. With these selections, you can have all that and fragrance as well.

DWARF FOTHERGILLA (*Fothergilla gardenii*). This witch-hazel relative, native to moist, acidic soils of the southeastern coastal plain, develops into a dense,



mounded shrub two to four feet high. It bears honey-scented white flowers in April to early May before the foliage emerges. Dark green to blue-green leaves cloak the shrub's upright, elegant branches. In autumn these turn a combination of yellow, orange, and scarlet that is effective for weeks. Despite its native habitat, dwarf fothergilla grows equally well in drier sites and can be used in combination with foundation shrubs or form a mass planting in a natural area. It grows best in part shade, but has better fall color in full sun. A pool of woodland phlox (*Phlox divaricata*) makes an appropriate underplanting. Because the species can be quite variable in habit, hardiness, heat tolerance, and foliage color, named selections are worth consideration. 'Blue Mist' has bluish foliage and does well north of Zone 7; 'Mount Airy'—

Top left: American yellowwood is an underused ornamental tree that produces dangling panicles of fragrant, creamy white flowers in late spring. **Top right:** The clustered stamens of dwarf fothergilla flowers resemble a bottle-brush. **Above:** The fragrant yellow flowers of common witch-hazel light up the woods in late fall to early winter.

Hardy Fragrant Natives for Northern Gardens

Although southeastern gardeners have a much wider palette of fragrant native plants to choose from than those in more northerly regions, don't despair if you live north of USDA Zone 5—there are still plenty of hardy fragrant native plants to grace your garden. Here are a few suggestions for fragrant natives that will thrive in cooler climates.

Common witch-hazel (*Hamamelis virginiana*) grows into a large shrub or small tree. Its fragrant, yellow, straplike flowers emerge from late fall to early winter, depending on the region. Native to much of eastern North America, from Canada to

Georgia and west to Nebraska, it also offers lovely yellow fall color. Zone 3–8.

Sweet fern (*Comptonia peregrina*) is a deciduous shrub with fragrant foliage rather than flowers. Native from eastern and central Canada south along the Eastern seaboard to southern Virginia, it is hardy to Zone 2, thrives in moist, infertile soils, and under the right conditions it eventually spreads to form large colonies.



On the right of these steps, sweet fern is used as a ground cover opposite Russian sage.

Wintergreen or checkerberry (*Gaultheria procumbens*) is a low-growing rhizomatous shrub with evergreen leaves. It produces white flowers and, in late summer, red berries. The foliage and berries have the characteristic wintergreen scent. It is native to shady, acidic wooded areas along mountains and the upper edge of the coastal plain from Newfoundland south to Georgia. Zone 3–8.

The following fragrant plants are also suitable for northern gardens. Most are described in greater detail in the main text.

TREES: Fringetree (*Chionanthus virginicus*), Zone 4–9; American yellowwood (*Cladrastis kentukea*), Zone 4–8.

SHRUBS: Sweetshrub (*Calycanthus floridus*), Zone 4–9 (suffers winter injury below –15 to –20 degrees Fahrenheit); summersweet (*Clethra alnifolia*) and cultivars, Zone 4–9; spice bush (*Lindera benzoin*), Zone 4–9; witch-hazel (*Hamamelis vernalis*), Zone 4–8; swamp azalea (*Rhododendron viscosum*), Zone 4–9.

PERENNIALS: Beebalm (*Monarda didyma*) and cultivars, Zone 3–8; false Solomon's seal (*Smilacina racemosa*, also known as *Maianthemum racemosum* ssp. *racemosum*), Zone 3–8.

—David J. Ellis, Editor

developed from *F. major*—has good fall color and heat tolerance.

FLORIDA LEUCOTHOE (*Agarista populifolia*). One of the best evergreen shrubs for shaded locations, its arching branches can reach eight to 10 feet and retain their foliage to ground level, perfect for screening a parked car or a compost pile. The lustrous, pointed leaves create a softly textured hedge, and creamy, distinctly honey-scented, urn-like flowers appear in May or early June. Though wild stands occur in wet woodlands from Zones 6 or 7 to 9, Florida leucothoe grows satisfactorily in competition with tree roots as long as the soil is acidic and has a fairly high organic component.

SUMMERSWEET (*Clethra alnifolia*). Bloom is scarce in the summer woodland, so the delectable scent of the summersweet

is particularly welcome in July throughout Zones 4 to 9. This three- to eight-foot-tall deciduous shrub has numerous twiggy stems. In its native habitat—bogs and wet pine savannas—summersweet spreads by underground stems. Its upright white or pale pink flower spikes are magnets for bees and butterflies. It is useful in groups in moist shade, where it withstands occasional flooding. It also thrives nicely and blooms more prolifically in a sunny mixed border. Several new cultivars offer useful variations, including 'Chattanooga', which has exceptionally long panicles. 'Hummingbird', at three feet, is smaller than the species. The best pink form is 'Ruby Spice'. **SWEETSHRUB OR CAROLINA ALLSPICE** (*Calycanthus floridus*). This shrub's fruity fragrance is common in hardwood and

mixed pine forests in Zones 4 to 9 and can waft pleasantly across a quarter-acre home-site. The reddish-brown blossoms are held terminally on the multi-branched, amorphous shrub, which matures at six to nine feet. Individual plants within the species exhibit fragrance of varying intensity, presumably due to genetic variation within the wild population, so it is advisable to select plants when they are in bloom. The yellow-flowered selection, *C. floridus* 'Athens', however, is reliably fragrant. Sweetshrub produces leathery fruit capsules that contain many large seeds relished by wildlife. Because of its sometimes unkempt appearance, sweetshrub looks best in naturalistic groups at the garden's edge. A drift of native Christmas fern (*Polystichum acrostichoides*) would effectively anchor a colony of sweetshrub.

Shrubs for Damp, Sunny Areas

Poor drainage is common in today's residential neighborhoods. Too many impervious surfaces create occasional backyard bogs. The knee-jerk solution calls for storm sewers and catch basins, but swamp-dwelling natives are genetically programmed to handle occasional inundations. A handful are, in addition, ornamental and pleasantly scented.

SWAMP CYRILLA OR TITI (*Cyrilla racemiflora*). It grows naturally in sunny swamps and low pinelands from Zone 6 southward, becoming a 10-foot shrub of sprawling habit. Its rich, green foliage is evergreen in mild climates but turns orange and scarlet in fall in its northern range. In June and July, six-inch-long racemes of fragrant white flowers are borne on the previous season's growth. Cyrilla is strikingly beautiful beside a sunny pond or massed along open ditches. 'Graniteville' is a low, spreading selection introduced by Woodlanders in Aiken, South Carolina.

SWAMP ROSE (*Rosa palustris*). The native American swamp rose flourishes in low, wet places across the Eastern seaboard in Zones 3 to 9. Its seven-foot canes bear clusters of fragrant pink blooms, followed by vividly-colored hips in fall. Swamp rose is at home next to a sunny pond, where it would enjoy consorting with blue flag (*Iris versicolor*) or pickerel weed (*Pontederia cordata*).

VIRGINIA SWEETSPIRE (*Itea virginica*). Deciduous thickets of Virginia sweetspire populate wooded swamps and streamsides in Zones 5 to 9. In May, six-inch racemes of lightly scented white blossoms create a

frothy presence in open shade. The plant's erect branches reach three to five feet in height and, given sufficient moisture, grow quickly. Virginia sweetspire is ideal for controlling erosion in drainage areas and will grow in drier sites, as well. The most widely grown cultivar, 'Henry's Garnet', produces consistent reddish-purple fall color, though it can develop leaf spot in southern gardens. The leaves also shed rather quickly, limiting the period of effective color. Arkansas plantsman Larry Lowman's introduction, 'Saturnalia', displays cleaner foliage as well as brilliant color in autumn. 'Sarah Eve' flaunts strikingly beautiful blush-pink flowers.

Shrubs for Moist Shade

Finding fragrant plants for a moist, shady garden situation may seem miraculous to some, but here are some good choices for naturalizing.

BUTTONBUSH (*Cephalanthus occidentalis*). A rangy, rounded shrub for Zones 5 to 10, buttonbush typically grows six to nine feet high. Spherical, creamy white blooms up to an inch in diameter, produced in early summer, are a nectar source for monarchs and tiger swallowtails. The plant's nutlets are eaten by waterfowl, a bonus in the woodland habitat garden. It grows best in moist, boggy soil or at the edge of a pond.

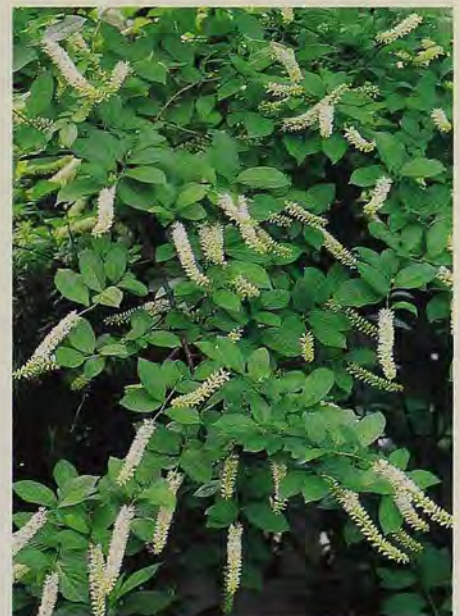
NATIVE AZALEAS (*Rhododendron* spp.). Several species of native azalea form per-

fumed colonies in fertile hardwood forests along the East coast. Among the best for garden use are the Piedmont azalea (*R. canescens*), Florida flame azalea (*R. austrinum*), and sweet azalea (*R. arborescens*). These deciduous shrubs thrive in very rich, organic soils that are moist but never soggy. Their ideal habitat is a gentle slope leading down to a stream, where their roots can tap into hidden springs. Slender stems reach six or eight feet in time, and their delicate flowers of pink, orange, and white, respectively, attract numerous butterfly species.

SPICEBUSH (*Lindera benzoin*). This deciduous shrub is native to moist woodlands from Maine to Florida and Texas, but in an ornamental setting it provides a more attractive habit when planted in nearly full sun. Its foliage provides the fragrance, giving off a distinct, lemony scent when bruised. Spicebush has an understated beauty, revealing pale yellow flowers on bare stems in late winter and golden yellow fall foliage.

VERNAL WITCH-HAZEL (*Hamamelis vernalis*). Late winter brings the blooms of vernal witch-hazel. Growing in the moist soil along rocky streams in Zones 4 to 8, these multi-stemmed, rounded plants will sucker to form large masses. Flowers may be yellow to red, measuring as much as three-quarters of an inch across. Pungently fragrant, they are effective for three to four weeks.

"If a garden's components, fragrant and otherwise, are drawn from nature's palette, then its design should also take inspiration from the plant communities that occur in nature."



The starlike yellow blossoms of Carolina jessamine, left, sparkle in the branches of a supporting tree; the vine can also be used to highlight a mailbox or fence. Virginia sweetspire, right, is an ideal shrub for naturalizing in moist, sunny sites. In addition to its fragrant summer flowers, it often provides incandescent fall color.



Buttonbush grows best in or around water and produces globular, creamy white flowers in mid- to late summer.

Climbers

Vines contribute scent and height to native plantings. They can be grown near the house so their fragrance is readily available or naturalized on a fence or on trees or shrubs.

AMERICAN WISTERIA (*Wisteria frutescens*). Restrained and garden-friendly, unlike its

Asian counterparts, in June this vine produces fragrant, drooping clusters of pealike lavender flowers the size of grape clusters. Because blooms appear long after the last frost, cold damage is avoided. Adaptable in Zones 5 to 9, it can be restricted to a picket fence or allowed to climb 20 feet or more. American wisteria grows best with moist, fertile soil and a half-day of sun. *W. frutescens* 'Amethyst Falls' blooms abundantly as a young vine. Reportedly, this cultivar's initial burst of color is followed by a second, equally impressive, flowering.

CAROLINA JESSAMINE (*Gelsemium sempervirens*). Driving across the southern coastal plain in April from, say, Macon to Savannah, travelers are treated to the sight of Carolina jessamine strung throughout the open, piney woods. For city-dwellers, it becomes the quintessential mailbox vine: clear yellow, fragrant trumpets in spring, evergreen foliage thereafter. A cooperative twiner with a tenacious constitution, it is useful on trellis or arbor, blooming best in sun, but sporadically in part shade. Carolina jessamine adapts to almost any soil, and its blooms lure spicebush swallowtails and hummingbirds. A double-flowered cultivar, 'Pride of Augusta', is also available.

WILD CLIMBING HYDRANGEA (*Decumaria barbara*). This underused native is common in the oak-hickory forests of the east-

ern United States in Zones 6 to 9. Growing 10 to 30 feet in height, it often cloaks the forest floor, blooming when aerial rootlets allow it to climb a cooperative tree. There it produces white, sweetly fragrant flowers in flat-topped clusters in spring. The foliage is a glossy, deep green, turning pale yellow in fall. This vine climbs just as easily on a rocky outcrop or a cedar post, suggesting several possibilities for garden use. Ted Stephens of Nurseries Caroliniana in North Augusta, South Carolina, endorses the nearly evergreen cultivar 'Chattooga'.

Herbaceous Perennials

Low-growing fragrant plants should not be ignored in the garden. Scents emanating from ground level can be the most provocative to visitors because they are sometimes more difficult to trace to their source than taller plants. Below are some good choices for Eastern gardens.

BEEBALM (*Monarda didyma* and cultivars). This colorful, floriferous member of the mint family has aromatic foliage. It does best in moist soils and full sun in Zones 3 to 7. Although the lacy, scarlet flowers of the species are stunning, it can be prone to mildew. Mildew-resistant cultivars such as 'Raspberry Wine' (purplish red), 'Marshall's Delight' (purplish pink), and 'Cherokee' (rosy pink) are better choices in humid areas.

FALSE SOLOMON'S SEAL (*Smilacina racemosa*). This upright perennial with creamy white fragrant flowers thrives in moist, shady sites in Zones 3 to 8.

HAY-SCENTED FERN (*Dennstaedtia punctilobula*). A rhizomatous fern with hairy, yellow-green fronds that arch out from the base. The foliage exudes a clean, fresh scent reminiscent of newly cut hay when bruised or brushed against. It grows in part shade or full sun and will tolerate dry soil once established. Hardy in Zone 3 to 8.

Today, for many of us, gardening is about connectedness. A landscape designed with nature in mind reaches beyond appearances and asks to be appreciated in all its aspects. Scented natives can be found in every plant category and for a range of cultural conditions, so providing for fragrance ought not to be an afterthought. Individual fragrances reveal themselves with time and can become a garden's most delicious dimension. 🍷

Paula Refi is a landscape designer living in Atlanta, Georgia.

Sources

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FAIRWEATHER GARDENS, P.O. Box 330, Greenwich, NJ 08323. (609) 451-6261. Catalog \$3.

NATIVE GARDENS, 5737 Fisher Lane, Greenback, TN 37742. (423) 856-0220. E-mail: rcopallina@aol.com. Price list free.

ROSLYN NURSERY, 211 Burrs Lane, Dix Hill, NY 11746. (516) 643-9347. Catalog \$3.

SUNLIGHT GARDENS, 174 Golden Lane, Andersonville, TN 37705. (423) 494-8237. E-mail: sungardens@aol.com. Catalog \$3.

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

Resources

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A Tale of Two Gardens

Elements derived from Zen gardening unite two very different Japanese-style gardens.



b y K a t h l e e n F i s h e r

Jack Miller has two gardens. Both of them looked to the East for their inspiration, yet in many ways they couldn't be more different.

Miller's home garden, named *Dans la Forêt*—"in the woods"—by his French-Canadian wife, Carmen Morin-Miller, is a green cathedral of hardwoods carpeted by two acres of moss in a bucolic setting outside tiny Collegeville—about 25 miles northwest of central Philadelphia—where Miller has lived most of his life.

His second garden, the Pagoda, which he was hired to create and tend, has a central floor of stones—so reflective that you need sunglasses to visit at midday—and surrounds a five-floor office building just off I-76 in the Philadelphia suburb of Bala Cynwyd.

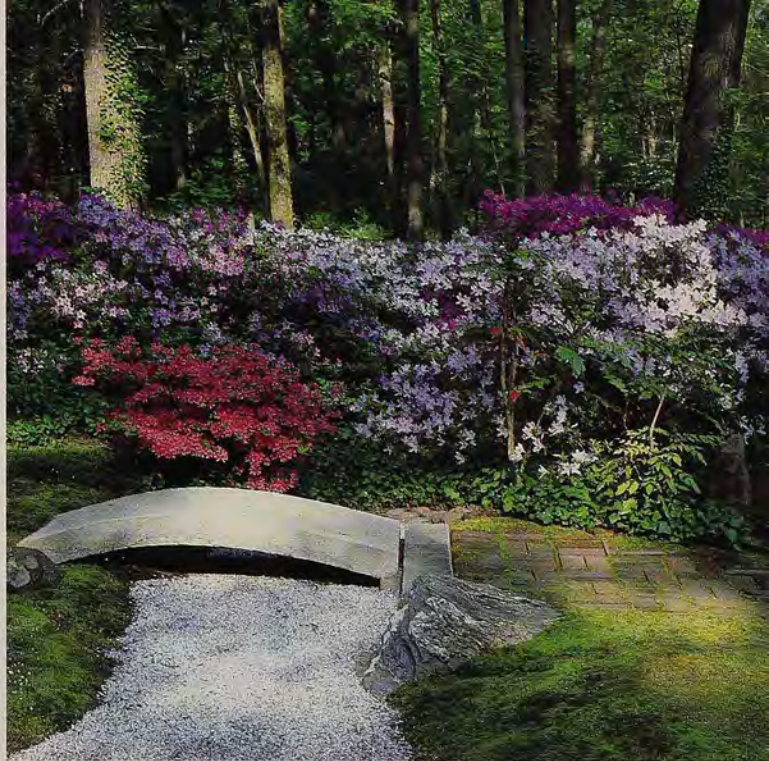
It's not remarkable that a professional gardener also has an impressive garden at home. But Miller's occupation for 18 years involved the artificial breeding of cattle. He also did a stint in the U.S. Army, stationed in the Philippines during World War II. With

his wife, an art dealer, he co-owned an art gallery in Manhattan and for several years he helped her set up exhibits throughout the Northeast. But it was Miller's passionate commitment to Japanese-style gardening and the reputation he earned for creating his home garden that led to his being hired—five years ago at the age of 70—to oversee development of the Pagoda garden.

A Woodland Treasure Trove

Miller is hardly a Johnny-come-lately to gardening. When he bought his three-acre Collegeville property almost 50 years ago, he began planting azaleas, rhododendrons, and boxwoods. Already gracing the landscape were oaks at least 75 years old, as well as ironwood, maple, hickory, sassafras, dogwood, and serviceberry. The woodland

Flowering plants—with a few exceptions, such as azaleas—are restricted in Miller's moss-carpeted home garden.



floor was rich with treasures: Jack-in-the-pulpit, mayflower, Solomon's seal, partridgeberry, wintergreen, dogtooth violets, bloodroot, and even trilliums.

It was about 20 years ago that Miller's burgeoning interest in gardening led to a friendship with Japanese landscape designer Hiroshi Makita. Makita needed a place to stay for a short time; Miller's son had just left home and the Colledgeville basement was unoccupied. In return for the room, Makita would teach Miller about Japanese- and Zen-style gardening. Miller had spent considerable time in various parts of Asia following his World War II duty and had become enamored of Asian art, so it seemed logical to him to apply Asian principles to gardening. Miller also felt that gardening practices in America seemed to be to let plants become overgrown—and then take them out.

Adding Zen Elements

Zen meditation, observes Miller, is based on the belief that the sole path to enlightenment is power over the self. The goal of a garden that incorporates Zen aesthetics is, therefore, to reflect and enhance this sense of self-discipline and austerity. Suggestion and symbolism are used to bring out the essential nature of garden features. With the exception of azaleas and some spring-blooming trees such as cherries, flowering plants are kept to a minimum. More subtle color is provided by Japanese maples—Miller grows more than 20 selections—and numerous hostas, tucked in at the foot of a

rock here or at the bend of a path there, like punctuation marks. Maintaining the overall mood are the unchanging hues of moss, evergreens, stones, sand, and gravel.

Makita worked closely with Miller four or five days a month for five years, but the final artistry evident in the garden is Miller's. "When it comes to painting or drawing, I'm terrible, but I think of myself as an artist in the garden," says Miller. "What Hiroshi did, more than anything, was to make sure that I didn't break tradition." The Millers have several bulky scrapbooks documenting the garden's creation—from the early phases of clearing, carpentry, and heavy lifting to the later stages of planting and shaping.

For instance, there are five gates, each with its own symbolism. The low-topped "Humble Gate" is often the only entry to a Japanese garden, explains Miller. Those who enter are forced to bow, thus paying homage to the garden and its creator. Another is a basket gate, so-called because the curved roof over the gate resembles an inverted shallow basket. The gates also act as frames for long garden views, and one helps support a 35-year-old wisteria. "The wisteria was there first," notes Miller. "We just built the gate close by and let its tentacles flow up and become part of it."

Among other distinctive features in the garden are four bridges, including a 22-foot rainbow or moon bridge that traverses a large dry pond and a carved stone bridge over a "river" of granite pebbles. In all, there are 12 different stone basins, in-

"Zen meditation... is based on the belief that the sole path to enlightenment is power over the self. The goal of a garden that incorporates Zen aesthetics is... to reflect and enhance this sense of self-discipline and austerity."

cluding a tiny one off the back of the house that captures overflow from the hose spigot. In typical Japanese tea garden style, one to the right of the front door is there for guests to use for purification of body or spirit. There are also two “waterfalls” that, like the rivers and ponds, are dry: One is created with stones, the other with a 20-year-old weeping juniper (*Juniperus procumbens* ‘Nana’) that drips over a stone retaining wall to a floor of sandstone pebbles. Behind it, a drooping leucothoe (*Leucothoe fontanesiana*) almost twice as old creates an upper falls. To those who love Japanese gardens, one of the most beautiful aspects of this feature is the patina of moss and algae that the years have painted on the rubblestone wall. “Some gardeners might scrub it off,” says Miller. Although the effect seems effortless, he has to prune

the juniper almost yearly to retain its form.

Stone is an important element in a Zen garden, and here you will find nearly a thousand tons of it. Carmen, who was born in Quebec, is especially proud of more than 50 tons of smooth Quebec glacier stone and pebbles, collected from a band that stretches from 200 miles north of Quebec City down to Maine. “They are one of my signatures,” says Miller. “I’ve used them everywhere I’ve put a garden.”

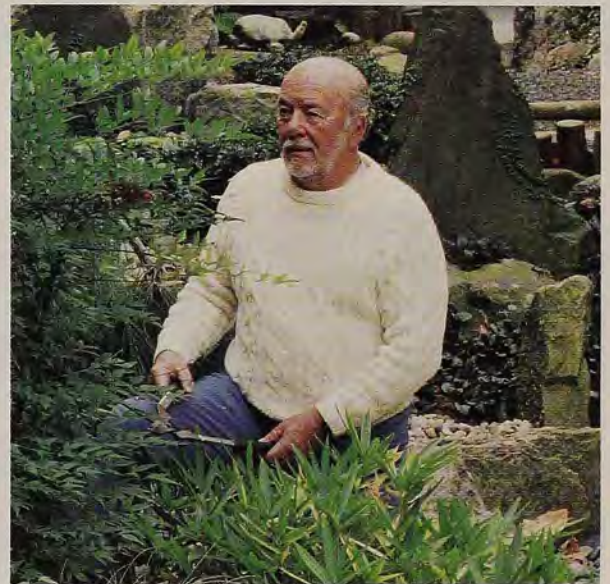
There are also some 700 tons of granite, 50 tons of native slate—not counting some 700 stepping stones—and 50 tons of New Jersey sand and pebbles that were used for the simulated waterfall.

The Millers say there are approximately 1,400 feet of winding trails here, plus a mosaic path of a variety of red sandstones, set “to give a feeling of musical,

Japanese-inspired features abound in Miller’s home garden: The basket gate—so-called because it bears a resemblance to an inverted basket—opposite left, is one of five gates in the garden. A dry stream made of crushed stone, opposite right, flows under a low bridge, one of four. Below, a pale expanse of granite pebbles sets off a lichen-encrusted stone wall draped by *Juniperus procumbens* and a flowering Glenn Dale azalea.



The arching moon bridge in Dans la Fôret, below, stands seven feet high and spans 22 feet over a "pond" of gravel. Right: Jack Miller shaping plants in the Pagoda garden.



rhythmic motion," explains Carmen.

Two of the most prominent features drawing a visitor along these paths are a gazebo, situated at the summit of the gently inclined landscape, and a group of strongly vertical rocks toward the very back of the property line. Japanese gardens are supposed to mimic nature; while this grouping looks from a distance like a mountain, it also suggests a brooding presence that could be either threatening or benevolent, like the monolith from the Stanley Kubrick movie *2001: A Space Odyssey*. That's the idea, says Miller. "What comes back to you when you look at these things will depend on the state of mind

the traditional bamboo rakes as the tool of choice, the task is gargantuan under this oak canopy. Miller shakes his head. "I won't even try to tell you what fall is like for us." More damaging and harder to deal with are woodland animals such as squirrels and chipmunks. "We're always repairing places where they've been digging." He was blessed, he admits, by having the perfect spot: protected, dappled shade, and rich, acidic soil. "This place is a dream. I never even water."

The Pagoda

There's a moss garden at the Pagoda, too, to the left of the entrance and about the size of an average home vegetable patch. Moss

"Although Zen gardening honors many religious and cultural traditions, there is plenty of room for innovation and even play."

you're in. Three or four people will all see different things."

Underlying and uniting the garden is the amazing moss, which the Millers believe to be one of the biggest expanses in the world. Miller estimates there are 30 different kinds of moss in their garden, although they have not been officially inventoried. Much of it simply came in on its own. "I would point out to Hiroshi where there was a good spread of moss, and we would remove grasses and other plants, and patch it if we needed to."

In spite of the fact that it never needs mowing, anyone who thinks moss is a low-maintenance ground cover should be quickly disabused. Leaves that fall on top in the autumn need to be quickly but gingerly removed, and even with leaf-blowers replacing

was almost the only thing that would grow in this spot because there's asphalt just a foot under the soil. But it's a terrible place for moss, too, because it's completely unprotected from hot sun and drying wind. This past summer, the wind blew in what Miller calls a moss "lookalike"—an algae that had to be carefully eradicated from the moss.

The Pagoda is a 37-year-old office building in the shape of a pagoda developed by a woman who became enthralled by Japanese culture and art after living in Japan for several years. "She came back saying that she would build a building the likes of which Philadelphia had never seen," says Miller, "and I would have to say she's right." The structure is now owned by Kennbert Investors, headed by Bob Kennedy and Bert Lofgren. The primary tenants are Primestar

Partners, a satellite relay operation, and Lofgren's Mainline Personnel.

It was Lofgren who, having heard about Dans la Forêt and the landscapes Miller had designed for several private gardens, asked him to take on the Pagoda landscape in 1993. "The interview took about 30 seconds. He asked if I thought I *could* do it, and if I *would* do it," recalls Miller.

Although there were existing elements worth keeping—a Japanese maple some 20 feet high and wide, a mature sourwood (*Oxydendrum arboreum*), a cedar of Lebanon (*Cedrus libani*), a bird's nest spruce (*Picea abies* 'Nidiformis') now three feet tall and almost six feet across, and appropriate-

is also a bridge of stepping stones, a stone slab, and a "flat bridge," which, like one at his home in Colledgeville and other Japanese gardens, is nevertheless slightly humped in the middle.

Here, too, is a dry waterfall. Each of the four levels is made of a slightly larger rock. "This suggests water falling at different speeds," says Miller. "You're also supposed to suggest the origins of the falls you create. In this case, our origin was a former dumping ground," backed, he might add, by a parking lot.

Although there are none of the usual accoutrements of a public picnic area, such as tables or trash barrels, a scattering of large

Among the whimsical touches Miller has added to the Pagoda garden is an irregularly shaped piece of slag, below left, that is spray-painted gold. For safety reasons, Miller replaced the water in a pond in the center of the Pagoda garden, below, with symbolic crushed stone.



ly, a Japanese pagoda tree (*Sophora japonica*, now sometimes listed as *Styphnolobium japonicum*)—there were also headaches. Most notable was a five-foot-wide overhang from the jutting roof of the pagoda, creating a "rain shadow" around the building.

Lofgren's only requirement was that the new garden be accessible to employees and the public. Because of its potential liabilities, the huge pond that had been the garden's focal point was slated to be removed. Since Miller's bent was toward dry gardens anyway, it wasn't a difficult decision to convert the area into a pond of stone, complemented today by four bridges. The first you come to, after entering through a Humble Gate, is a zigzag bridge. The origin of this design is derived from the belief that the devil always travels in a straight line. There

flat-topped rocks in one area invites employees and others to escape to nature during breaks. Under the sprawling Japanese maple, another rock invites meditation. In front of the picnic area is a stand of bamboo (*Phyllostachys nuda*) with the lower leaves stripped. This creates a sense of mystery by half revealing and half hiding a clump of liri-ope and a small hill on the other side.

Here, as at Miller's home garden, are more than 20 species of bamboo. These include the dwarf *Pleioblastus pygmaeus* var. *distichus*, which forms white leaf margins as it ages. Used as a ground cover, it is sheared back annually. On a berm to the right of the front entrance, interspersed with conifers such as *Pinus strobus* 'Pendula'—there are 31 different conifers in the one-acre landscape—are three species of *Sasa* bamboos,

Resources

CREATING JAPANESE GARDENS

by Philip Cave. Charles E. Tuttle Company, Inc., Boston, 1993. AHS price: \$13.50. TUT 001

ENHANCE YOUR GARDEN WITH JAPANESE PLANTS: A PRACTICAL SOURCEBOOK

by Judy Glattstein. Kodansha International, New York, 1996. AHS price: \$20. KOD 001

JAPANESE GARDEN DESIGN by Marc P. Keane. Charles E. Tuttle Company, Inc., Boston, 1997. AHS price: \$28. TUT 002

JOURNAL OF JAPANESE GARDENING.

An annual subscription to this bimonthly magazine published by Roth Tei-en is available for \$35. Write to P.O. Box 159, Orefield, PA 18069.

ORIENTAL GARDENING by The Japanese Garden Society of Oregon, with Kate Jerome. Pantheon Books, New York, 1996. AHS price: \$20. PAN 001

including the beautiful variegated *S. veitchii*. Some of these bamboos are restrained underground, but other clumps grow unencumbered. "Bamboo won't get out of hand if the gardener is attentive," Miller assures, then adds, "There's a joke going around that Jack Miller is planting bamboo all over Pennsylvania because he's 75 and won't be around long enough to worry about it! It's OK... I started it."

While the history of Dans la Fôret is one of taking advantage of exquisite surroundings—albeit with 50 years of hard work—the Pagoda story is one of overcoming obstacles. The large overhang, for instance, precludes plants next to the building, so Miller has been creative with stonework and sculpture. In one place, he planted a Japanese maple slanting out from the structure, a ploy that may look odd to Western eyes but is an appropriate conceit for a Japanese garden.

In back, he topped a potentially hazardous three-foot-deep emergency storm drain area with granite slabs and shaped a formal rockscape. But what to do about all of Primestar's techno-paraphernalia: a two-story generator, a hulking transformer, and about a dozen air-conditioning units? In addition to more bamboo, Miller has planted Amur silvergrass (*Miscanthus floridulus*), described as growing to nine feet but pushing 12 when it produces its silvery flowerheads. There is only so much he can do to hide all these contraptions, so he's attempted to distract the eye with ground-level plantings and rocks that feature arresting color patterns. To one side of the Pagoda's back entrance he's laid flagstones around a Japanese maple, accompanied by an upright stone that looks remarkably—perhaps because we visited during Halloween week—like someone draped in a sheet poised to yell, "Boo!" Says Miller: "It makes the women who work here a little nervous when they leave after dark. I'm hoping they'll get used to it."

The Art of Compromise

Although Japanese and Zen gardening honor many religious and cultural traditions, there is plenty of room for innovation and even play. Sometimes the rules just have to be broken because there is no choice. For instance, purists might feel that large shade trees don't belong in a Japanese-style garden, yet it is the red oak canopy that gives Dans La Fôret its signature atmosphere.

"In most Japanese gardens, the rocks would be more rounded," says Miller, ges-

turing toward the stones in the dry pond at the Pagoda. "But these rocks were already here." Others would frown on the vertical rocks he uses to such effect. "They would call them tombstones." There is even a belief that evil will befall anyone who sets a flat rock upright.

Miller also professes a weakness for the deep, round indentations he calls "dynamite holes" in large rocks. "Most people would turn these to the back. But I think they just give viewers something else to think about."

Both of Miller's gardens contain elements that let visitors exercise their imaginations. One bit of whimsy is the pieces of slag that he has rescued from steel refinery refuse and spray-painted gold. An especially intriguing one hangs on a wisteria arbor at the Pagoda. Is it a monkey? A dragon?

At Dans la Fôret, it seems that everywhere you turn, there is reason to smile. Turtles play an important role in Japanese mythology and are often included symbolically in Zen gardens—the Millers have a whole family of stone turtles, as well as a triad of buffalo and a "deer" resting under an azalea branch. A weeping Norway spruce is in training to become Don Quixote's horse, Rocinante, "but Jack has had trouble getting the rump right," says Carmen.

Perhaps the oddest feature in the garden is an 80-pound rock that has been set into the trunk of a tree. But this is no laughing matter. Miller says that in the early '80s he began having nightmares in which giants were lobbing rocks at him. This went on for almost two years. In one, the giant missed and the rock stuck in a tree. He woke up in a sweat and described the dream to Carmen. "Why don't you do that in the garden?" she suggested. Says Jack: "I'm not a believer in the supernatural, but after I did it, I never had those dreams again."

You would think that a three-acre garden at home and another acre to care for would be sufficient work in your seventh decade. But this fall, Miller began designing another Japanese garden for a home in the main-line suburb of Wayne. "I'm going to continue to exercise my right to make money," he laughs. "Saturday I almost killed myself helping two other men move a rock by hand that weighed a ton. I'm working a lot harder than I did before I retired 20 years ago, and I know I'm in better shape." 🐾

Kathleen Fisher is a free-lance writer living in Alexandria, Virginia. Her most recent book, Herbal Remedies, was published in February by Rodale Press.

(Continued from page 13)

Recognizing Skin Cancer



BASAL CELL CARCINOMA

This usually appears as a small bump on the neck, scalp, hand, or trunk. Sometimes it is a reddish patch or irritated area that can itch or hurt. It can ooze and form a crust. Often these growths are smooth, with a rolled border and an indentation in the center. Sometimes they are shiny, translucent bumps that can be pink, red, or white.

The skin might appear taut. Basal cell cancers do not enlarge quickly and rarely spread to other areas of the body. However, they can damage the surrounding skin surfaces, resulting in disfigurement.



SQUAMOUS CELL CARCINOMA

The rim of the ear and lower lip are very common sites for this form of skin cancer. Look for a persistent, scaly red patch that has irregular borders and sometimes crusts or bleeds. Sometimes they appear elevated, with a central depression that occasionally bleeds and can grow rapidly. Squamous cell cancers can spread to other parts of the body but most often just cause local disfigurement.



MELANOMA

Melanoma-type skin cancer can appear suddenly and is often deadly if not caught early. It often starts in or near a mole or other dark spot on the skin and usually has an uneven border and has varied shades of brown, tan, or black. They are often larger than common moles.

sary to protect ourselves. Our greatest obligation, however, is to educate children at an early age. Several countries, notably Australia, Canada, and Scotland, have had public education programs about sun exposure underway for a number of years. Now the U.S. Environmental Protection Agency (EPA) has launched a nationwide educational program to teach children and their caregivers about the danger of overexposure to ultraviolet radiation (see box on right for where to locate more information).

Although older age is the time of onset of these skin cancers, it is unprotected exposure to sunlight in childhood that is the major environmental factor critical to determining risk for all three kinds of skin cancers at later ages. Protection and education should start in childhood so that for all of us, applying a sunscreen and putting on a hat before going outside becomes second nature. ♣

A board-certified anesthesiologist, as well as an avid gardener, Richard L. Bitner, M.D., lives in Lancaster County, Pennsylvania.

Resources

AMERICAN ACADEMY OF DERMATOLOGY, P.O. Box 4014, Schaumburg, IL 60168-4014. (847) 330-0230.

CANCER INFORMATION SERVICE, (800) 4 CANCER

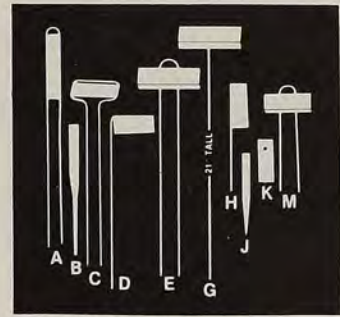
SKIN CANCER FOUNDATION, 245 Fifth Avenue Suite 1403 New York, NY 10016. (212) 725-5176

U. S. ENVIRONMENTAL PROTECTION AGENCY SUNWISE SCHOOL PROGRAM, 401 M Street S.W., Washington, D.C. 20460; or visit the program's Web site at www.epa.gov/sunwise/index.html

Sources

SUNGRUBBIES, 5519 Clairemont Mesa Boulevard, San Diego, CA 92117. (888) 970-1600. sungrubbies.home.mindspring.com

SUN PRECAUTIONS, 2815 Wetmore Avenue, Everett, WA 98201. (800) 882-7860. www.solumbra.com



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THE COLOR ENCYCLOPEDIA OF ORNAMENTAL GRASSES: SEDGES, RUSHES, RESTIOS, CAT-TAILS, AND SELECTED BAMBOOS.

Rick Darke. Timber Press, Portland, Oregon, 1999. 325 pages. 8½×11". Publisher's price, hardcover: \$49.95. AHS price: \$35.

TIM 160

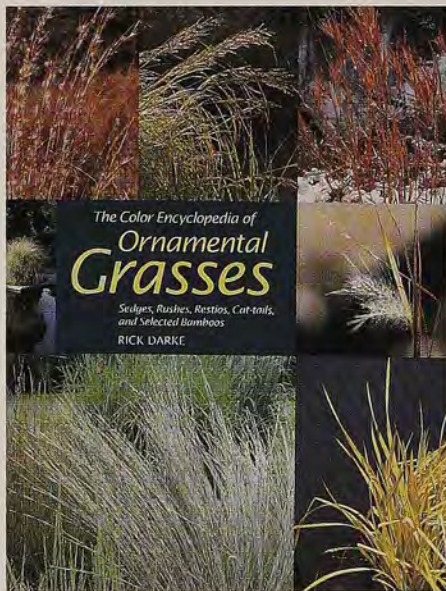
The use of ornamental grasses in American landscaping has trailed that of more traditional plants. Now the growing popularity of native plant landscaping and xeriscaping, fueled by increasing water shortages and a more widespread environmental ethic, demands an even more inclusive approach to ornamental grass books. This book—the first major treatment of grasses since John Greenlee's 1992 *The Encyclopedia of Ornamental Grasses*—succeeds in demonstrating the beauty and diversity of these plants.

Rich color photographs and evocative prose effectively illustrate Darke's understanding of grasses and their uses. He explains how lighting and grasses work together throughout the seasons and introduces the important concepts of landscaping with grasses, including form, texture, color, and contrast. Selection practices and what to expect or look for when shopping for ornamental grasses are also covered.

Darke provides the "how-to's" of grass propagation, although his timetable for divisions could be expanded for those who live in milder climates. Grass diseases are

also addressed—the first treatment of the subject in public literature—and the issues of maintenance and invasiveness are thoughtfully discussed.

The extensive individual grass entries are outstanding. Clean, sharp photographs—most by the author—clearly demonstrate the desirable characteristics of different grasses. A few regional improvements



would be helpful to cover variations in structures or color performance within a species, but this is a minor shortcoming considering the depth of coverage of such major genera as *Miscanthus*, *Pennisetum*, and *Festuca*. A wide range of other ornamental grasses and similar plants, such as sedges and restios, are covered as well. Rather than focusing on just the most attractive and well-known plants, Darke also includes a few species that demand an "acquired taste."

I was disappointed, however, in the chapter "Learning from Grasses in Native Habitats." The title raises hopes for important progress in the literature, but, unfortunately, the chapter doesn't live up to its potential. Darke fails to address two important questions: "Why are grasses in different spots within a natural habitat?" and "How can a gardener translate this into positioning?" Darke does explain, with the help of richly detailed photographs, that you can plant a few non-grasses with grasses or use a few specimen grasses among other plants for an effective landscape design. However, giving a general landscape picture—without detailing why particular grasses grow where they do—falls short of fully informing the reader.

Darke discusses grass structures to help the reader with field identification and de-

scribes, in considerable detail, the rules for scientific nomenclature. Both chapters are accurate, but the technical nature of the nomenclature chapter can lose the reader's interest and probably would have been more effective as an appendix.

These reservations aside, *The Color Encyclopedia of Ornamental Grasses* is a strong step toward bringing ornamental grasses to the public eye and removing fears about their culture. I predict a strong surge in ornamental grass landscaping, due in large part to this book. It will no doubt be used frequently as a reference by both professionals and backyard gardeners for many years.

—John Snowden

John Snowden is the owner of Bluestem Nursery, a wholesale nursery in Arlington, Texas, specializing in ornamental grasses.

GROWING PERENNIALS IN COLD CLIMATES.

Mike Heger and John Whitman. Contemporary Books, Lincolnwood, Illinois, 1998. 448 pages. 8½×11". Publisher's price, hardcover: \$49.95. AHS price: \$35.

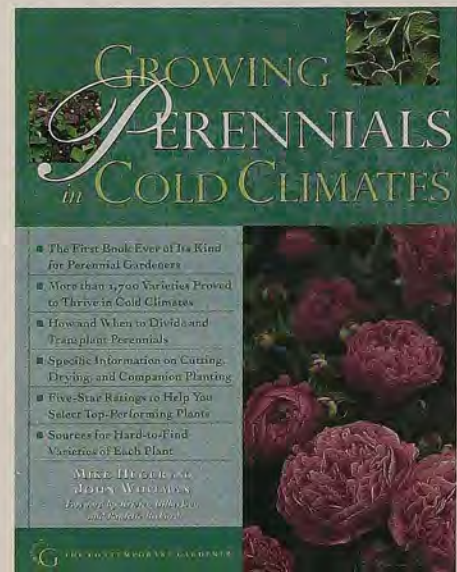
CON 002

GROWING ROSES IN COLD CLIMATES.

Jerry Olson and John Whitman. Contemporary Books, Lincolnwood, Illinois, 1998. 272 pages. 8½×11". Publisher's price, hardcover: \$39.95. AHS price: \$28.

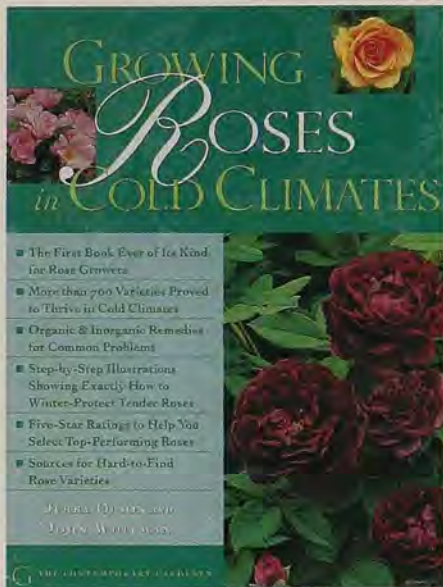
CON 001

These excellent books have been a long time coming. For more than 15 years I've gardened in far northern Michigan's Zone 4, and it has often frustrated me that so few garden writers understand my climate. These authors do, and they share their expertise and experience in a clear, us-



able way, enhanced by good color photos of selected plants.

Growing Perennials in Cold Climates covers 50 genera, including more than 1,700 species or cultivars, each hardy to -20 degrees Fahrenheit or below. For each genus the authors describe the plants and explain cultural needs clearly and concisely. These descriptions include everything you expect from a good plant encyclopedia, but with realistic attention to our special climate. Quick reference charts list the differences between species and cultivars in the genus in question.



Growing Roses in Cold Climates covers 700 species and named cultivars of roses. The descriptions of roses and how they should be treated in a severely cold climate are excellent. As a rose lover, I'm delighted with the level of detail provided for planting and care of each kind of rose. I am a little disappointed, though, by the large amount of space devoted to roses that must be given the extreme winter protection of tipping and burying the plant each year. Still, many roses are listed that require little or no protection beyond good cultural practice—and those instructions are simple and complete.

Particularly welcome in both books are realistic hardiness ratings given by temperature rather than by zone; cultural information for both organic and non-organic gardeners; planting instructions for both bare-root and potted plants; practical propagation directions; a good glossary; and a lesson on how to order from a catalog. *Perennials* also includes information on plant longevity and how long you can expect the plant to bloom from seed.

Both books use a five-star rating system for plants. In *Roses*, one to five stars are awarded based on many factors, including hardiness. In *Perennials*, however, plants ei-

ther get five stars or none, which is odd, and one of the considerations is consumer cost. Because prices fluctuate over time and have nothing to do with garden performance, I feel that this is an inappropriate consideration and greatly weakens the overall rating system.

In both books, many sources are listed for each group of plants. Canadian readers—and there will be many—will be disappointed that so few Canadian sources are listed in *Perennials*, though *Roses* lists many. Source listings in both books take up far more room than necessary. In the next editions—books of this caliber will surely run to more than one edition—it would be effective and less repetitious to have master source lists in the back of the books and only a brief list of names in the text. This would leave more room for plant descriptions.

But these are minor quibbles. While *Growing Perennials in Cold Climates* and *Growing Roses in Cold Climates* are excellent references for beginning and intermediate gardeners, they have much to offer more experienced gardeners as well. I'm very glad to own them and recommend them highly.

—Nancy McDonald

A free-lance writer, Nancy McDonald experiments with cold-hardy plants in her Grand Marais, Michigan, cottage garden.

THE GARDENER'S ATLAS: THE ORIGINS, DISCOVERY, AND CULTIVATION OF THE MOST POPULAR GARDEN PLANTS.

John Grimshaw. Firefly Books, Buffalo, New York, 1998. 224 pages. 8½×11". Publisher's price, hardcover: \$29.95. AHS price: \$21.

FIRO07

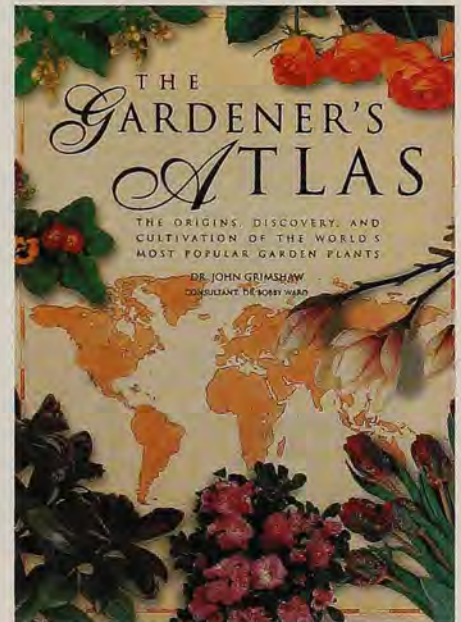
If you've ever wondered about the history of the elusive Joseph Rock peony (*Paeonia rockii*), then you'll want to read John Grimshaw's *The Gardener's Atlas*. Grimshaw, a plant hunter and lecturer, surveys more than 20 plant families, covering the history, cultivation, collection, characteristics, and hybridization of hundreds of species along the way.

Beginning with the early history of cultivated gardens in the Babylonian empire, Egypt, Persia, and the Far East, the book then quickly moves on to discuss early plant collectors and provides a brief description of plant families native to different continents.

The main section of *The Gardener's Atlas* is organized by major plant groups, including the rose, daisy, orchid, magnolia, and heather families. Grimshaw explains the origin of each family, how plants got

their names, and, with the aid of excellent, easy-to-read maps, tells us how the plants ended up in foreign lands. Sometimes the reasons for the spread of a plant are not what we would expect. During the reign of Caesar Augustus (43 B.C.–14 A.D.), for example, the Romans discovered that the Spanish flavored their wine by immersing clove-scented carnations (*Dianthus caryophyllus*) in it. "As the dunking habit spread," notes Grimshaw, "so did the plant, and it was soon cultivated all over Europe."

Interspersed throughout the book are short profiles of famous plant hunters or botanists, such as America's John Bartram, (1699–1777), a Quaker farmer from Pennsylvania who introduced at least 200 native American species to Europe, and England's Reginald Farrer (1880–1920), known as "the rock garden wizard," who is credited with the development of the modern rock garden. Grimshaw also includes short vignettes of famous gardens—including Sissinghurst, Versailles, and the Huntington Botanical Gardens—and classical garden styles, ranging from Japanese



gardens to plantations of the American South. The book is crammed with gorgeous photographs of plants and gardens, as well as beautiful botanical illustrations.

Grimshaw's work is, of course, subjective in its selection of plant families and specific plants, and my only complaint is that the book is not more comprehensive. It appears Grimshaw would have plenty to write about in a second or even third volume.

The Gardener's Atlas is perfect for any gardener who likes history, any historian who likes to garden, or anyone else who simply enjoys reading fascinating stories about the intriguing people and plants that



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are part of our horticultural heritage.

—Jane Berger

A landscape designer, Jane Berger is a partner in the Garden Design Group in Alexandria, Virginia.

PLANT INFORMATION ONLINE.

University of Minnesota Libraries, St. Paul, Minnesota. Annual subscription price: individual: \$39.95; institutional/commercial: \$59.95.

If you purchase a lot of plants through mail-order catalogs, you may already be familiar with *The Andersen Horticultural Library's Source List of Plants & Seeds*, a published index that is updated every three years. Following publication of the 1996 edition, however, the time-sensitive source list has gone high-tech under the name Plant Information Online, located at <http://plantinfo.umn.edu>. This online service provides fully updated sources for more than 60,000 plants, listings for more than 1,000 North American seed and plant providers, and more than 150,000 citations of botanical illustrations and photographs from 150 current horticultural journals and books.

The site is simple to navigate, and finding sources for your favorite plants is a snap. Under "Sources for Plants & Seeds," you can search for plants by scientific or common name. You may be as vague or as detailed as you wish, but—as with any search engine—if you are *too* vague, you'll have to wade through a long list of unrelated "hits." A list of plants matching your search criteria is retrieved very quickly, and with a simple click of the mouse button you can pull up a list of retail and wholesale mail-order nurseries that carry that plant. The nursery list includes company names, catalog prices, and the city, state, and country (United States or Canada) of

the nursery. Click again on any nursery in the list and you'll be given the full address, phone and fax numbers, e-mail addresses, and a direct link to nursery Web sites—if they have them. And if you connect to one of these Web sites, simply hit the back button on your browser to return to Plant Information Online; you won't have to log back on.

Don't have a particular plant in mind? Go to "Information on North American Nurseries" to search for nurseries by plant specialty. A pull-down box allows you to select from broad categories, such as nurseries specializing in rock garden plants, houseplants, evergreens, and water plants, or from nurseries that deal with specific plants, including peonies, roses, orchids, clematis, and ferns. You can also search for nurseries by name or by city, state, country, and by whether a firm is retail or wholesale. Finding a mail-order nursery has never been easier.

Another nice feature of this service is the Members Mailbox, where you can e-mail questions to the Web site's editors. Questions and answers deemed to be of general interest to subscribers are posted.

This is an excellent resource for anyone who gardens by mail. Updated daily, the site is the most comprehensive resource for plants available by mail-order. So if you've ever spent hours scouring the pages of 25 catalogs trying to remember where you saw that 'Tutti Frutti' rhododendron advertised, subscribe to Plant Information Online and spend less time with your head in a catalog and more time with your hands in the garden. If you prefer to use the printed version of *The Andersen Horticultural Library's Source List*, don't despair. The next edition is tentatively scheduled for publication in the year 2000. 🐾

—Christina M. Scott

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



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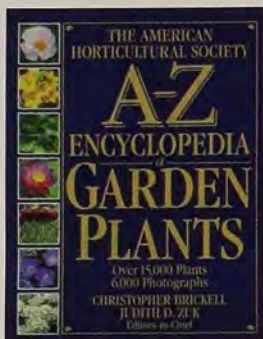
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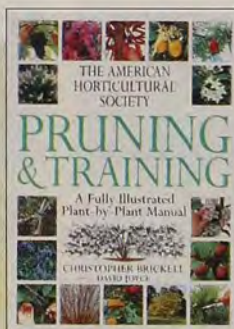
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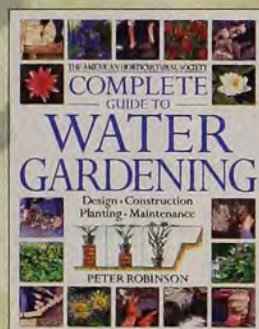
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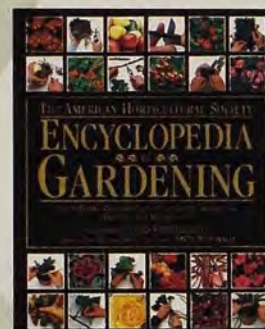
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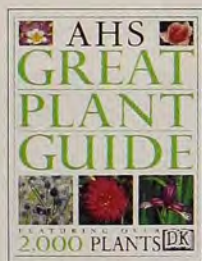
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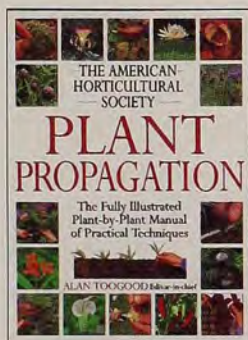
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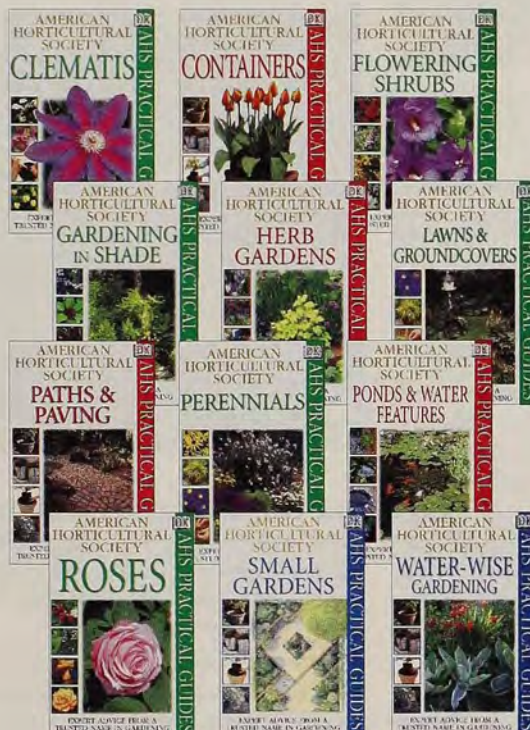
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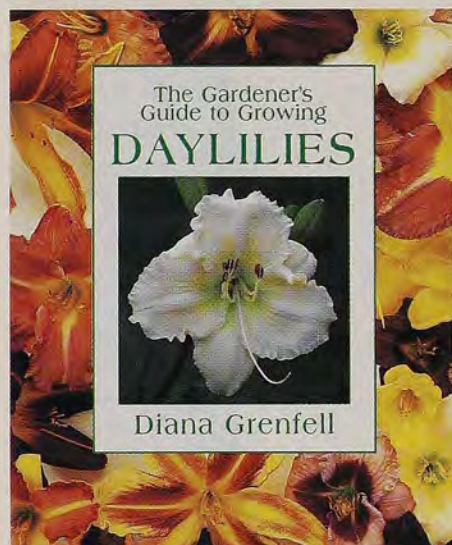
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PLANTS



THE GARDENER'S GUIDE TO GROWING DAYLILIES.

Diana Grenfell. Timber Press, Portland, Oregon, 1998. 160 pages. Publisher's price, hardcover: \$29.95. AHS price: \$22. **TIM 158**

A practical reference for one of the most popular flowering plants in the garden. The author, a leading authority on the genus *Hemerocallis*, provides a wealth of information on cultivation, propagation, and garden uses, together with encyclopedic entries describing hundreds of cultivars. Information on history, botany, and breeding of daylilies gives the gardener an idea of how a genus of only 30 species now includes more than 40,000 different selections. Contains 74 color photographs.

CAMPANULAS: A GARDENER'S GUIDE.

Peter Lewis and Margaret Lynch. Timber Press, Portland, Oregon, 1998. 176 pages.

Publisher's price, hardcover: \$34.95. AHS price: \$25. **TIM 157**

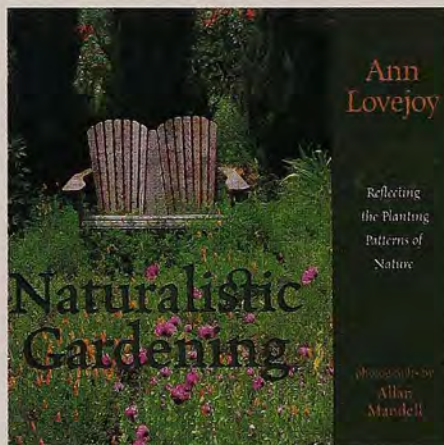
This revised edition of Lewis and Lynch's 1992 guide to these revered garden plants and wildflowers is updated to include the latest hybrids, cultivars, and name changes. As in the original, the authors provide anecdotes about the history and discovery of various bellflowers, as well as tips on cultivation. Hundreds of encyclopedic entries reveal the fantastic variety of sizes, shapes, and colors available to the gardener. Contains 75 color photographs and 20 line drawings.

DESIGN

NATURALISTIC GARDENING: REFLECTING THE PLANTING PATTERNS OF NATURE.

Ann Lovejoy. Sasquatch Books, Seattle, 1998. 160 pages. Publisher's price, softcover: \$21.95. AHS price: \$18. **SAS 009**

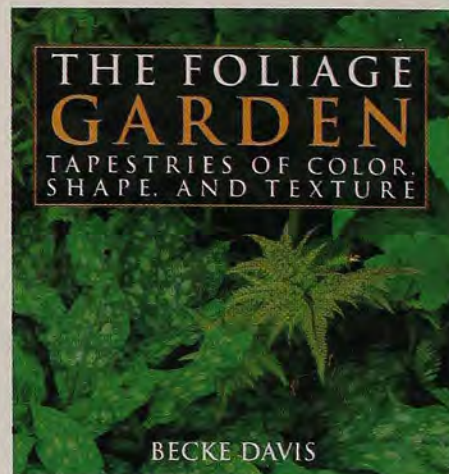
Award-winning garden writer Ann Lovejoy looks to nature for inspiring garden designs in this colorful new book, graced with beautiful photography by Allan Mandell. Lovejoy explains naturalistic principles in detail and describes how they can be applied to any garden, whether large or small, urban or rural. Individual plant portraits are sprinkled through the text, providing a closer look at some of the more intriguing plants in a naturalistic setting. Numerous planting schemes that provide color and foliage year round are also illustrated. Contains 100 color photographs.



THE FOLIAGE GARDEN: TAPESTRIES OF COLOR, SHAPE, AND TEXTURE.

Becke Davis. Friedman/Fairfax, New York, 1998. 144 pages. Publisher's price, hardcover: \$27.50. AHS price: \$20. **FF 005**

For those who want more out of their gardens than showy flowers that last only a fraction of the gardening season, this book shows how to create a garden full of plants



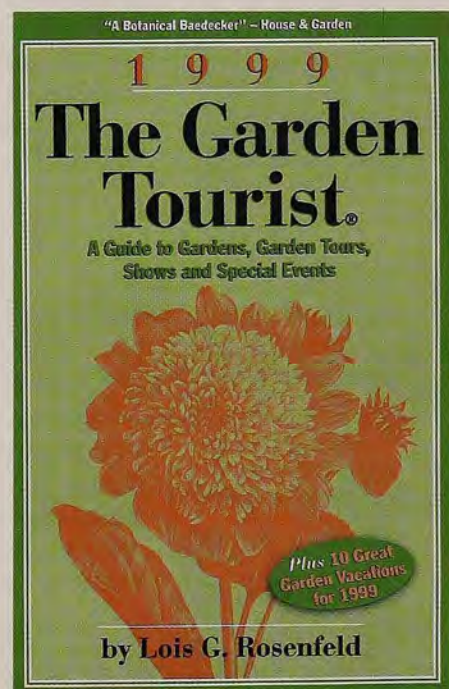
with beautiful leaves. Helpful sidebars focus on topics of special interest, such as ornamental grasses, bamboos, fragrant plants, and plants with ornamental bark and berries. The book also offers a variety of easy-to-follow garden designs that you can integrate into your own landscape. A resource guide lists organizations, mail-order nurseries, and books for further reading to help you create the perfect foliage garden. Contains more than 100 color photographs.

TRAVEL

THE GARDEN TOURIST 1999.

Lois G. Rosenfeld. Garden Tourist Press, New York, 1998. 264 pages. Publisher's price, softcover: \$18.90. AHS price: \$18.90. **GTP 001**

For eight years, *The Garden Tourist* has directed readers to North America's best



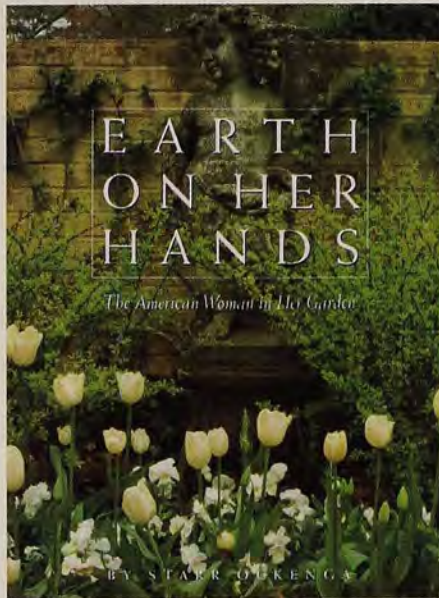
garden events. As with previous volumes, the 1999 edition lists nearly 1,000 "best-of-the-best" garden events in 49 states and nine Canadian provinces. This new edition has expanded with the addition of a "Guide to Gardens," which provides complete information on more than 440 gardens in the United States and Canada. Another new feature is 10 short articles on what to see and do in selected great North American garden spots. There is also a section on selected garden tours and horticultural events around the world, including Europe, Asia, and South America. An indispensable guide for the traveling gardener.

MISCELLANEOUS

TOOLS OF THE EARTH: THE PRACTICE AND PLEASURE OF GARDENING.

Jeff Taylor. Chronicle Books, San Francisco, 1998. 174 pages. Publisher's price, hardcover: \$25. AHS price: \$18. **CHR 013**

Each of the 24 essays in this delightful book highlights one commonly used garden tool—from the shovel to the harvest basket—and explores its meaning, feel, history, and use. In a witty and often moving style, Taylor explores the subtle lessons about life, patience, and practicality that working a garden can teach. A great book for anyone who has ever felt a special bond with their favorite garden trowel or watering can, or for anyone who simply loves spending time in the garden. Illustrated with color photographs by Rich Iwasaki.



EARTH ON HER HANDS: THE AMERICAN WOMAN IN HER GARDEN.

Starr Ockenga. Clarkson N. Potter, Inc., New York, 1998. 240 pages. Publisher's price, hardcover: \$55. AHS price: \$40. **POT 002**

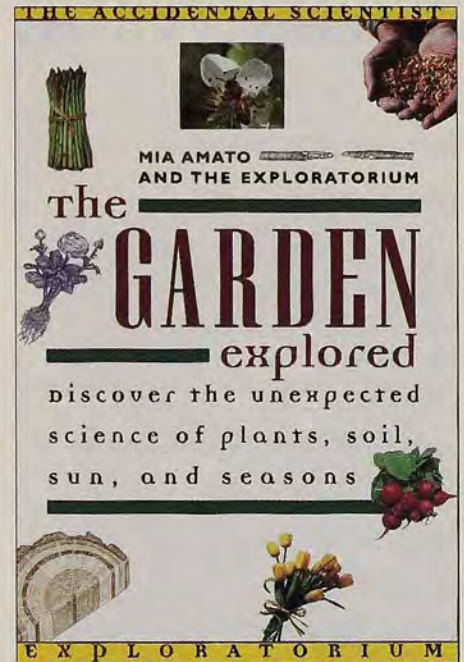
Writer and photographer Starr Ockenga examines the private gardens of American women who, she says, are the backbone of America's gardening renaissance. Concentrating on the gardening experiences of 18 fascinating women, the book becomes, as Ockenga claims, "a remarkable resource of a half century of everyday gardening across America." Each profile is accompanied by a complete garden plan and comprehensive plant lists and tips on plant culture are given for many of the featured gardens. Large-format color photographs grace

nearly every page of this delightful book.

THE GARDEN EXPLORED.

Mia Amato. Henry Holt and Company, New York, 1997. 60 pages. Publisher's price, softcover: \$12.95. AHS price: \$11. **HOL 020**

This book is not another how-to gardening reference; instead, it explains why some things work in the garden while others don't. Through written explanations and dozens of hands-on projects, you'll learn the answers to such questions as "Why do plants respond better to morning waterings?" and "Why prune at a certain time of year?" A great book for gardeners who want to learn about what's going on beneath the garden surface and within the plants they grow.



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regional happenings

a look at what's happening around the nation

MID-ATLANTIC

MAR. 7-14 ■ Philadelphia Flower Show. Pennsylvania Convention Center, Philadelphia, Pennsylvania. (215) 988-8899.

MAR. 18 ■ Tropical and Temperate Bulbs of Summer. Lecture by Brent Heath. Friends of River Farm. River Farm, Alexandria, Virginia. (703) 768-5700 ext 10.

MAR. 19-21 ■ Richmond Home and Garden Show. State Fairgrounds on Strawberry Hill, Richmond, Virginia. (804) 288-5653.

MAR. 20 ■ Slide Show. Potomac Valley Chapter of the North American Rock Garden Society. River Farm, Alexandria, Virginia. (703) 768-5700 ext 10.

MAR. 27 ■ Native Plant Symposium. U.S. National Arboretum, Washington, D.C. (202) 245-4521.

APR. 10 ■ Flower Design Short Course for the Amateur. Class with Thomas Powell. Friends of River Farm. National Center for Floral Studies, Alexandria, Virginia. (703) 768-5700 ext 10.

APR. 15-17 ■ River Farm Garden Festival and Plant Sale. River Farm, Alexandria, Virginia. (703) 768-5700 ext 10.

APR. 17-24 ■ Historic Garden Week in Virginia. The Garden Club of Virginia.

Richmond, Virginia. (804) 644-7776.

APR. 23-25 ■ Northeast Pennsylvania Flower Show. 109th Field Artillery Armory, Wilkes-Barre, Pennsylvania. (717) 457-8301.

APR. 24 ■ Herbs Galore. Festival. Maymont Foundation. Maymont Herb Garden, Richmond, Virginia. (804) 358-7166.

APR. 25 & 26 ■ House and Garden Tour of Historic Berkeley and Jefferson Counties. Shenandoah-Potomac Garden Council. Martinsburg, West Virginia. (800) 848-8687.

MAY 1 ■ Herb Fair and Sale. Goose Creek Herb Guild. Oatlands Plantation, Leesburg, Virginia. (703) 777-3174.

MAY 7-9 ■ 16th Annual Wildflower Symposium. The Wintergreen Nature Foundation. Wintergreen, Virginia. (804) 325-8172.

MAY 12 ■ The Capitol: Yesterday,

Today, and Tomorrow. Lecture by J. Matthews Evans, Senior Landscape Architect and Horticulturist of the U. S. Capitol. Friends of River Farm. River Farm, Alexandria, Virginia. (703) 768-5700 ext. 10.

NORTH CENTRAL

MAR. 6-APR. 18 ■ Foremost's Butterflies Are Blooming. Butterfly garden exhibit. Frederik Meijer Gardens, Grand Rapids, Michigan. (877) 975-3171.

MAR. 13-21 ■ Chicago Flower and Garden Show. Navy Pier, Chicago, Illinois. (312) 321-0077.

MAR. 13-21 ■ Indiana Flower and Patio Show. Indiana State Fairgrounds, Indianapolis, Indiana. (317) 576-9933.

MAR. 13-28 ■ Spring Flower Fest. Olbrich Botanical Gardens, Madison, Wisconsin. (608) 246-4550.

MAR. 18 & 19 ■ Plant Exploration: Protocol for the Present, Concerns for

Celebrating American Garden Design

Held March 28 through 31, the 53rd Colonial Williamsburg Garden Symposium, co-sponsored by AHS, will celebrate the heritage of American garden design with forums, clinics, and hands-on workshops led by garden design experts and horticultural leaders. Well-known speakers, including Rick Darke and Darrel Morrison will outline European influences on the evolution of landscape design in America, explore the meaning and value of contemporary gardening, and provide a look ahead to garden design in the 21st century. Garden walking tours and design workshops will focus on perennials, herbs, and container gardens. Optional tours of private gardens will also be available.

The registration fee of \$250 includes conference presentations, daily refreshments, closing reception dinner, and free admission to all Colonial Williamsburg museums and exhibition buildings. AHS members receive a 10 percent discount on registration. For more information, contact the Colonial Williamsburg conference registrar at (800) 603-0948, or write to: Registrar, Garden Symposium, Williamsburg Institute, Colonial Williamsburg Foundation, P. O. Box 1776, Williamsburg, VA 23187-1776.

—Mark C. Mollan, *Communications Assistant*

Southern Gardening School and California Show

AHS is co-sponsoring two other notable events this spring: the *Southern Living* Garden School and the Southern California Spring Garden Show. The Garden School series of educational shows will take place from February through May at many of the South's premier botanical gardens and destinations. Each show will feature the latest in garden design and techniques from experts. The series begins at the Disney Institute in Orlando, Florida, on February 27. Call AHS at (800) 777-7931 ext. 10 for a destination near you.

On the West coast, AHS joins with the Southern California Garden Alliance in hosting the 10th annual Southern California Spring Garden Show in Costa Mesa, California, on April 15 through 18. The show will feature lavish floral arrangements, informative seminars, and a variety of vendors. Call (714) 435-2160 for details.

the Future. Conference. Chicago Botanic Garden, Glencoe, Illinois. (847) 835-8261.

MAR. 27 ■ Creating a Natural Landscape. Seminar. Muskegon Community College, Muskegon, Michigan. (616) 788-3380.

APR. 10 ■ The Art of Gardening Celebration. Seminar. Chadwick Arboretum, Columbus, Ohio. (614) 688-3479.

APR. 21-APR. 25 ■ Cincinnati Flower Show. Ault Park, Cincinnati, Ohio. (800) 670-6808.

APR. 30-MAY 2 ■ Orchard in Bloom Garden Show. Holiday Park, Indianapolis, Indiana. (317) 290-7673.

NORTHEAST

MAR. 11-14 ■ Rochester Flower and Garden Show. The Dome Center, Henrietta, New York. (716) 265-9018.

APR. 17 ■ If Only We Knew: Landscape Preservation in Context, 1890-1950. Symposium. Wave Hill, Bronx, New York. (718) 549-3200 ext. 204.

APR. 22 ■ Identification of Plants Using Taxonomic Keys. Workshop. University of Rhode Island, Kingston, Rhode Island. (401) 783-5895.

APR. 24 & 25 ■ Nantucket Daffodil Festival. Nantucket Garden Club. Nantucket, Massachusetts. (508) 228-4133.

MAY 7-9 ■ New, Classic and Extraordinary Plants for Urban Gardeners. The New York Botanical Garden, Bronx, New York. (718) 817-8137.

MAY 14-16 ■ Plant Sale and Herb Fair. Berkshire Botanical Garden, Stockbridge, Massachusetts. (413) 298-3926.

NORTHWEST

MAR. 25-28 ■ Boise Flower and Garden Show. Boise Center on the Grove, Boise, Idaho. (888) 888-7631.

MAR. 27 & 28 ■ Oregon Camellia Show. Japanese Garden Society of Oregon. Portland, Oregon. (503) 223-4070.

APR. 17 & 18 ■ Hood River Valley Blossom Festival. Hood River Valley, Hood River, Oregon. (541) 386-2000.

Medieval Landscape Conference and Garden Fair

During the second weekend in April, an interdisciplinary medieval landscape conference and garden fair sponsored by the Pennsylvania State University's Center for Medieval Studies will bring gardens of the Middle Ages to life through scholarly discussion and garden re-creations.

On Friday and Saturday, April 9 and 10, the conference, titled "Scenes and Seasons: The Medieval Landscape," will bring together scholars from the fields of religion, engineering, history, and landscape architecture to explore the concept of the garden for nobles and serfs, and the roots of our present views about nature. The \$25 admission fee for the two-day conference, held at the Nittany Lion Inn in State College, Pennsylvania, is waived for all teachers and students with identification.

The admission-free Medieval Garden Fair, held on the Pennsylvania State University campus, will showcase functioning medieval-style physic, kitchen, and ornamental gardens planted with herbs and flowers typical to the period. For more information on these events call the Center for Medieval Studies at (814) 863-7484.

Tropical Exhibit Opens in Denver

Last November, Boettcher Memorial Conservatory opened a new living exhibit "Tropical Botanica"—a look at Colorado's prehistoric landscape. Visitors to the 12,800-square-foot glass and concrete structure at Denver Botanic Gardens (DBG) are awed by the centerpiece of the new exhibit, a 40-foot-tall artificial banyan tree, which conceals a new elevator, supports two new viewing decks, and hosts scores of living epiphytes.

With the help of state-of-the-art weather simulation devices and hundreds of tropical plants from around the world, inhabitants of the semi-arid climate of contemporary Denver can now get a glimpse of the tropical climate Colorado enjoyed at the beginning of the Cenozoic era, some 65 million years ago.

Thematic tours of the tropical exhibit offer insights into today's diminishing tropical rainforest. For more information call the DBG at (303) 370-8220. —M.C.M.



Denver Botanic Gardens' 40-foot-tall artificial banyan tree.

MAY 8 ■ Native Plant Sale. Central Puget Sound Chapter Washington Native Plant Society. Bellevue Botanical Garden, Bellevue, Washington. (206) 634-1209.

SOUTH CENTRAL

MAR. 6-APR. 11 ■ Dallas Blooms: Birds In Paradise. Flower festival. Dallas Arboretum, Dallas, Texas. (214) 327-8263.

MAR. 19 & 20 ■ Plant Sale. Mercer Arboretum and Botanic Gardens, Humble, Texas. (281) 443-8731.

MAR. 27 & 28 ■ Gardening Festival and Plant Sale. Lady Bird Johnson Wildflower Center, Austin, Texas. (512) 292-4200.

APR. 27 & 28 ■ Florescence: The Arts In Bloom. Flower show. Museum of Fine Arts, Houston, Texas. (713) 520-7111.

MAY 12 ■ Harvesting and Drying Herbs for the Home. Workshop. The McAhan Herb Gardens at Festival Hill, Round Top, Texas. (409) 249-5283.

SOUTHEAST

MAR. 18-21 ■ Student Career Days and Horticultural Competition. Associated Landscape Contractors of America. Lexington, Kentucky. (800) 395-2522.

MAR. 25-28 ■ Festival of Flowers. Flower and garden show. Spring Hill College, Mobile, Alabama (334) 639-2050.

Secret Gardens of the East Bay

Rain or shine, 10 private gardens in the San Francisco Bay area will open their gates on Sunday, April 25, to benefit scholarship and academic programs at Park Day School in nearby Oakland. Highlights of this popular tour include an English-style garden, an extensive garden forest with more than 800 conifers, a Zen temple garden, and a garden blending plants and modern art. Doctors and designers will be on hand to answer questions at each stop in the tour.

Tickets—\$35 per person—include a tour map and detailed descriptions of each garden. Lunch boxes are available by reservation. For more information, call Park Day School Garden Tour at (510) 653-6250.

—M.C.M.



An English-style garden in Piedmont.

APR. 10 & 11 ■ Spring Orchid Show and Sale. Jacksonville Orchid Society's Garden Center, Jacksonville, Florida. (904) 275-2826.

APR. 10 & 11 and 17 & 18 ■ Spring Wildflower Festival and Native Plant Sale. Reflection Riding Arboretum & Botanical Garden, Chattanooga, Tennessee. (423) 821-9582.

APR. 16–MAY 30 ■ Epcot International Flower and Garden Festival. Includes lectures series co-sponsored by AHS as part of the Great American Gardener Lecture series. Walt Disney World, Lake Buena Vista, Florida. (407) WDISNEY.

APR. 17 ■ Azalea and Rhododendron Show. Smyrna Civic Center, Smyrna, Georgia. (404) 634-1019.

APR. 24 ■ Herb Education Day. Seminars. Chattahoochee Unit of The Herb Society of America. Atlanta Botanical Garden, Atlanta, Georgia. (404) 876-5859.

SOUTHWEST

MAR. 13–MAY 31 ■ Botanical Art Show. Denver Botanic Gardens, Denver, Colorado. (303) 370-8021.

APR. 10 & 11 ■ Home Garden Tour. Tucson Botanical Gardens, Tucson, Arizona. (520) 326-9686.

APR. 24 ■ Garden Fair. Albuquerque Garden Clubs. Albuquerque Garden

Center, Albuquerque, New Mexico. (505) 296-6020.

WEST COAST

MAR. 18–21 ■ San Francisco Flower and Garden Show. Cow Palace, San Francisco, California. (800) 829-9751.

MAR. 19–21 ■ Orchid Oasis: Orchid Show and Plant Sale. San Diego Orchid Society. San Diego, California. (619) 444-8839.

MAR. 19–APR. 18 ■ Tulipmania: Spring Festival of Flowers. Descanso Gardens, La Cañada Flintridge, California. (818) 952-4401.

MAR. 27 & 28 ■ Bonsai Show. Huntington Botanical Garden, San Marino, California. (626) 405-2141.

APR. 16 & 17 ■ Southwestern Botanical Systems Symposium: The Evolution of Ecological Adaptation. Rancho Santa Ana, Claremont, California. (909) 625-8767 ext. 251.

MAY 8 & 9 ■ Orchid Festival. Huntington Botanical Garden, San Marino, California. (626) 405-2141.

CANADA

APR. 22–MAY 3 ■ World Orchid Conference. Vancouver, British Columbia. (604) 681-5226. Same-day registration available every day of conference.

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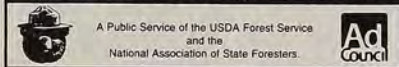
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hardiness and heat zones

For your convenience, most of the cultivated plants featured in this 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.

A-C

- Abies lasiocarpa* USDA 5-6, AHS 6-5
- Abronia fragrans* 6-9, 12-5
- Achillea ageratifolia* 3-9, 9-1
- A. millefolium* var. *occidentalis* 5-7, 7-4
- Agastache cana* 5-11, 12-5
- A. rupestris* 7-11, 12-7
- Anemone quinquefolia* 4-8, 8-1
- Artemisia filifolia* 5-8, 8-3
- Berlandiera lyrata* 7-9, 9-7
- Calycanthus floridus* 4-9, 9-1
- Calylophus serrulatus* 3-8, 8-1
- Campanula rotundifolia* 'Olympica' 5-8, 8-4
- Cedrus libani* 6-9, 9-3
- Cephalanthus occidentalis* 5-10, 12-3
- Cerastium tomentosum* 3-7, 7-1
- Cercocarpus ledifolius* 6-9, 9-6
- Chionanthus virginicus* 4-9, 9-3
- Cladrastis kentukea* 4-8, 9-3
- Clethra alnifolia* 4-9, 9-1
- Comptonia peregrina* 2-8, 8-3
- Cyrilla racemiflora* 6-9, 9-5

D-G

- Datura innoxia* 11, 12-4
- Decumaria barbara* 6-9, 9-6
- Delosperma cooperi* 8-10, 10-8
- Dennstaedtia punctilobula* 3-8, 8-1
- Dianthus amurensis* 3-8, 8-1
- D. arenarius* 3-9, 9-1
- D. barbatus* 5-8, 9-1
- D. carthusianorum* 5-9, 9-1
- D. caryophyllus* 7-10, 10-7
- D. chinensis* 7-10, 10-6
- D. cruentus* 5-9, 9-3
- D. deltoides* 3-11, 10-1
- D. giganteus* 4-9, 9-1
- D. gratianopolitanus* 4-9, 9-1
- D. knappii* 3-9, 9-1
- D. petraeus* 4-8, 8-1
- D. plumarius* 4-9, 9-1
- D. superbus* 3-8, 8-1
- D. sylvestris* 5-9, 9-4

- Dulichium arundinaceum* 6-11, 12-6
- Encelia farinosa* 7-9, 9-7
- E. frutescens* 7-9, 9-7
- Fothergilla major* 'Mt. Airy' 5-9, 9-3
- Fraxinus cuspidata* 5-8, 8-4
- Gaultheria procumbens* 3-8, 8-1
- Gazania linearis* 'Colorado Gold' 8-10, 10-1
- Gelsemium sempervirens* 7-9, 9-7
- Geranium maculatum* 4-8, 8-1

H-M

- Holodiscus dumosus* 6-9, 9-5
- Hydrangea arborescens* 'Annabelle' 3-9, 9-1
- Impatiens pallida* 11, 12-1
- Itea virginica* 5-9, 9-5
- Juniperus monosperma* 6-9, 9-3
- J. procumbens* 'Nana' 5-9, 9-1
- J. scopulorum* 3-7, 7-1
- Larrea tridentata* 8-11, 12-8
- Leonotis leonurus* 10-12, 12-1
- Leucothoe fontanesiana* 5-8, 8-3
- Lindera benzoin* 4-9, 8-1
- Magnolia virginiana* 6-9, 9-6
- Mahonia repens* 5-8, 8-3
- Malus angustifolia* 5-8, 8-1
- M. ioensis* 5-8, 8-1
- Mirabilis longiflora* 9-11, 12-1
- Miscanthus floridulus* 6-9, 9-3
- Monarda didyma* 4-9, 9-1
- M. fistulosa* 3-9, 9-1

N-R

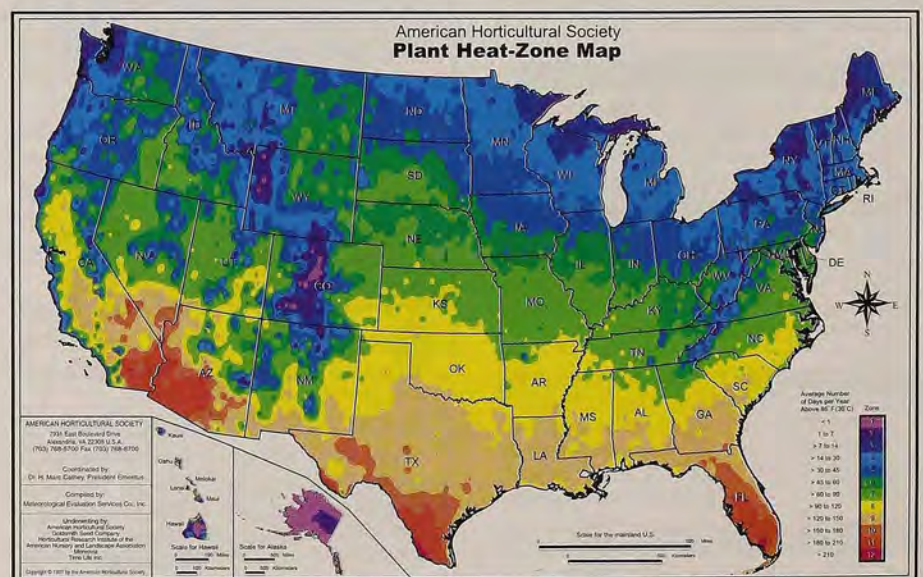
- Nelumbo nucifera* 4-11, 12-3
- Osteospermum ecklonis* 'Lavender Mist' 10-11, 6-1
- Oxydendrum arboreum* 5-9, 9-4
- Parkinsonia florida* 6-9, 9-6
- Penstemon barbatus* 'Elfin Pink' 4-8, 8-1
- P. palmeri* 3-11, 12-1

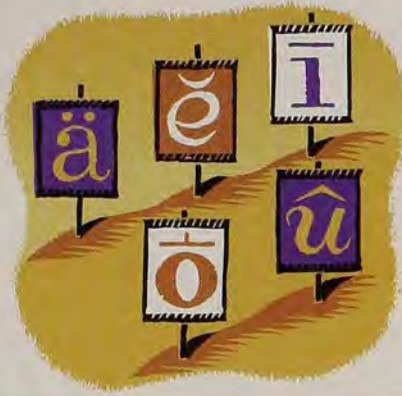
- P. pinifolius* 'Mersea Yellow' 4-11, 12-1
- Philadelphus lewisii* 4-8, 8-3
- Phlox divaricata* 3-9, 9-4
- Phyllostachys nuda* 7-11, 12-7
- Picea abies* 'Nidiformis' 2-8, 8-1
- Pinus strobus* 'Pendula' 4-9, 9-3
- Pleiblastus pygmaeus* 7-11, 12-7
- Polygonum cascadenae* 5-8, 8-5
- Polystichum acrostichoides* 3-8, 8-1
- Pontederia cordata* 3-9, 9-1
- Populus angustifolia* 4-9, 9-2
- P. tremuloides* 1-8, 8-1
- Ratibida columnifera* 3-11, 12-1
- Rhododendron arborescens* 5-9, 9-4
- R. austrinum* 6-10, 10-7
- R. canescens* 4-7, 7-4
- R. viscosum* 4-8, 8-4
- Rhus trilobata* 4-6, 6-2
- Ribes odoratum* 5-9, 9-4
- Rosa palustris* 3-9, 9-1

S-Z

- Salvia greggii* 7-9, 9-7
- Scrophularia macrantha* 5-9, 9-5
- Smilacina racemosa* 3-8, 8-3
- Sophora japonica* 5-9, 9-5
- S. secundiflora* 7-11, 12-7
- Stachys coccinea* 4-8, 8-1
- Styrax americanus* 6-8, 8-6
- Talinum calycinum* 8-10, 10-8
- Trillium grandiflorum* 4-7, 7-3
- Veronica liwanensis* 4-8, 8-1
- Wisteria frutescens* 5-9, 9-6

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.





pronunciations

a simple speaking guide to plants found in this issue

- Abronia fragrans*
uh-BRO-nee-uh FRAY-granz
- Agarista populifolia*
ah-guh-REES-tuh pop-yew-li-FO-lee-uh
- Agastache rupestris*
ah-guh-STAH-she roo-PES-triss
- Anemone quinquefolia*
uh-NEM-o-nee kwinq-FO-lee-uh
- Berlandiera lyrata*
bair-lon-DEER-uh ly-RAY-tuh
- Calycanthus floridus*
kal-ee-KAN-thus FLOR-ih-dus
- Calylophus serrulatus*
kal-ih-LO-fus sair-yew-LAY-tus
- Cedrus libani*
SEED-rus LIH-ban-eye
- Cephalanthus occidentalis*
sef-uh-LAN-thus ahk-sih-den-TAL-iss
- Cerastium tomentosum*
seh-RASS-tec-um toh-men-TOH-sum

- Cercocarpus ledifolius*
sur-ko-KAR-pus leh-dih-FO-lee-us
- Chamaebatiaria millefolium*
kam-ee-bah-tee-AIR-ee-uh mih-lih-FO-lee-um
- Chrysactinia mexicana*
kris-ak-TIN-ee-uh mex-ih-KAN-uh
- Comptonia peregrina*
comp-TOH-nee-uh pair-eh-GRY-nuh
- Cyrilla racemiflora*
sy-RIL-luh ras-em-ih-FLOR-uh
- Datura innoxia*
duh-TOO-ruh in-NOK-see-uh
- Decumaria barbara*
dek-yew-MAY-ree-uh BAR-bar-uh
- Dennstaedtia punctilobula*
den-STET-ee-uh punk-tih-LO-bew-luh
- Diamorpha smallii*
dy-AM-or-fuh SMAW-lee-eye
- Dianthus amurensis*
dy-AN-thus am-ur-EN-sis
- D. arenarius*
D. ar-en-AIR-ee-us
- D. carthusianorum*
D. kar-thew-see-uh-NO-rum
- D. caryophyllus*
D. kair-ee-o-FIL-lus
- D. cruentus*
D. krew-EN-tus
- D. gratianopolitanus*
D. grat-see-ay-no-pol-ih-TAY-nus
- D. knappii*
D. NAP-ee-eye
- D. petraeus*
D. peh-TREE-us
- Dulichium arundinaceum*
dul-ik-ee-um ah-run-dee-NAY-see-um
- Echinocystis lobata*
eh-kee-no-SIS-tus low-BAY-tuh
- Encelia farinosa*
en-SEE-lee-uh fair-ih-NO-suh
- Fraxinus cuspidata*
frak-SIH-nus kus-pih-DAY-tuh

- Gaultheria procumbens*
gawl-THEER-ee-uh pro-KUM-benz
- Gazania linearis*
guh-ZAY-nee-uh lin-ee-YAR-iss
- Gelsemium sempervirens*
jel-SEE-me-um sem-pur-VY-renz
- Holodiscus dumosus*
hol-o-DIS-kus dew-MO-sus
- Hymenoclea monogyra*
hy-meh-no-KLEE-uh mon-o-JY-ruh
- Hyptis emoryi*
HIP-tiss eh-MOR-ee-eye
- Larrea tridentata*
LAR-ree-uh try-den-TAY-tuh
- Leonotis leonurus*
lee-o-NO-tis lee-o-NUR-us
- Leucothoe fontanesiana*
loo-KO-thoh-ee fon-tan-ee-zee-AN-uh
- Lindera benzoin*
lin-DAIR-uh BEN-zo-in
- Malus ioensis*
MAL-us eye-o-EN-siss
- Nelumbo nucifera*
neh-LUM-bo new-SIH-fer-uh
- Parkinsonia florida*
park-in-SO-nee-uh FLOR-ih-duh
- Parthenium incanum*
par-THEE-nee-um in-KAY-num
- Phyllostachys nuda*
fil-lo-STAY-kiss NEW-duh
- Picea engelmannii*
PY-see-uh en-gul-MAN-ee-eye
- Pleioblastus pygmaeus*
play-o-BLAS-tus pig-MAY-us
- Polystichum acrostichoides*
pah-LISS-tih-kum uh-kro-stih-CHOY-deez
- Pontederia cordata*
pon-tuh-DEER-ee-uh kor-DAH-tuh
- Psoralea fremontii*
saw-ro-THAM-nus free-MON-tee-eye
- Rhododendron austrinum*
ro-doh-DEN-dron aw-STRY-num
- R. canescens*
R. kan-NES-senz
- R. viscosum*
R. viss-KO-sum
- Rhus trilobata*
RUS try-lo-BAY-tuh
- Ribes odoratum*
RY-beez o-doh-RAY-tum
- Scrophularia macrantha*
skroff-yew-LAY-ree-uh mak-RAN-thuh
- Smilacina racemosa*
smy-luh-SY-nuh rass-eh-MO-suh
- Sophora japonica*
so-FOR-uh jah-PON-ih-kuh
- S. secundiflora*
S. sek-un-dif-FLO-ruh
- Talinum calycinum*
tuh-LY-num kal-ih-SY-num
- Vicia faba*
VIH-see-uh FAY-buh

What's in a Name: *Cercocarpus ledifolius*

A member of the rose family (Rosaceae), curl-leaf mountain mahogany is native to higher elevations of the western United States from the eastern slopes of the Sierra Nevada-Cascade divide to the Rockies. Its common name refers to the distinguishing characteristic of this tall shrub or small tree: leathery leaves that are rolled under at the margins.

Hopi Indians used the plant's reddish brown bark to dye leather, and the hard wood was often used to make tool handles. Its slow-burning wood also produced the preferred charcoal used for smelting ores in the 19th century. Curl-leaf mountain mahogany can be extremely long lived; several trees in central Nevada are believed to be approximately 1,300 years old.

The genus name *Cercocarpus*—derived from the Greek words *kerkos*, meaning “tail,” and *karpus*, or “fruit”—alludes to the plumelike style that remains attached to the fruit. The specific epithet, *ledifolius*, is derived from the plant's foliage, which resembles that of plants in the genus *Ledum*.

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March 9	Memphis Botanic Garden	(901) 685-1566 x 152
March 16	Riverbanks Zoo & Botanical Garden (Columbia, SC)	(803) 779-8717 x 1117
March 18	New Orleans Botanical Garden	(504) 483-9386
March 19	Callaway Gardens (Pine Mountain, GA)	(706) 663-5153
March 23	The Mint Museum of Art, with Ribbonwalk, Charlotte's Botanical Forest	(704) 372-9594
March 24	San Antonio Botanical Garden	(210) 829-5360
April 7	The Dallas Arboretum	(214) 327-8263 x102
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