

The American GARDENER[®]

The Magazine of the American Horticultural Society

November / December 2015

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Planting Under Trees

John Greenlee:
Ornamental Grass
Evangelist

Tropical Hibiscus
for All Gardens



design tips for
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NOTES FROM RIVER FARM

IN LATE OCTOBER, Harry Risetto, past chair of our AHS Board of Directors, and I participated in the National Chrysanthemum Society's annual convention and show in northern Virginia. Harry and I were there by invitation to give a presentation on the unique challenges and opportunities facing plant societies and other horticultural groups across the country in the digital age.

Supporting national plant societies has historically been an important part of the American Horticultural Society's mission. Over the years, many of the AHS's leaders have also played a significant role in these related organizations. Harry, for example, is a longtime member and officer of the American Dahlia Society. While there are many trends—most notably a decline in participation—that warrant attention, we believe there is equal reason for optimism. Organizations that are able to adapt and



Left: The judging tables at the National Chrysanthemum Society's show. Above: Exhibitor Robert Howell with his award-winning bloom.

successfully embrace changing communications trends and technology potential-ly have a wealth of opportunities ahead. The topic even piqued the interest of a *Washington Post* gardening columnist, who was in attendance at the chrysanthemum group's meeting as part of field research for an article about plant societies.

A question that frequently surfaces at meetings like this is how people became involved with a particular plant or with gardening in general. More often than not, it stems from a childhood experience that evolved into a lifelong passion. Often, the catalyst for this is a parent, grandparent, or mentor who took the time to share their love of plants. With this in mind, I'd like to suggest that in the coming year we all make a commitment to "pay it forward" by sharing the gift of gardening with a young person we know.

You'll find several intriguing facets of gardening described in this issue's pages. For example, you'll learn how to extend the enjoyment of your garden with the feature on creating evening landscapes. A fascinating profile of "grassman" John Greenlee might change your view on meadow gardens. And an article about eye-catching tropical hibiscus will help you anticipate summer.

Best wishes for a joyful holiday season from all of us here at the AHS!

Tom Underwood
Executive Director

TOM UNDERWOOD (2)

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News from the AHS

November / December 2015

PROGRAMS • EVENTS • ANNOUNCEMENTS

POLLINATOR GARDEN NETWORK MEETS IN WASHINGTON, D.C.

IN OCTOBER, the American Horticultural Society participated in a planning meeting of the National Pollinator Garden Network, a coalition of organizations dedicated to fostering greater awareness of the importance of pollinators and helping create critical pollinator habitat throughout the United States.

Held at the Eisenhower Executive Office Building in Washington, D.C., the meeting included 60 participants representing many of the more than 30 nonprofit organizations, trade groups, and Federal agencies that are part of the coalition. The goal was to provide an update on the Million Pollinator Garden Challenge (MPGC), the coalition's effort to encourage people to plant gardens for pollinators, and to address plans for educational and marketing programs to be launched in spring 2016.

"The meeting was very inspirational," says **Ping Honzay**, AHS member programs associate. In addition to her role in the AHS membership department, Honzay tends several hives of honeybees at the AHS's River Farm headquarters. "It was encouraging to hear how many individuals and groups have joined the MPGC and to hear success stories from many of the partner organizations."

Among the speakers was **John Holdren**, director of the White House Office of Science and Technology Policy, who congratulated the coalition on how its efforts are dovetailing with President Obama's 2014 Federal directive to promote the health of pollinators.

As part of the AHS's own efforts to support pollinators, staff, interns, and volunteers recently completed a renovation of a wildlife garden at River Farm. Many AHS members also have already registered their gardens as part of the MPGC. For information on how to create and register your own pollinator garden, click on the link on the AHS website or visit www.millionpollinatorgardens.org.

MEMBERS-ONLY SEED EXCHANGE FOR 2016


SEEDS COLLECTED by AHS members and seed houses from across the country have arrived at River Farm for the 2016 AHS Seed Exchange program. Over the next few




Horticulturist Sylvia Schmeichel harvests seedpods from native false indigo in River Farm's meadow.

weeks, volunteers and staff will be busily sorting and packaging these seeds, researching cultural and germination information, and compiling the seed catalog. This catalog and order form will appear on the AHS website in mid-January and a list of available seeds will be published in the January/February issue of *The American Gardener*. As usual, AHS members who donated seeds to the 2016 exchange will get the first opportunity to order seeds, which can be beneficial because a few rare or unusual varieties are sometimes in short supply.

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- Become a member of the Horticultural Heritage Society.

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Join the AHS as we venture to extraordinary garden destinations around the world. The 2016 trips are filling fast, so reserve your space today!

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April 22–May 2, 2016

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September 1–10, 2016

Travel through historic cities and towns, see world-famous, iconic architecture, and visit renowned public and private gardens—all while surrounded by spectacular scenery, such as the majestic Dolomites mountains.

For more information about the AHS Travel Study Program

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Participation in the Travel Study Program supports the American Horticultural Society and its vision of *“Making America a Nation of Gardeners, A Land of Gardens.”*



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Experience the horticultural richness of the greater Chicago area. More details coming soon. President's Council members only! For more information about the AHS President's Council, please contact Susan Klejst at (703) 768-5700 ext. 127.



AHS NATIONAL EVENTS CALENDAR

Mark your calendar for these upcoming events that are sponsored or co-sponsored by the AHS. Visit www.ahs.org or call (703) 768-5700 for more information.

DEC. 1–24. **Indoor Holiday Display.** River Farm, Alexandria, Virginia.

DEC. 12. **Holiday Open House.** River Farm, Alexandria, Virginia.

2016

JAN. 9–20. **South Africa: Gardens of the Cape** (with optional post-tour safari, Jan. 20–23). AHS Travel Study Program.

APR. 8 & 9. **Spring Garden Market at River Farm.**

Alexandria, Virginia (Member's preview morning of April 8).

APR. 16. **Great Gardens and Landscaping Symposium.**

Woodstock, Vermont. (AHS partner event.)

APR. 21–MAY 1. **Gardens of Portugal: Lisbon, Sintra and Madeira.** AHS Travel Study Program.

APR. 23–30. **Historic Garden Week in Virginia.** (AHS partner event.)

APR. 24–26. **Colonial Williamsburg Garden Symposium.**

Williamsburg, Virginia. (AHS partner event.)

JULY 14–16. **National Children & Youth Garden Symposium.**

Columbia, South Carolina.

AUG. 31–SEPT. 10. Italy: **Architecture and Gardens of the Veneto, Dolomites, and Venice.** AHS Travel Study Program.

SEPT. 17. **AHS Annual Gala at River Farm.** Alexandria, Virginia.

OCT. 6–8. **America in Bloom Symposium.** Grande Arroyo, California. (AHS partner event.)



The grandchildren of an AHS member in Oregon show off the Italian climbing zucchini grown from seed obtained from the seed exchange.

While the practice of saving and exchanging seeds allows for the preservation of genetic traits carried by heirloom and open-pollinated seed, it also gives gardeners a chance to try out new or unusual plants. And there is a special bond created between gardeners when seeds that have a special family history or regional connection are shared. The AHS is pleased to have been facilitating this time-honored tradition since 1959 through its annual Seed Exchange.

Gifts of Note

In addition to vital support through membership dues, the American Horticultural Society relies on grants, bequests, and other gifts to support its programs. We would like to thank the following donors for gifts received between September 1 and October 28, 2015.

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If you would like to support the American Horticultural Society as part of your estate planning, as a tribute to a loved one, or as part of your annual charitable giving plan, please call (703) 768-5700.

And the program doesn't just benefit AHS members. Any leftover seeds are donated to other nonprofit organizations. "We fulfill requests from schools, 4-H groups, Master Gardeners, and community gardening groups across the country," says **Sylvia Schmeichel**, River Farm manager and horticulturist.

AHS FLORAL GARDEN MUGS NOW AVAILABLE

WITH THE HOLIDAYS just around the corner, the AHS is offering a set of floral garden mugs, now available at the River Farm Garden Shop or online through the AHS website. Proceeds support the AHS's educational programs. For more details about the mugs, which are decorated with floral artwork, turn to "Gifts for the Gardener" on page 54.

News written by AHS staff.

AHS NEWS SPECIAL: America In Bloom Community Involvement Award

by Benjamin Whitacre

WHEN A SMALL city with a historic but abandoned downtown kick-starts its economy by swapping acres of concrete for plants, people take notice. For its beautification efforts, Ottawa, Illinois, took home the American Horticultural Society Community Involvement Award and a special prize for Most Dynamic Transformation of a Downtown Streetscape at the 14th an-



Thanks to its beautification efforts, downtown Ottawa today, above, is verdant and thriving—a remarkable change from the stark streets and empty buildings of just a few years ago, left.

nual America In Bloom (AIB) symposium, held in Holland, Michigan, in September.

“Ottawa might well be the poster child for the benefits of quality landscapes,” says **Evelyn Alemanni**, who co-judged Ottawa this year. “It’s absolutely drop-dead gorgeous. All through town people are planting gardens because they want to be a part of it.”

HORTICULTURAL REVITALIZATION

Before Ottawa’s transformation, 60 percent of its downtown storefronts sat vacant and the only greenery consisted of a single tree in front of the city courthouse. When the 2008 recession hit, the city hired a consulting firm, expecting to hear that a marketing campaign focused on the city’s ties to Abraham Lincoln and the founder of the Boy Scouts of America would offer the best results for revitalization. Instead the firm advised rebranding Ottawa with a garden theme.

Focusing on the downtown area, “we decided that the streetscaping should be bold,” says **Reed Wilson**, Ottawa’s director of economic development. “Instead of adding a few planters here and there, sizable tree and plant beds were cut in the sidewalks.” The cost of streetscaping alone meant only a block could be done each year, so implementing the plan required extensive com-

munity participation along with aggressive fundraising. With financial support from grants and sponsorships, countless volunteers from Ottawa’s Garden Club and other civic organizations helped bring Ottawa’s beautification goals to fruition.

BUILDING ON SUCCESS

After three years of steady improvement, Ottawa discovered America In Bloom in

2015 AIB Award Winners Population Category Awards

- Under 3,500 **Combined Locks, WI**
- 3,500–6,000 **Lewisburg, WV**
- 6,000–12,500 **Morro Bay, CA**
- 12,500–16,000 **Holliston, MA**
- 16,000–20,000 **Fairhope, AL**
- 20,000–30,000 **Venice, FL**
- 30,000–40,000 **Saratoga, CA**
- Over 40,000 **Lexington, KY**
- Champions (small cities) **Lewes, DE**
- Champions (mid-size cities) **Holland, MI**

The American Horticultural Society Community Involvement Award is one of the Outstanding Achievement Awards given by America in Bloom. For a complete list of all the 2015 award winners, visit www.americainbloom.org.

2012. The city earned immediate acclaim from AIB judges, winning the award for best city with a population of 16,000 to 20,000 in just its second year of competition, followed by awards this year across all population sizes.

“People are going, hey, this is working,” says **Stephanie Stacy**, co-chair of the leadership committee for Ottawa Is Blooming! “We’re getting more supporters every time we bring an award home.”

Today, Ottawa’s downtown has no vacancy, demand is growing for housing, and tourists are re-envisioning it as a weekend destination. Outside the downtown area, a similar revitalization is taking place with the creation of a popular boardwalk and park.

AIB judges praised the efforts of the city’s Ottawa Is Blooming! committee and volunteers as proof that horticultural beauty transforms not just the look of cities, but everything from the quality of life to the success of businesses.

For more information on America In Bloom, visit www.americainbloom.org and visit www.ottawaisblooming.org to learn more about Ottawa’s efforts. 🌿

Benjamin Whitacre is an editorial intern for The American Gardener.



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Seeds on the Move



No matter the flower color, all clematis form some version of these fuzzy-looking seedheads. Each feathery tail is attached to a single seed to help it ride the wind.

ASSUMING A SEED is not separated from the plant before it has a chance to fully develop and ripen, and assuming there have been no physical or genetic mishaps along the way, it should be viable. It should be ready, willing, and able to generate a new plant. However, so many things have to go right, it's a wonder seeds ever form new plants successfully. And yet by sheer numbers, wily survival mechanisms, and the resources to sprout, they do.

Plants can perish when they are moved, as gardeners and landscapers sometimes

learn the hard way. But most seeds are designed to travel, which they do for a variety of reasons. A big one is to avoid sibling rivalry. Because seedlings must compete for real estate, soil moisture, nutrients, and sunlight—not only with each other but often with the parent plant—most won't make it to adulthood if they are jammed together.

Various dispersal mechanisms come into play to give seeds a better chance of surviving long enough to sprout and set seeds of their own. Getting out of the immediate neighborhood will also provide opportunities to diversify the gene pool. Here is a look

at the ways that seeds go mobile to find a hospitable spot in which to thrive.

WIND TRAVELERS

In order for a seed to travel on a breeze, it must be tiny and lightweight. The lighter it is, the further afield it may float. Some seeds, like those from orchids, are so small as to be dustlike.

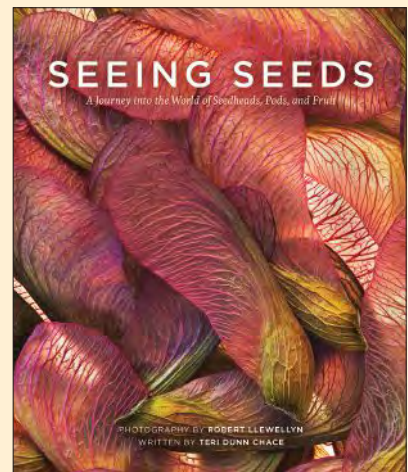
Many small seeds have a navigation assist in the form of an attached plume, tuft, or silky hairs. The dandelion has a stalked plume that acts like a parachute, twirling and whirling while mostly keep-



Understanding how plants send their progeny out into the world can help gardeners with propagation or eradication efforts.

BY TERI DUNN CHACE

PHOTOGRAPHS BY ROBERT LLEWELLYN



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ing the fluff up and the seed dangling below. Thistle seeds, on the other hand, have slim plumes coming directly off them at all angles, and consequently they tumble about more randomly.

Wind travelers often have different or additional features to get and keep them airborne. A portion of their interior may be inflated or empty, basically nothing but an air pocket. Such a seed or capsule can be larger, have more surface area, and still be able to fly, kind of like a hot-air balloon. A typical example is the pod of the goldenrain tree. Still other seeds get wings. Maple keys, or samaras,

whirl around as they fall from trees or get tossed about by the wind. Elm trees have their version, as do ashes. These seeds are bigger and heavier than those of most herbaceous plants, and the wings, while papery in texture, do not break or snap off easily. More often they wither away once they have delivered the seeds to a new home.

A seed's point of attachment to the parent plant remains until there is an opportune moment to let go. A light puff of wind may not impress the dandelion seedhead or the maple samara. It will wait for a breeze with promise.

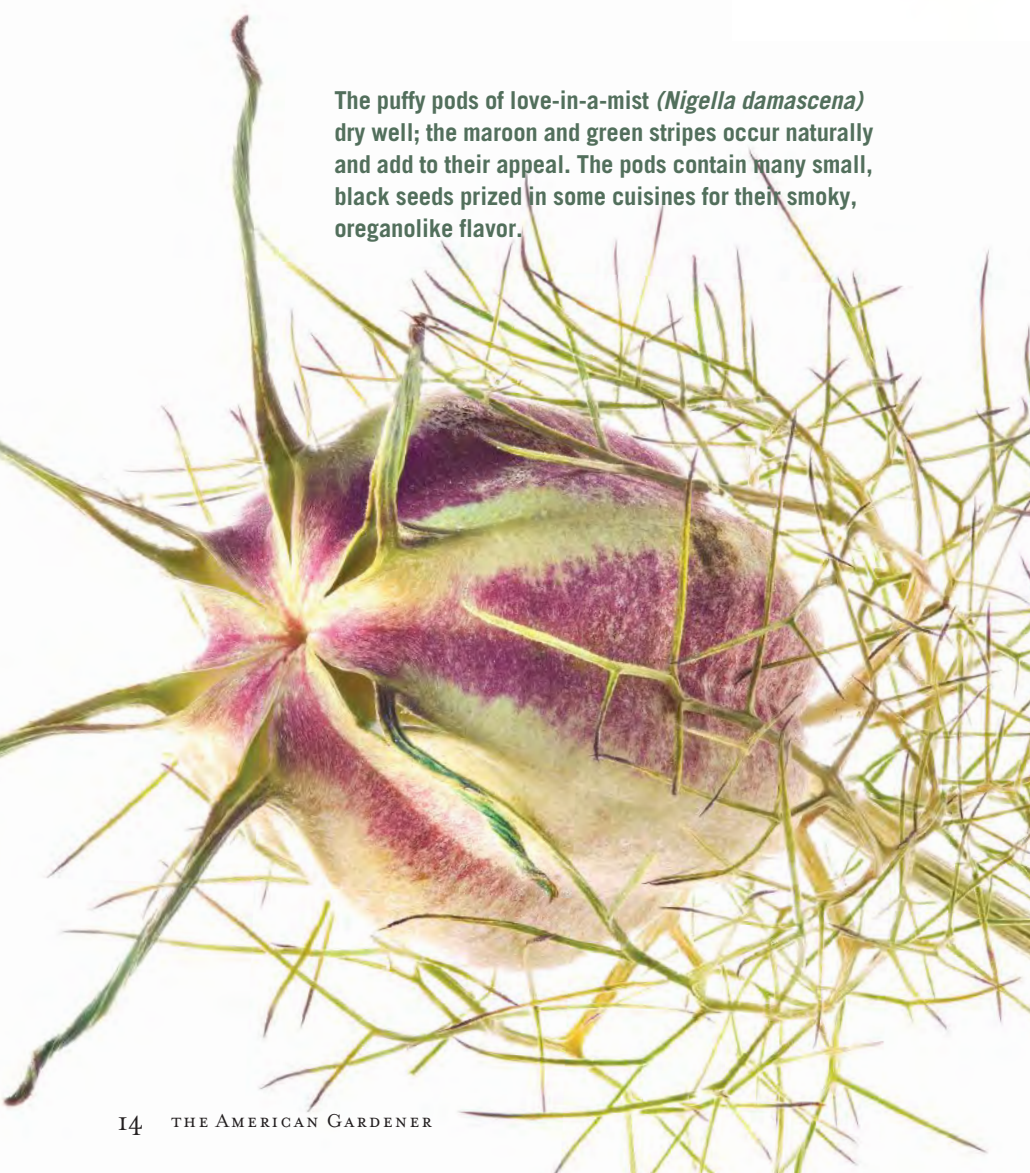
SAILORS

For a seed to be able to travel on water—whether an estuary, the open sea, a pond, or a rolling river—it needs at least two key qualities. It needs to be waterproof, at least for a while, or it could sprout too soon or rot because it is waterlogged. It also needs to be buoyant so it can float rather than sink. Coconuts, for example, can travel on ocean tides for great distances and wash up on far-off beaches.

A tough, impervious seed case or coat is essential for waterborne seeds. It will keep moisture out and perhaps even discourage birds and other creatures from



Pot marigold (*Calendula officinalis*) has bizarre-looking, rough-textured, curled seeds that turn from green to brown as they ripen. The spikes and spurs of these curved seeds help them to snag on a passing animal.



The puffy pods of love-in-a-mist (*Nigella damascena*) dry well; the maroon and green stripes occur naturally and add to their appeal. The pods contain many small, black seeds prized in some cuisines for their smoky, oreganolike flavor.

snacking. There is a lot of variation in the interiors of some of these seeds, including air pockets, corklike material, and spongy tissue. In time the inner and outer material will break down or disintegrate, exposing or releasing seeds.

Like their airborne cousins, waterborne seed structures may also sport handy extras like barbs or hooks. Sometimes these assist navigation. The thorny shape of a water chestnut can serve as a keel. Later, these protuberances may snag roots, lodge in soil, or cling to the ankles of shoreline plants, ending or slowing the seed's journey. They may also allow the seed to grab a water bird's feathers or the fur of an animal, sending its journey on a new path.

POP STARS

Seeds develop on a plant and eventually mature or ripen, reaching a point where they are ready to disperse. Typically, green and growing gives way to brownish and drying.

Drying out is imperative for seeds that take dispersal into their own hands. This process involves contraction, shrinking a bit, and tightening up to develop tension. When the tension reaches a critical

point, the case unrolls, unfurls, or flings open. The capsule bursts. Seeds catapult in all directions like those from a fat jewelweed capsule a child has just pinched.

With some seeds, the tension is created and released not in dryness, but in response to water or humidity. A seed case swells and stretches until it can hold no more moisture, then built-up pressure bursts it apart. Some tropical plants operate this way.

Expulsion is not always self-contained or triggered internally. Some seeds don't break open until an external force acts on them. An animal, bird, or human brushes against the seed, or wind, rain, or tide tosses it about. Seeds can even be nudged by their neighbors. One burst pod may create enough movement in a plant or plant colony to get the party started.

Ejected seeds may end up a good distance from where they began. The world record appears to belong to *Tetraberlinia moreliana*, an African tree in the bean family (Fabaceae), whose seeds landed almost 200 feet (60 meters) away.

A mess is often left behind. Curled or mangled remnants of the seed capsule or pod betray the force of the release. If you look closely, you may discover that the explosion was not random. Fragments often correspond to whole or half carpels. You may be able to identify and count peeled-back sepals.

Keep your ears open. If you listen closely, sometimes there are even sound effects—an audible pop as something bursts open, an airborne ping of a flung seed, and perhaps even the plunk of a landing.

HITCHHIKERS

In his novel *The Dharma Bums*, Jack Kerouac comments that a hitchhiker must depend “solely on himself and thereby learn his true and hidden strength.” This turns out to be equally true for seeds that grab rides on animal fur, human clothing, and farm machinery, car tires, train wheels, bales of hay, organic packing materials or ballast, and more. In order to attach to someone or something that

ALTERNATIVES TO SEEDS

Not every plant reproduces, or can reproduce, via seeds. Some reproduce vegetatively, or asexually. Some use seeds sometimes, and other methods concurrently or at other times. A few are even parthenocarpic—literally virgin fruit. These oddballs, including some figs and watermelons, produce fruit without fertilization and yield sterile (seedless) fruit.

Certain plants such as ferns, mosses, and horsetails reproduce via spores. A spore, like a seed, is a reproductive unit capable of producing a new plant. It is a comparatively simple item made up of one or more cells.

—T.D.C.

moves it along, a seed needs the ability to stick (and, later, to unstick). Anyone who has ever spent time tugging burdocks out of a dog's fur can appreciate the tenacity of those pricklers. (Burdocks were



Many familiar fruits, whether cultivated like this bitter melon or wild like a bramble berry, use the dispersal method of enticing a creature to consume their flesh but jettison their seeds.

actually the inspiration for Velcro.) Close inspection of this particular hitchhiker shows bracts enclosing the burr end with little curved hooks that are attached to sheaths. The seeds are within. When the hooks are yanked in an attempt to dislodge them, the sheaths open and release many seeds. Removal itself can be a built-in seed-dispersal mechanism.

Some such seeds are merely sticky, with numerous tiny hair-like pricklers, while others sport mini hooks or barbs. Some seeds develop formidable spines, claws, or horns that are visible to the naked eye. In all cases, the aim is to attach and travel to a suitable spot, then disembark and germinate. Research suggests that a period of travel is often built in to the overall plan. Seeds assisted in this fashion would not germinate at the moment they leave their parent plant. A little more time is needed, either for the seeds within to fully ripen or to ride out a cold winter or a dry season.

IN THE BELLY OF THE BEAST

Traveling inside an animal is yet another successful, widespread seed-dispersal method. By some estimates, at least half of seed-producing plants rely on animals to ingest their seeds and move them a distance from their point of origin.

The majority of fruits are in this category. They attract wildlife and humans with their color, beauty, fragrance, and tasty flesh. The flesh lures and nurtures with fat, sugar, starch, and protein. Many plants produce their fruit at the top or outer edges to make it more accessible. A fruit, berry, or drupe is at peak and enticing flavor and value to the eater only when the seeds within are ripe. We don't eat unripe fruits because they're not as appealing; the unripe fruit doesn't want you and your dispersal services too soon.

From the plant's point of view, the valuable part is the seeds embedded inside the fruit. These tend not to be as complicated, ornate, or textured as the seeds discussed previously. Instead, they're usually hard and smooth. The

coating, whether true seed coat or endocarp, only has to be tough enough to withstand gastric juices and enzymes in the digestive tract. (Although there are times when gastric juices and enzymes are necessary to trigger germination, as is believed to be the case with chiltepins, the wild ancestor of peppers.) The eater's job is to deposit undigested, intact seeds somewhere distant in a pile of feces, which functions both as temporary protection from the elements and a starter dose of fertilizer.


Timing is important. Consider a fruit—say, a viburnum or pyracantha—that ripens in autumn. Birds eat heavily at that time of year because they need energy to migrate or to weather the upcoming winter. This type of fruit is a boon to the hungry birds, but also good for the embedded seeds, which get consumed, moved, and deposited in great numbers.

In many cases, birds are the ideal consumer. They don't chew their food, so seeds remain intact, whereas a raccoon, fox, deer, or bear could mash certain seeds while eating. Perhaps this is why so many seeds that are wrapped up in a substantial, juicy package are small and slick, such as those in apples, pears, blueberries, and grapes. Also, certain plants have long-established relationships with particular creatures (for example, only the aptly named nutcracker bird can extract seeds from the cones of the European arolla pine). Any damage to either population upsets the balance and impacts the survival and reproductive prospects of both parties.

INTERDEPENDENCE

Seeds exist to ferry and carry on their own kind into the future, the same principle as eggs in the animal world. They can't reproduce or spread without help from their environment (including, occasionally, humans), which provides a vivid reminder of the interrelatedness of all life. Seeds may be small, but what they contain and do is huge, mysterious, and important to understand.

Teri Dunn Chace is a writer and editor with more than 30 titles in publication, including Seeing Flowers (Timber Press, 2013). She lives in Upstate New York.



If not eaten by squirrels or other animals, acorns like this one from a chestnut oak (*Quercus prinus*) nourish the seedling inside until its leaves and roots develop.

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the Grassman

BY NAN STERMAN

California-based plantsman and garden designer John Greenlee has spent his career seeking out ornamental grasses and promoting their use in naturalistic and meadow-style landscapes.

John Greenlee takes a break in his grass-filled nursery in Pomona, California.

THERE WAS a time when your surname signified your profession: The barrel maker was Mr. Cooper; Mr. Taylor sewed suits; Mr. Cook prepared food, and so on. In today's society, names and professions seldom match, however, which makes John Greenlee something of a rarity. "Greenlee" is a Scottish term that translates to "green meadow," and John Greenlee makes meadows.

The 60-year-old Greenlee looks more like a surfer than a horticulturist. He sports sunburnt skin and a wild touse of still-blond hair. His perpetual smile and the glint in his eye suggest he's ready for any adventure. Widely known as "the Grassman," he lives

just south of San Francisco and consults on landscapes for headquarters of well-known Silicon Valley technology companies. He also designs meadows for the home gardens of those companies' owners. Greenlee recently worked on the award-winning Tongva Park in Santa Monica, California. He's designed green roofs for the Los Angeles Museum of the Holocaust and has contributed to countless other projects across the country, both large and small.

Greenlee also owns a funky, century-old cottage on an acre in Pomona, 30 miles due east of downtown Los Angeles. The property he refers to as his "garden gallery" is located in a community of squat, rectangular, 1950s homes with minimally land-



Designing gardens takes up much of Greenlee's time these days. Among his projects is this naturalistic private garden in Los Altos, California, above, and award-winning Tongva Park, a community park in Santa Monica, California, right.

scaped lots. Greenlee's garden gallery, by contrast, is a jungle of tall trees, bamboos, and grasses planted to form a series of garden rooms. Here, Greenlee experiments with new plants and also entertains guests.

FORMATIVE YEARS

Greenlee's interest in grasses goes back to his childhood in Fullerton, California, then largely citrus groves. In summer, a suffocating layer of smog rolled in from Los Angeles. Greenlee escaped to a summer job as a nature counselor at the Ahwahnee Boy Scout Camp in the nearby San Bernardino Mountains. In the course of teaching 12- to 16-year-olds about mountain habitats, Greenlee fell in love—with trees.



In 1973, he enrolled in California Polytechnic State University, Pomona, intending to complete his general education requirements in advance of heading to forestry school in Colorado. Freshman orientation included a tour of Cal Poly Pomona's ornamental horticulture green-

houses. Intrigued, Greenlee decided to sign up for a class taught by Oliver "Jolly" Batcheller, the horticulture department's founder. "Jolly was such a huge booster for ornamental horticulture," Greenlee remembers, "that I changed my major after that first class."

A TURNING POINT

Once Greenlee was bitten by the plant bug, there was no going back. It was the era of the perennial garden and “I considered myself to be one hot shot plantsman,” Greenlee recalls. To earn money for college, he designed and installed gardens. Seeking bigger projects, Greenlee partnered with Mike Sullivan, a newly minted Cal Poly Pomona landscape architect.

One of the duo’s early projects became a defining moment for both men: a garden for a new home in San Marino designed by

Left in place, the soil would have killed the oaks. Sullivan’s solution was to spread out the soil to create “a passive, strolling garden, designed as an oak woodland.” Key garden components were the overhead canopy and a low, see-through ground plane. “Mike thought we should make the garden look like Pasadena 200 years ago,” Greenlee recalls, “which would have been an oak savannah with native grasses.” The responsibility for sourcing the grasses fell to Greenlee. At the time, area gardens and nurseries didn’t carry many grasses.

project. There was only one nursery in the United States—located near Baltimore, Maryland—that specialized in grasses, Olbrich told Greenlee. “Marshall handed me a Kurt Bluemel catalog,” Greenlee says, “and that was the beginning of it all.”

This was the 1980s, when East Coast landscape architects Wolfgang Oehme and James van Sweden were developing their “New American Garden,” a pioneering style featuring layered masses of perennials and grasses. Their signature landscape was the garden at the Federal



Greenlee has turned his one-acre property east of Los Angeles into a garden gallery to showcase ornamental grasses and other grasslike plants.

modernist architect John Galbraith. Greenlee describes the home as “severe.” “I like modern architecture,” says Greenlee, “but this was ugly.”

The garden project, however, was intriguing. The owner didn’t want a swimming pool or other typical high-end features. Instead, he wanted an environment where he could sit and contemplate. The site sloped down a canyon to an ancient oak grove. “Galbraith had already excavated the foundation,” Sullivan recalls. “He pushed all the dirt down to the bottom, where it was piled around the trunks of the trees.”

IN SEARCH OF GRASSES

Greenlee’s quest took him north 450 miles to Western Hills Rare Plant Nursery in Occidental, California. The nursery was owned by legendary horticulturists Lester Hawkins and Marshall Olbrich, who experimented with growing exotic, drought-tolerant plants from Australia, the Mediterranean, South Africa, and Chile, along with California natives.

At Western Hills, Greenlee had a transformative experience. “I thought, ‘Oh my gosh, this is it,’” Greenlee recalls. “This is the look I want to do!” But even Western Hills didn’t have enough grasses for the

Reserve Board in Washington, D.C. The grasses for that project came from Bluemel, owner of the eponymous nursery and renowned grass expert who died in 2014.

Greenlee convinced the San Marino client to send him to meet Bluemel at his nursery. “The first time I stood there and saw more than 250 varieties of grass, I felt stupid,” says Greenlee. “How come no one told me about these things?”

Greenlee shipped a refrigerated tractor-trailer of grasses back to California. “That,” Greenlee says, “was the beginning of ornamental grasses on the West Coast in one wallop.”

Greenlee and Sullivan's San Marino garden won numerous awards. Eventually the two went their separate ways. Sullivan went on to found SITE design studio, inc., in nearby Tustin. Greenlee started growing ornamental grasses in his backyard nursery in Pomona.

Soon after, Greenlee traveled to South America to hunt for *Hippeastrum* bulbs on behalf of a Pasadena collector. On his way back, Greenlee stopped at Bluemel's nursery to learn more about grasses. The two men decided to collaborate, issuing a joint Bluemel-Greenlee Nurseries catalog in 1987. While the enterprise lasted just one year, Greenlee learned enough to make his first major foray into writing with *The Encyclopedia of Ornamental Grasses*, published in 1992. This encyclopedia was the first of its kind for North American gardens.

COLLECTING WITH A MISSION

From that point on, wherever Greenlee traveled, he searched for native grasses in their natural habitats. He's hunted plants from Kennebunkport, Maine, to the Chiricahua Mountains along the Arizona-Mexico border, to the San Bernardino Mountains of his childhood.

For more information

John Greenlee travels widely, lecturing about grasses. He also offers occasional tours and workshops at his garden gallery in Pomona. For dates and locations of lectures and other events, visit www.greenleeandassociates.com.

Books by John Greenlee

The American Meadow Garden.

Timber Press, Portland, OR, 2009.

The Encyclopedia of Ornamental

Grasses. Rodale Publishing, Emmaus, PA, 1992.

"I was collecting plants in nature," he says. "And for a living I was learning how grasses grow in a Mediterranean climate." Most of Bluemel's grasses came from northern Europe and Asia, so few thrived in southern California's climate. Popular grasses like eulalia (*Miscanthus* spp.) and fountain grass (*Pennisetum* spp.), Greenlee found, "were just a fire hazard in California and needed all kinds of water. People in a Mediterranean climate don't

want grasses that are brown, crispy, and flammable."

One of Greenlee's goals was finding garden-worthy lawn grasses to use in place of the conventional bluegrass (*Poa* spp.), zoysiagrass, Bermudagrass (*Cynodon* spp.), and fescue (*Festuca* spp.). He began seeking out "little groundcover grasses and sedges, the innocuous things that are green."

Greenlee stumbled upon sedges (*Carex* spp.) some 25 years ago while visiting Prairie Nursery in Wisconsin. According to Prairie Nursery's owner, Neil Diboll, Greenlee immediately saw the potential for these versatile grasslike plants. "He has done great things to popularize *Carex* for more sustainable landscapes in California, Arizona, and other places," Diboll says.

In addition to sedges, Greenlee has introduced or championed many other grasses and grasslike plants (for a list of some of his favorites, see the web special for this article). At his garden gallery, he points to a flat filled with a lush, deep green grass whose broad leaves stand a foot tall. "That's the Holy Grail," he says with a salesman's conviction. "I'm going to go out on a limb and say that *Leymus triticoides* 'Lagunita' is going to be the dominant groundcover grass in western gardens within two years."

A STYLE OF HIS OWN

As Greenlee's knowledge of grasses expanded, he started outgrowing his backyard nursery. With the help of the late landscape designer Robert Fletcher, Greenlee added growing grounds in Malibu, just north of Los Angeles. The owner of that property had one stipulation—when Fletcher and Greenlee were done with the space, they had to leave it as a garden. Fletcher took the lead in creating a nursery of carefully designed garden rooms to show off Greenlee's grasses.

The Malibu growing grounds gained a reputation as a grass showroom for high-end Los Angeles clients and well-known landscape designers.

Greenlee began developing his own design style for combining grasses with other plants. "Rather than a drift of grasses and a drift of perennials like Van Swe-

A hands-on designer, Greenlee lays out containers of grasses during the installation of a new meadow garden.





Always looking for new introductions, Greenlee gathers seeds of canyon ricegrass (*Leersia monandra*) on a collecting trip in New Braunfels, Texas.

den and Oehme, I was more interested in grass ecology and making meadows, trying to recreate what I was seeing in nature,” he says.

Greenlee draws upon the expertise of colleagues like garden designer Scott Ogden to add pops of color to his meadows. Ogden, who splits his time between homes in Texas and Colorado, is an expert on warm-climate bulbs and xeric tropical and subtropical plants. “As a country, and in California in particular, there are too many people, too much city—the natural places have been gobbled up,” says Ogden. “So there is almost a rebellious streak to what John has brought to the design world, putting back some of the wild nature in an urban context.”

In addition to that rebellious streak, Greenlee is witty, irreverent, energetic, and what colleagues describe as “a real salesman.” Mike Sullivan says Greenlee’s ambitious approach helped push that first modern garden project beyond his wildest dreams. “He would always throw caution to the wind, saying things like ‘Let’s go for greatness!’ That is his attitude. Sometimes it got him in trouble, and sometimes it led to great things,” Sullivan says.

REPLICATING AFRICA

One of those great things happened

around 1997. By then, Greenlee’s Pomona nursery featured the most diverse grass collection on the West Coast. One day, Greenlee’s long-time colleague Paul Comstock came to visit. Comstock was director of design at Walt Disney World in Orlando, Florida, and a renowned designer and plantsman in his own right. Greenlee remembers Comstock walking



Greenlee is bullish on *Leymus triticoides* ‘Lagunita’ as a drought-tolerant lawn substitute.

through his nursery and saying, “This is it! This is the look!”

The “look” was for Disney’s Animal Kingdom, the Africa-inspired theme park then under construction at Walt Disney World. “The high concept,” Comstock says, “was to replicate several types of natural [African] environments.” Comstock was tasked with designing habitats that emulated African biomes.

Comstock and Greenlee had known each other for years. In fact, before joining Disney, Comstock enlisted Greenlee’s help designing the landscaping for the “Jaws” ride at Universal Studios’ Florida theme park.

Animal Kingdom, however, was much bigger. Hundreds of acres. Hundreds of thousands of trees and shrubs. More than three million grasses. “It was an unsolvable puzzle,” Comstock says. “No one knew how to go about doing something that big, especially the grass thing.” Greenlee was the man he turned to. “We have similar personalities,” Comstock explains. “We can visualize something and do whatever it takes to get it done.”

The grass requirements for this project were complex and multifaceted. The animal areas required two categories of grasses, one for feed and the other for aesthetics. Some feed grasses were for browsing animals that eat just leaves,

others for grazers that pull up an entire plant. Grasses had to tolerate heat, cold, sun, shade. To create the right effect, the grasses also had to blend seamlessly between animal habitats and public areas. And, Comstock adds, being Disney, “the art director wanted to simulate a verdant green Serengeti 365 days a year.”

Comstock pulled in Greenlee’s former partner Kurt Bluemel, too. The trio started with 375 species of grass plants, including “all the *Cortaderia*, *Muhlenbergia*, *Pennisetum*, all of John’s *Carex*,” Comstock says, “We tried nearly every plant in John’s book.”

company would invest so much into making an environment for gorillas.”

CONTINUING PURSUITS

Greenlee’s design business has thrived since the Animal Kingdom success. He also took time out for another book project. *The American Meadow Garden*, a collaboration with California photographer Saxon Holt, was almost immediately featured on National Public Radio, where it was listed as one of 2009’s Crop of Great Gardening Books. It also won the top book award from the national Garden Writers Association.

Greenlee. “I call it meadow gardening for lack of a better term, but it is much more a partnering with nature and an acknowledgment of changing climate and changing ecology.”

With extreme drought conditions in California, Greenlee’s approach is gaining steam. “Using sedges and grasses to create long term, highly functional landscapes that are livable and durable is a big contribution,” says fellow grass expert Rick Darke, a Pennsylvania-based landscape ethicist and author of *The Encyclopedia of Grasses for Livable Landscapes*.



A small herd of giraffes wanders through the grass-filled Kilimanjaro Safari section of the Animal Kingdom at Walt Disney World in Orlando.

As for the men’s success, if you haven’t visited Animal Kingdom, Comstock’s anecdote about the gorilla habitat says it all. Disney’s gorillas came from Lincoln Park Zoo in Chicago where they lived in what Comstock describes as “concrete boxes.” Disney’s gorilla habitat was thoughtfully designed and planted with Greenlee’s many sedges. When the animals first arrived, they didn’t know how to behave. “They were like little kids,” Comstock recalls. “They rolled around in the grasses and climbed the magnolia trees.” Soon after, renowned primate expert Jane Goodall came to visit. When she saw the habitat, “she broke into tears,” he says. “She couldn’t believe that a

Nowadays, in addition to seeking out new plants, Greenlee’s primary focus is designing what he calls “grass ecologies.” These complex grass systems involve “the art and science of putting grasses together in a way that is ornamental and useable,” says Greenlee. “I was collecting species *Hippeastrum* (bulbs) in Brazil in 1984, and now I am making meadows that have sweeps of *Amaryllis* (bulbs) coming up through the meadow.”

While much of Greenlee’s work is for West Coast gardens, he sees his approach as being relevant throughout the country. “I think America needs to discover a whole new kind of gardening,” says

Looking back over his long career, Greenlee says he feels fortunate and blessed. “I have had this amazing journey through the heart of American horticulture,” he says. But Greenlee’s journey isn’t finished. There are still horticulturists, landscape designers, and gardeners to be converted to his vision. Undeterred, the Grassman climbs into his pickup truck and heads out to win over a potential new client.

Nan Sterman is the host of “A Growing Passion,” a gardening show that airs on KPBS in San Diego, and author of numerous gardening books. She lives in Encinitas, California.



designing outdoor spaces for Evening Enjoyment

Here's how to make your garden an inviting destination—even after the sun's gone down.

BY PAUL LEE CANNON



The Tucson, Arizona, garden of Ann Butler starts to shine as dusk falls. Strategic lighting of the garden's pink wall, water feature, and a specimen palm tree beyond create a magical mood.



AS YOU MAKE plans for your garden in the new year, one thing to contemplate is how much time you actually get to enjoy it. For many, daytime hours are spent in the office, running errands, or engaging in other activities away from the garden. At the end of the day, darkness usually precludes spending time outdoors. But it doesn't have to be that way.

A waterfall cascading from a white wall washed with theatrical lighting forms a dramatic focal point in Margot Washburn's evening garden in La Jolla, California.



If you don't have enough time during the day to enjoy your garden, consider turning it into an "after-hours Eden," as Lia Leendertz, author of *The Twilight Garden*, puts it. She offers multiple reasons to create a night garden: the climate in which you live might be cooler and more comfortable in the evening; the somewhat mystical aesthetic of a moonlit landscape appeals to you; or you simply relish evening meals and entertaining *al fresco*. It could also be a combination of all of these.

Above: White is the dominant theme in this view of Ann Nichols's garden in Oakland, California, which includes a variety of plants with white flowers and/or foliage and an off-white sheep's head sculpture at the base of the pillar water feature. Right: In this nook framed by fragrant star jasmine, Nichols has hung a large mirror on the fence to reflect light and create the illusion of more space.



APPEAL TO ALL THE SENSES

“An evening garden is all about mood,” says Florida-based garden designer Kerry Harvey. “You’re not going to see as much of the garden, so I would definitely concentrate on the other senses.”

To help you plan the garden, sit outside one night and note what you experience. As dusk approached one evening in mid-May, I put my senses to this test in my small woodland garden in Oakland, California. I lit the fire pit, kicked back in an Adirondack chair, and closed my eyes. A mockingbird sang. Periodic breezes created a soothing rustle among the bamboos growing in large containers nearby. The fire crackled and popped. Occasionally, the sweet aroma of unseen flowers wafted by. Dogs barked in the distance and the whir of traffic on the distant freeway sounded like the ocean. Opening my eyes, I glimpsed the Japanese maples by the deck, underlit to showcase the delicate foliage and cast shadows that seemed to dance in the breeze.

This simple, mindful act only took a few minutes and brought me a new appreciation for my garden. Being able to enjoy it during the day *and* at night was like having two gardens in one.

PLANTS WITH GREAT NIGHTTIME ATTRIBUTES

When it comes to what to plant in an evening garden, look for shrubs, trees, vines, herbaceous perennials, and annuals that have bright leaves and white flowers. These reflect available light, whether it’s from an outdoor lantern, the flames of a fire pit, or from the moon.

Real estate agent Ann Nichols curates a shady corner plot in her renowned Oakland, California, garden with an impressive collection of shrubs and herbaceous perennials—all thoughtfully layered in a harmonious arrangement of shapes, textures, and sizes. White-flowering selections of night-scented *Brugmansia × candida* share the spotlight with silvery-leaved Siberian bugloss (*Brunnera macrophylla* ‘Jack Frost’ and ‘Looking Glass’), variegated Japanese knotweed (*Fallopia japonica* ‘Variegata’) with its cream-mottled green foliage, and white-flowered *Anemone × hybrida* ‘Honorine Jobert’. Star jasmine (*Trachelospermum jasminoides*), an evergreen vine with abundant small, white, star-shaped flowers, spills over chest-high white walls nearby, captivating visitors with its bracingly sweet scent.

Resources

The Evening Garden by Peter Loewer. Timber Press, Portland, OR, 2002.

The Moonlit Garden by Scott Ogden. Taylor Trade Publishing, Boulder, CO, 1998.

The Twilight Garden by Lia Leendertz. Chicago Review Press, Chicago, IL, 2011.

nera macrophylla ‘Jack Frost’ and ‘Looking Glass’), variegated Japanese knotweed (*Fallopia japonica* ‘Variegata’) with its cream-mottled green foliage, and white-flowered *Anemone × hybrida* ‘Honorine Jobert’. Star jasmine (*Trachelospermum jasminoides*), an evergreen vine with abundant small, white, star-shaped flowers, spills over chest-high white walls nearby, captivating visitors with its bracingly sweet scent.

CHOOSING PLANTS FOR THE GARDEN

An exceptional evening garden smells wonderful and has plants that seem to glow in the dark because of the luminosity of their foliage and/or flowers. For maximum effect, use selections from each category. Plants that are not hardy in your region can be grown in containers. (For hardiness information on the plants listed below, see page 58.) —P.L.C.

White Flowers

There are so many white-flowered ornamental plants that listing them would be impractical. Plants such as sacred datura (*Datura wrightii*), Solomon’s seal (*Polygonatum* sp.), and snowball bush (*Viburnum opulus* ‘Roseum’) produce mainly white blossoms, while white-flowered species or selections of numerous other genera are easy to find. The key is to choose plants with overlapping bloom times so you can enjoy the longest period of display.

Bright or Reflective Foliage

Bee sage (*Salvia apiana*)
Chalk dudleya (*Dudleya brittonii*)
Dusty miller (*Jacobaea maritima*, formerly *Senecio cineraria*)
Euphorbia characias ‘Tasmanian Tiger’
Japanese painted fern (*Athyrium niponicum* var. *pictum*)
Lamb’s ears (*Stachys byzantina*)
Lilyturf (*Liriope spicata* ‘Silver Dragon’)
Mexican orange (*Choisya ternata* ‘Aztec Pearl’)

Siberian bugloss (*Brunnera macrophylla* ‘Jack Frost’)
Silvermound (*Artemisia schmidtiana*)
Snow-in-summer (*Cerastium tomentosum*)
Variegated Italian buckthorn (*Rhamnus alaternus* ‘Variegata’)
Yarrow (*Achillea millefolium*)

Fragrance

The following plants have sweet-scented flowers that can be enjoyed in evening or a fragrance that is most pronounced after sunset. Asterisks indicate night-bloomers.

Angel’s trumpet (*Brugmansia × candida*)
Daturas (*Datura innoxia* and *D. wrightii*)
Evening primrose (*Oenothera* spp.)
Flowering tobacco (*Nicotiana glauca*)*
Four ‘o clocks (*Mirabilis jalapa*)
Fragrant tea olive (*Osmanthus fragrans*)
Gladiolas (*Gladiolus muriei* and *G. tristis*)*
Madagascar jasmine (*Stephanotis floribunda*)
Moonflower vine (*Ipomoea alba*)*
Night-blooming jasmine (*Cestrum nocturnum*)*
Night-scented stock (*Matthiola longipetala*)*
Star jasmine (*Trachelospermum jasminoides*)
Sweet pea (*Lathyrus odoratus*)
Yucca (*Yucca filamentosa*)



Brunnera macrophylla
‘Jack Frost’

Nichols chose the plants for their attractive leaves and variety of bloom times. “That way, something’s always coming and something’s always going,” she says of this succession planting that allows gardens in mild climates to look nice year round. “But it’s really all about the foliage.”

Richard Turner, editor emeritus of *Pacific Horticulture* magazine, also suggests thin-leaved trees with open frameworks, “like Japanese maples, so that when you are sitting or lying under them the moonlight shines through.”

(For a list of plants that have white flowers, pale foliage, and/or nighttime fragrance, see page 27.)

GO LIGHT WITH HARDSCAPE AND ACCENTS

Pale hardscape elements and accents can add instant beauty to the nightscape. In the Florida coastal region where Harvey lives and works, she says crushed white seashells are often used to pave and illuminate pathways. If you can’t find crushed seashells, though, fine granite in a light hue does the trick just as well.

In the Nichols garden, a weathered, off-white, concrete ram’s head sculpture tucked in the shade garden next to a columnar dripping fountain echoes the variegated foliage and white flowers of the plants around it. On a wooden fence draped with star jasmine, Nichols has hung a large mirror that not only reflects light, but creates the illusion of extra space.



The white pavers and gravel edging in this intricate path help visitors safely navigate the garden in the evening.

INVITING LIGHT

Lighting serves several important functions in the landscape. It illuminates the silhouettes of trees and shrubs, spotlights sculptures and water features, keeps paths safe, defines gathering spaces in the garden, and even deters would-be thieves.

“When you walk into the backyard and it’s largely dark, it is often anything but welcoming at night,” says Washington, D.C.-area landscape lighting designer Mark Oxley, owner of Outdoor Illumination. He has designed and installed outdoor lighting at more than 3,000 residential and commercial properties, including the U.S. Vice President’s Residence, Mount Vernon Estate, and Dumbarton Oaks. “But you can change the garden to a different composition at night based on what you decide to light. You can

MARK OXLEY’S PRO TIPS FOR LANDSCAPING WITH LIGHT

Be selective about what you light. “Less is more. It’s really important to be disciplined because the tendency is to light everything, and if you do, you light nothing,” cautions Mark Oxley. “You want your eye to be led to interesting features. You can get a lot done with very few lights or very few elements lit.”

■ Use light to define a space. “You may want to light certain key elements that are fairly close in to make a space more intimate. In other cases, you may want to see the full depth of the property by borrowing trees or other objects of interest in the distance by projecting the light out to them.”

■ Light from above whenever possible. “Place fixtures in trees or on structures high up to create a moonlit effect. People are most accustomed to lighting that comes from above, so it feels natural to start with, and, in addition to that, there are no visible fixtures.”

■ Install lights on limbs rather than on the trunk of the tree. “Mounting a light fixture on a tree limb and pointing it straight down is the best way to reduce glare. You’ll also get more interesting shadows if there are other limbs below. If you mount a light right on the trunk of the tree, the tree would block 30 percent of the area that could be lit, and inevitably, you’ll have to point it straight down, which means you will have a big hot spot right below the fixture on the trunk itself.”

■ Uplight for dramatic effect and to complement downlighting. “Uplighting is not expected. It’s different, more focused on one element, usually brighter, and creates drama. When you combine downlighting and uplighting, you’re almost guaranteed to hit it out of the park.”

■ LED is the way to glow. Oxley says he works almost exclusively now with LED lighting. “It’s getting better every year, more versatile, and there are more options in terms of color temperature, color rendering, dimmability, softness and brightness.” Plus, it’s long-lasting and better for the environment, using 80 percent less energy and far less wire.

—P.L.C.

make a decision about how much of the garden you want to see—and how much you want your guests to see.”

Oxley says the best lighting looks natural. “The objective is when you walk onto the property, you don’t even know for sure there’s lighting. Then you turn it off, and you’re like, OK, there’s lighting there.” (For Oxley’s tips on lighting an evening garden, see the sidebar above.)

DOUBLE THE ENJOYMENT

If you’re used to thinking you can only enjoy your garden during the day, try some of the ideas offered here. I hope I’ve inspired you to take a fresh look at your landscape and imagine how you can get twice the pleasure from it.

Paul Lee Cannon is a freelance writer who enjoys relaxing in his evening garden in Oakland, California.

Craig Quirk and Larry Neill, who live just outside Portland, Oregon, worked with designer Laura Crockett of Garden Diva Designs to transform their garden—named “Floramagoria” because of the abundance of flowers and foliage together with often cheeky artwork and whimsical accents—into a verdant paradise that’s as inviting at night as it is during the day.

“I always wanted fire and water together,” Quirk explains of the garden’s design inspiration. “The fire pit butts up against the concrete gunnera leaf [designed by artists George Little and David Lewis] which is actually a fountain built into a little pond.” The backdrop for the fountain and blue glass fire pit, designed by Gina Nash of Experienced Materials, is a low wall painted a warm orange. In the pond, papyrus (*Cyperus papyrus*) and elephant ear (*Alocasia* spp.) lend a lush, tropical vibe.

The sweet scent of a large potted angel’s trumpet (*Brugmansia* spp.) fills the air between the fire pit and a spacious dining pavilion with bamboo-framed roof. Underneath hangs a custom metalwork chandelier, also by Nash, whose “kind of subterranean” design of cutout bugs, tiny reptiles, ferns and Venus flytraps, references amusing decorative motifs throughout Quirk and Neill’s playful plot.

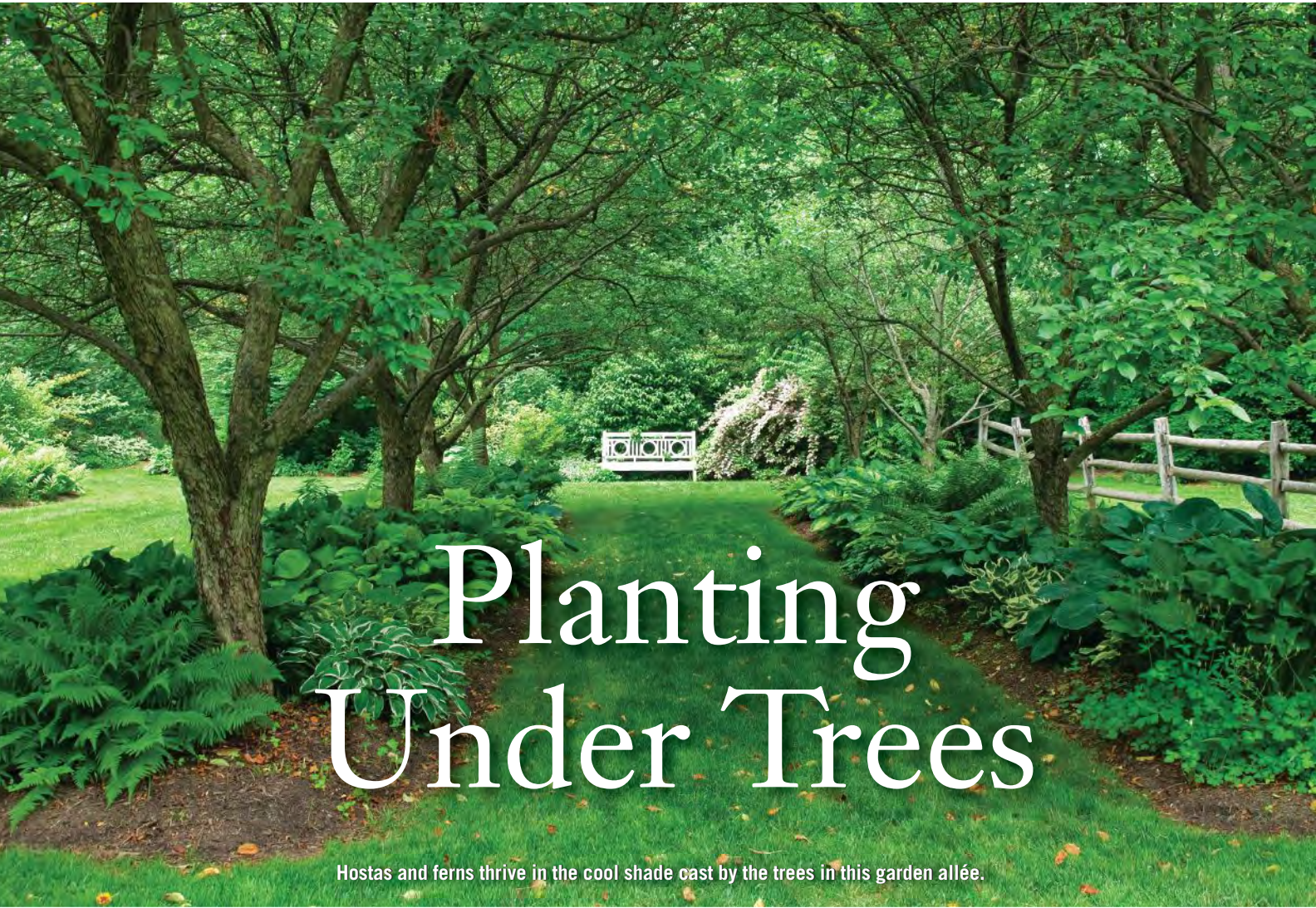
Additional lighting in the garden includes uplighting a giant sequoia in the shade bed and of a bamboo planted behind the orange wall by the fire pit.

“Before, the dining area was just a big table and chairs on the patio, right off the house, so we put the pavilion out in the garden,” says Quirk. “It was a conscious decision to get us out in the garden more.” —P.L.C.

“Before, the dining area was just a big table and chairs on the patio, right off the house, so we put the pavilion out in the garden,” says Quirk. “It was a conscious decision to get us out in the garden more.” —P.L.C.

A lit firepit in the Quirk-Neill garden is an invitation for visitors to pull up a chair and linger. Inset: The homeowners and their friends gather under a whimsical custom metal chandelier.





Planting Under Trees

Hostas and ferns thrive in the cool shade cast by the trees in this garden allée.

DURING MY career as an arborist, a client once asked me to examine the root system of a large tree in his backyard. He wanted to plant a perennial bed around the base of the tree, but was having trouble because the tree's roots were so close to the soil surface. He sought my opinion on whether he could clear away some of the surface roots with an ax.

My response was that if he did that, he might as well just cut down the tree. Damaging the root system that extensively, I explained, would make the tree—which was growing close to his house—dangerously unstable and could even kill it eventually.

Instead, we created an unobtrusive mulch bed around the tree. He was able to install a great new garden without significantly harming the tree's roots.

Understanding the physiology of tree roots before you launch into a planting

Protecting tree roots from damage is important when creating beds under trees.

BY DAVID OETTINGER

project like this will increase your chances of sustaining a tree's health. Because trees—especially mature ones—are a valuable investment, it is critical to carefully consider what you plant around your trees and how you plant it.

THE ROOT OF THE ISSUE

Gardeners naturally tend to focus on the health of the visible, above-ground struc-

ture of the tree. It's easy to forget about the roots, which serve several key functions: anchorage, absorption of water and mineral nutrients, storage of food, association with symbiotic fungi known as mycorrhizae, and synthesis of certain organic compounds, including those that regulate activities in the top of the plant.

Roots, unlike stems, do not have regular branching patterns. They grow wherever moisture and oxygen are available. Paul Cowie, a consulting arborist in Hiawatha, New Jersey, says there's a common misconception that roots do not grow beyond a tree's crown—the circumference of the branch spread. "Roots won't stop at the drip line unless a physical or environmental barrier prevents them from growing beyond it," says Cowie, adding that under ideal growing conditions, a tree's roots can extend up to two to three times the width of the crown.

However, the drip line does define the “critical root zone.” This is the area, explains Scott Josiah, state forester and director of the Nebraska Forest Service in Lincoln, where damage to any roots will adversely affect the tree’s long-term health and structural stability. The closer you garden to an existing tree trunk, the greater the potential for root damage that will cause lasting harm to the tree.

Because the roots of most ornamental trees grow in the first one or two feet of soil, even shallow digging may damage them. And most of the fine feeder roots—the ones that absorb water and nutrients—are located in the upper foot.

Of course, some trees do tend to send roots deeper than others. In some cases, root depth is as much soil dependent as species dependent. According to Cowie, even typically deep-rooted species may become surface-rooted when growing above a rock outcrop or in compacted soil.

Severely compacting the soil around a tree—which often happens when heavy equipment is used during construction or major landscaping—jeopardizes tree health because it removes air that roots need for healthy growth. If you are planning major construction for your home or garden, ask the contractors to make the root zones of

CHEMICAL DEFENSES

A few tree species are allelopathic—they produce chemicals that can kill or inhibit the growth of other plants growing underneath or nearby. The best known examples of this are walnuts (*Juglans* spp.), which produce juglone, a chemical toxic to a wide range of plants including azaleas, blueberries, and tomatoes. Other trees known to have allelopathic tendencies are sugar maple (*Acer saccharum*), black locust (*Robinia pseudoacacia*), some eucalyptus (*Eucalyptus* spp.), and sassafras (*Sassafras albidum*). Establishing new plants under these trees may be more difficult than under others.

—D.O.

trees off-limits to heavy equipment by roping them off or installing temporary fencing.

Root damage may not directly kill your tree. More often, in order to make up for the lack of nutrient uptake, the tree begins to divert resources from defense to growth. This leaves it vulnerable to secondary stresses such as disease and insects. It is this secondary attack that usually kills the tree—months or even years later.

CUT WITH CARE

The rule of thumb among arborists is that once 50 percent of a tree’s root mass is lost, the eventual death of the tree is a foregone conclusion. Extensive root loss also makes a tree very unstable, which can create a hazardous situation.

According to the International Society of Arboriculture, severing even one major root can cause the loss of 15 to 25 percent of the root system. And root damage does not repair quickly. On average, it takes a tree one year for every inch in trunk diameter to recover from torn roots. If you must trim roots radically to accommodate landscape construction, you should consider root pruning well in advance of construction to lessen the impact.

The further away from the trunk the cut, the less likely you are to injure a large root that will have a profound impact on the entire root system. “Unfortunately, on most sites, space is limited and this rule must be bent,” says Gary R. Johnson, an Extension professor in the department of forest resources at the University of Minnesota in Minneapolis. “Just how close an activity can come without seriously threatening the survival of a tree depends on the species, the extent of damage, and the plant’s health.”



Above: Trees with shallow or surface roots, like this one, can be easily damaged by plantings. Right: The health of many urban trees is often compromised during major construction when heavy equipment severely compacts or removes the soil around their roots.



TOUGH TREES

The following common landscape trees have shown some tolerance of root disturbance or soil compaction.

- Acer rubrum* (red maple)
- Carya glabra* (pignut hickory)
- Cercis canadensis* (eastern redbud)
- Crataegus phaenopyrum*
(Washington hawthorn)
- Fraxinus pennsylvanica* (green ash)
- Gleditsia triacanthos* (honey locust)
- Gymnocladus dioica*
(Kentucky coffee tree)
- Ilex opaca* (American holly)
- Magnolia grandiflora*
(southern magnolia)
- Picea abies* (Norway spruce)
- Picea pungens* (blue spruce)
- Pinus banksiana* (Jack pine)
- Pinus virginiana* (Virginia pine)
- Quercus prinus* (chestnut oak)
- Quercus rubra* (red oak)

Top right: Red maple (*Acer rubrum*).
Right: Lilyturf (*Liriope* sp.).



PLANTS FOR DRY SHADE

The plants below tolerate the shade cast by a tree's canopy and the dry conditions caused by the tree roots' great intake of soil moisture.

- Asarum canadense* (wild ginger)
- Carex pensylvanica*
(Pennsylvania sedge)
- Chrysogonum virginianum*
(green and gold)
- Convallaria majalis* (lily of the valley)
- Dennstaedtia punctilobula*
(hay-scented fern)
- Epimedium* spp. (barrenworts)
- Eurybia divaricata*, syn.
Aster divaricatus (white wood aster)
- Hakonechloa macra* (Hakone grass)
- Helleborus foetidus* (stinking hellebore)
- Liriope* spp. (lilyturfs)
- Ophiopogon* spp. (Mondo grasses)
- Polypodium virginianum* (rock fern)
- Polystichum acrostichoides*
(Christmas fern)
- Sanguinaria canadensis* (bloodroot)
- Symphytotrichum cordifolium*, syn.
Aster cordifolius (blue wood aster)

To minimize root damage, Johnson recommends that for each inch of tree trunk diameter at breast height (dbh), allow for one and a half feet of critical root zone for sensitive trees; one foot for trees regarded as more tolerant of root disturbance. So, for a tree with a dbh of 10 inches, cutting roots no less than 15 feet away from the trunk would reduce the risk of major damage.

Arboriculture and forestry professionals use a specially graduated tape to determine trunk diameter, but anyone can make this calculation by measuring the circumference of a tree with a household measuring tape and then dividing that number by three (3.14, or pi, if you want to be precise).

Some tree species are more tolerant than others of root disturbance (see the list above). Older trees are generally less tolerant of disturbance than are younger trees, so if you have a choice, consider creating a new bed under a younger tree.

RAISING THE GRADE

Aside from the impact on a tree's health, the biggest dilemma in trying to plant under one is the same problem my client encountered—finding space to in-



Bulbs and shallow-rooted plants like Johnny jump-ups (*Viola tricolor*) are good choices for sites like this, where a couple of inches of soil have been added around a cluster of trees.



Barrenworts (*Epimedium* spp.), foamflowers (*Tiarella* spp.), and Siberian bugloss (*Brunnera* spp.) form a dense groundcover around a birch tree.

sert new plants among the existing roots. This, too, varies by tree.

“Some tree species produce a denser root mass that is more difficult to work around,” notes Cowie. “Maples, for example, produce a thick, dense mat of fibrous roots while oaks tend to have larger, more distinct primary horizontal roots that can be located and worked around.”

For small-scale landscaping renovations, adding soil around the base of a tree to provide a planting area is probably a better option. This approach has its own potential problems. Adding too thick a layer of soil can starve the root zone of oxygen. Raising the grade around the tree can potentially divert water and nutrients away from roots, too.

It has been my experience, however, that adding some soil around a tree will cause less harm than indiscriminately cutting roots. Experts recommend adding no more than two to four inches of planting medium to the base of any tree at one time.

Make sure to use a light blend of soil—or, better yet, compost—and organic mulch such as wood chips, shredded bark, or pine needles. As it slowly decomposes, this organic matter will condition the

soil, moderate soil temperatures, maintain moisture, and reduce competition from weeds and grass. Never let the planting medium come into direct contact with the trunk because it can facilitate fungal and bacterial infections.

Rex Bastian, an arborist with Davey Tree Expert Co./The Care of Trees in Wheeling, Illinois, advises amending the soil around trees several months in advance of planting. “Mulching first and installing later provides a couple of advantages,” he says. “First, the soil and mulch mix will have had some time to break down, providing some organic matter to the soil. Second, the organic layer will help loosen the soil beneath it, making it easier to open holes to receive the plants. This allows a greater depth over the existing root system with which to work.”

Resources

Arbor Day Foundation, Nebraska City, NE. (888) 448-7337.

www.arborday.org.

International Society of Arboriculture, Champaign, IL. (888) 472-8733.

www.isa-arbor.com.

A BALANCING ACT

Landscaping under or around existing trees involves balancing the health of the tree against the needs of the plants you want to grow under them. When deciding what to plant under your tree, try to match the moisture needs of the new plants with those of the tree or trees they are going to accent. This is important because as you try to get your new garden established, you might wind up overwatering an existing tree that does not like wet soils. Trees such as birches, alders, bald cypresses, sweetgums, and some maples will thrive in moist soils, but most others do not.

Thirsty trees tend to quickly absorb water in their root zone, leading to the dreaded gardening challenge known as dry shade (see the list of plants adapted to dry shade on opposite page). Soil moisture levels are also affected by the rain shadow cast by different trees; dense-canopied trees such as maples, beeches, pines, and spruces tend to divert water toward their drip lines.

Dense-canopied trees also cast heavier shade than open-canopied trees, which means you have a narrower choice of plants adapted to grow underneath them. To let through more light, your main op-



Good choices for planting under trees for spring color include snowdrops and crocuses, above left, and lily of the valley, above right.

tions are to limb the tree up (remove some of the lowest branches) or have its canopy thinned by a certified arborist.

PLANT SELECTION

In general, shallow-rooted herbaceous perennials, bulbs, and groundcovers are best suited to sharing soil space with existing tree roots because they need less growing medium and will not require the digging of large holes around the tree.

Small bulbs such as crocuses, snowdrops (*Galanthus* spp.), *Iris reticulata*, and hardy cyclamen (*Cyclamen* spp.) only need to be planted a couple of inches deep (or covered to that depth with new soil) and can be easily integrated between roots. Rhizomatous or shallow-rooted groundcovers like hardy gingers (*Asarum* spp.), Allegheny spurge (*Pachysandra procumbens*), crested iris (*Iris cristata*), foam-flowers (*Tiarella* spp.), and some ferns are

also ideal for such sites as long as the soil remains somewhat moist.

Because annuals need to be replaced frequently, they are not the best planting choice under shallow-rooted trees unless you grow them from seed.

Shrubs with larger root balls are also problematic. “There is no good way to incorporate a lot of large plants close under a tree without doing long-term damage to the tree,” says Nina Bassuk, a horticulture professor at Cornell University and program leader for its Urban Horticulture Institute. Your best bet is to select the smallest possible ones and plant them in phases over several growing seasons.

If you are planting a bed of mixed shrubs and perennials, consider placing perennials closest to the tree trunk, then gradually integrating shrubs as you get further away from the tree’s major roots.

Remember, arboriculture, like gardening, is both an art and science, so there’s no magic-bullet solution for every situation. But you’ll have better results with both your trees and garden plants if you take tree-root health into account before putting shovel to earth. When in doubt, consult a professional arborist rather than risking the loss of a treasured tree. 🌿

CARING FOR ESTABLISHED PLANTINGS

Once you’ve planted underneath trees, you will have multiple root systems competing for water and nutrients. Be sure to water your new planting regularly for a couple of months until the plants are well established. Then gradually reduce the frequency of waterings but soak the entire planting area thoroughly each time you water.

Deep watering encourages root systems to grow deeper, making plants more drought tolerant and reducing surface rooting that can interfere with your garden. Letting the soil dry between irrigations allows for natural shrinking and swelling that will help improve soil structure.

Watering the lower trunk near the root collar can lead to fungal problems so aim sprinklers or irrigation nozzles away. If you are installing an irrigation system in and around a new garden bed that encompasses trees, arborist Rex Bastian with the Davey Tree Expert Co./The Care of Trees also cautions against running irrigation lines across tree roots. “Many system installers will simply cut the roots of a tree when installing irrigation,” he says. “Require the contractor to run the main line outside the drip line, and run the branches toward the trunk of the tree like spokes on a wheel. Install a directional head that waters away from the tree trunk to avoid problems.”

Established trees generally don’t need much supplemental fertilizer, but with new roots to feed, you may want to add a balanced slow-release fertilizer (10-10-10 is fine) or compost tea at the time you install your new plants. Once the new plants get established, apply fertilizer a couple of times a growing season or amend the bed annually with compost or other organic matter. —D.O.

David Oettinger was a professional arborist and forester for over 25 years. This updated article was originally published in the January/February 2005 issue of The American Gardener.

today's generation of
Tropical Hibiscus

With new selections of tropical hibiscus available, even temperate region gardeners can add sizzling color to their summer landscapes.

BY CALEB MELCHIOR



Newer tropical hibiscus selections like 'Valentine's Day' offer not only spectacular flower color, but a dense, rounded habit, and vigorous growth even when grown as summer annuals in temperate regions.

FEW OTHER flowers have the exotic allure of tropical or Chinese hibiscus (*Hibiscus rosa-sinensis*). Even the basic red, yellow, and peach varieties carried by big box stores make a striking summer focal point. But if your only experience of tropical hibiscus is with these basic varieties or ones you've seen growing in Hawaii or Florida, you have a treat in store. Over the last decade or two, breeders have tapped into the genetic diversity of this tender evergreen shrub to achieve a mind-boggling range of flower shapes, colors, and patterns that range from tie-dyed to kaleidoscopic. The American Hibiscus Society, which maintains a database of registered tropical hibiscus cultivars, now lists more than 7,000 varieties.

"I think that the natural attributes of *H. rosa-sinensis*—including flowers of good form and many colors; strong shiny evergreen foliage; and compact growth habit—combined with genetic flexibility and ease of care has made these obvious winners with home gardeners as well as professional plantsmen," says Barbara Perry Lawton, author of *Hibiscus: Hardy and Tropical Plants for the Garden* (see "Resources," page 39).

Even better news is that because these new hibiscus selections are being produced at less cost than their forbears, gardeners in temperate regions can afford to grow tropical hibiscuses as summer bedding plants, as focal points in mixed borders, or in containers on the patio.

BEAUTIFUL PLANTS WITH MURKY ROOTS

A member of the mallow family (Malvaceae) along with hollyhocks, okra, and cotton, tropical hibiscus has surprisingly murky origins. Plants cultivated under that name today are probably derived from several wild species that originated in subtropical Asia, South Pacific islands, and islands of the Indian Ocean.

"Though not known in the wild any longer, *H. rosa-sinensis* has been grown for many centuries, maybe thousands of years," says Lawton. She notes that the plant has a long history of cultivation in India and China both for its ornamental and utilitarian value; early common names for the plant were shoe black or blacking plant, a reference to a dark purple dye produced from the crushed flowers, which was used in India to stain shoes.

Specimens collected by naturalists and plant hunters made their way to Europe, where they were growing in greenhouses by the mid- to late 1700s. Soon thereafter, they reached North America, where passalong heirloom selections such as 'Double Peach', 'Brilliant', and 'Cooperii' are still commonplace in gardens in southern Florida, coastal Louisiana, and southeast Texas.

subjected to near-freezing temperatures or exposure to wind in winter. In temperate regions, tropical hibiscus in containers must be brought indoors or moved to a greenhouse (for tips on caring for tropical hibiscus, see sidebar on opposite page).

In places with ideal climates, such as Hawaii, tropical hibiscus can become tree-like, but in most subtropical regions, se-



'Sassy Girl' is part of the Cajun Hibiscus™ series developed by Robert Gerlich and Bobby Dupont.

Tropical hibiscus bears attractive glossy green leaves with serrated edges, and flowers in a range of bright colors from white to purple. The single or double flowers are generally funnel-shaped, opening out into five overlapping petals around a prominent central stamen. Bloom is nearly year-round where hardy, but in cooler regions is mainly from spring through fall. They are typically hardy in USDA Zones 9 to 11, but can experience foliage damage if

selections develop into rounded to upright shrubs, maturing at five to 15 feet tall and about half as wide. According to Curt Sinclair, owner of Exotic Hibiscus in LaBelle, Florida, most of the modern selections top out at three to five feet in the landscape, even less in containers. "If you're going to grow them in a container, you're better off with low- or slow-growing" selections, he says. He recommends checking the mature height of specific varieties before purchas-

GROWING TROPICAL HIBISCUS

Tropical hibiscus are relatively easy to grow, but they are greedy plants, demanding plenty of nutrients, water, and warm temperatures to support that lush foliage and long season of bloom. “Hibiscus thrive on everything except neglect,” Robert Gerlich says. Water regularly during dry periods and apply a balanced liquid or granular fertilizer (10-10-10 is fine) monthly during active growth.

Full-sun exposure is important for optimal flowering, but tropical hibiscus will grow with as little as six hours of direct sun per day, particularly in hot climates.

Aphids tend to be the most common outdoor pest of hibiscus, but these can be readily removed with a strong jet of water or with insecticidal soap.

In temperate regions, tropical hibiscus in containers should be brought indoors once nighttime temperatures dip into the mid-40s says Joe Kraut, a horticulturist with Brookside Gardens, a public garden in Wheaton, Maryland. They can be overwintered in a cool greenhouse or a room with bright, indirect light. “Ideally if you can keep them in the 50s, they will go kind of dormant and lose their leaves,” says Kraut. During winter, water only once a month and don’t fertilize. As with many indoor plants, winter stress may make tropical hibiscus susceptible to pests such as mealybugs, spider mites, and scale. Mild infestations can be scrubbed away using an old toothbrush dipped in insecticidal soap; more serious ones should be treated with horticultural oil.

Kraut recommends getting potted hibiscus back outdoors as soon as possible once the weather starts warming. “In late March to early April, once they start to bud out here in the mid-Atlantic, you can begin watering more frequently and fertilizing them,” he says. Before putting them outside, check the rootball to see if the plant is potbound. If so, transplant the hibiscus into a container that is at least two inches wider.

Tropical hibiscus blooms on new wood, and Sinclair says mature specimens should be cut back by about a third in winter or early spring to remove a portion of old wood. Container specimens can be pruned before they are brought indoors for winter so that they take up less space.

—David J. Ellis, Editor



Tropical hibiscus can be grown in containers as specimens or, as shown, combined with other plants.

ing, warning that some retail growers treat hibiscus plants with growth regulators to keep them artificially small in the nursery.

HIBISCUS BREEDERS

Because tropical hibiscus offers such a diverse gene pool and hybridize easily, modern plant breeders and hobbyists have been able to develop selections that offer an astounding range of flower colors, patterns, and sizes, as well as varieties with shorter stature and some with variegated foliage. And they are less expensive and easier to produce now, primarily because they are no longer grafted onto different rootstock.

“There’s so much genetic material, you don’t know what you’re going to get with a new seedling,” says Robert Gerlich, a Jesuit priest who was hooked from the first hibiscus show he attended decades ago. Along with a group of friends from Loyola University, he established the New Orle-



‘Red Hot’ tropical hibiscus combines with variegated abutilon in this summer border to create a knockout combination of foliage and flowers.

ans Hibiscus Club, now the New Orleans Chapter of the American Hibiscus Society.

Through his interest in hibiscus, Gerlich began collaborating with Bobby Dupont, owner of Dupont Nurseries in Plaquemine, Louisiana, who has developed one of the most notable tropical hibiscus breeding programs in the United States. The Dupont-Gerlich hybrids, marketed as Cajun Hibiscus™, are becoming increasingly popular for their ease of growth and flowers that feature unusual colors and patterns, including shades of ochre, plum, and raspberry.

Gerlich cites a Cajun hybrid called ‘Cinnamon Seas’, which has consistently large, smoky orange-brown flowers with a red blush at the center and lilac veining, as an example of the surprises breeders can encounter. One parent is ‘Sweetie’, an orange-flowered selection with modest five- to six-inch flowers, while the other parent is ‘Storm Front’, which has large silvery-lilac flowers. “From a breeding standpoint, what’s unusual about ‘Cinnamon Seas’ is the size of the flower is such a contradiction to one of its parents,” Gerlich notes. ‘Cinnamon Seas’ won Seedling Best of Show at the 2014 New Orleans Hibiscus Society Spring Show.

On the other side of the country, hibiscus breeder Charles Black of Hidden Valley Hibiscus in Hemet, California, was drawn to tropical hibiscus through a different characteristic—their newfound potential for huge flowers. “I was growing and propagating different plants in the early ’90s, trying to find a niche as a wholesale grower,” Black recalls, when he heard about a tropical hibiscus selection called ‘Donna Lynn’ that produced nine- to 10-inch-wide flowers. He was initially skeptical of this claim, but “when it bloomed, it blew my mind,” he says.



New tropical hibiscus selections are available in a wide range of colors and patterns. Here are ‘Cinnamon Seas’, top, Snow on the Mountain, above left, and Spring Fever, above right.

Black built a collection of more than 1,000 hibiscus selections and began propagating. He soon realized, however, that many tropical hibiscus selections had been bred for show rather than for use in home gar-

dens. The large, multicolored flowers were attention grabbing, but the plants were not vigorous and didn’t have attractive foliage or habit. “They didn’t look good compared to other plants in the garden center,” Black

TOP TROPICAL HIBISCUS SELECTIONS

| Cultivar | Height/Width* (feet) | Flower Form and Color | Flower Size (inches) | Year Introduced |
|------------------------|----------------------|--|----------------------|-----------------|
| ‘Acapulco Gold’ | 3–8/2–6 | Yellow, orange, and white | 7–9 | 2008 |
| ‘Magic Moments’ | 3–4/2–4 | Double orange and yellow ruffled | 8–10 | 2011 |
| ‘Snow on the Mountain’ | 3–4/2–4 | Single silver and pink | 6–7 | 2011 |
| ‘Spring Fever’ | 4–8/3–5 | Red, pink, and orange pinwheel | 8–11 | 2014 |
| ‘Thunder Egg’ | 5–6/3–6 | Brown and opal blue with yellow flecks | 5–7 | 2012 |
| ‘Valentine’s Day’ | 4–8/3–6 | Pink and red shades | 7–9 | 2005 |

*These selections may grow larger at maturity in regions where they are hardy year-round outdoors.



One of the selections in the Fascinating Foliage line from Hidden Valley Hibiscus, ‘Thunder Egg’ has deeply cut foliage and flowers with intriguing shades of brown, lilac, and yellow.

says. “I thought, ‘This is intolerable, we need better bushes.’” So he started hybridizing.

Since then, Black has introduced over 150 tropical hibiscus varieties. The best products of his breeding program are introduced in two series, marketed as Fascinating Foliage and Giant Hibiscus.

With the Fascinating Foliage series, Black focused on creating selections with attractive leaves and flowers. “When hibiscus seeds first germinate,” he says, “they will show interesting leaves that don’t look like hibiscus—they’re more deeply cut. As

Resources

Hibiscus: Tropical and Hardy Plants for the Garden by Barbara Perry Lawton. Timber Press, Portland, OR, 2004.

American Hibiscus Society, www.americanhibiscus.org. (Annual membership is \$25 and includes a subscription to the society’s quarterly publication, *The Seed Pod*.)

Sources

Exotic Hibiscus, La Belle, FL. (863) 674-1903. www.exotichibiscus.com.

Hidden Valley Hibiscus, Hemet, CA. (951) 926-7330. www.hiddenvalleyhibiscus.com.

Logee’s, Danielson, CT. (888) 330-8038. www.logees.com.

the plant matures, the seedling reverts to more typical ovate hibiscus leaves.” Black noticed that when he made crosses with one specific parent, half of the seedlings maintained deeply serrated leaves as mature plants. However, the first generation plants only had five- to six-inch flowers in not-so-attractive colors. Persevering, he crossed those seedlings with other varieties to develop a range of different colors that he continues to improve each year. A current

favorite is ‘Thunder Egg’, which has deeply lobed leaves along with intriguing five- to seven-inch flowers in two shades of brown and purple with bright yellow speckles.

With the Giant Hibiscus line, Black has focused on enhancing the trait that first attracted him to tropical hibiscus: the size of their flowers. Black’s breeding program has a full range of varieties that consistently produce flowers eight to 10 inches across, but it hasn’t been easy. “Breeding for size is unpredictable,” he admits. “There is some genetic key that we don’t understand. For instance, we have a seedling that reliably produces 11-inch flowers, but it’s the dullest light pink and a terrible bush.”

To date, one of Black’s favorite Giant varieties is ‘Spring Fever’, which Black says has eight- to 10-inch flowers in a mix of yellows and pinks. His goal is to have large-flowered selections in a wide range of colors within a few years. (For more information on select hybrids introduced by Gerlich, Dupont, and Black, see chart on opposite page.)

Because tropical hibiscus seedlings are quick to bloom—often within a year—Gerlich recommends them for anyone interested in learning how to hybridize (for tips on how to do this, click on the link with this article on the AHS website).

GARDEN PLACEMENT

Where hardy, tropical hibiscus tends to be grown as specimen shrubs, foundation plants, or as components of a mixed border. Older, taller-growing selections such as ‘Brilliant’ and ‘President’ are used for hedging or screening and are sometimes pruned as espaliers.

In temperate gardens, they are more often grown in containers placed on a patio or balcony, or planted outdoors for a spot of bright color in mixed borders or as a focal point among standard bedding plants.

Whether you’re a retiree with a sunny Florida garden, a 30-something Los Angeles apartment dweller, or a Milwaukee commuter with a postage-stamp townhouse plot, there’s a tropical hibiscus for you. Try a few of these new varieties, pamper them with rich soil and a sunny site, and every flower will evoke thoughts of balmy tropical breezes and waving palm trees.

Caleb Melchior is a garden writer based in Little Rock, Arkansas.



Grouped to form a colorful living fence, these Hidden Valley hibiscus hybrids provide a long season of bloom in Darren Eminian’s Los Angeles, California, garden.

Dealing with Poor Drainage

by Scott Aker



Left: The raised bed in this shade garden provides the drainage needed for ferns, impatiens, and other plants to thrive. Above: Performing a simple percolation test will tell you how well your soil drains, which will help you determine the best solution.

PLENTIFUL RAINFALL usually benefits a garden—unless it has drainage problems. Many plants can't survive in waterlogged soil, and those that require consistently moist soil do not necessarily thrive where drainage is poor. For example, camellias, roses, and many ferns that demand constant moisture also need very porous soil that drains well. If most of the pore spaces in the soil are filled by water, the roots don't have access to oxygen, and it is actually the lack of air, not the water, that kills plants that don't tolerate wetness.

There are a variety of techniques for handling soggy soil, from relatively simple fixes to expensive investments. But first, you need to determine the scope of the problem.

MEASURING DRAINAGE RATES

The type of soil in your garden factors into how well it drains. In fine-textured clay and silt soils, small pore spaces limit oxygen in the soil. Water moves slowly through those tiny spaces, which is why heavy soils stay wet for so long. Clay particles may even swell, further limiting water movement.

To assess your soil's drainage, you'll need to test its percolation rate. Start by digging a few holes about two feet deep in various locations on your property. Then, either wait for a soaking rain or water the area thoroughly so you can determine how quickly the soil drains when it is already wet. Fill the holes with water and use a yardstick to gauge the rate of infiltration

in each of the holes. If it takes more than an hour or two for one inch of the water in a hole to move down through the soil, drainage is insufficient to grow plants that cannot tolerate periods of saturation. Instead of a spruce or lilac, you may need to plant a dawn redwood or summersweet.

RISING ABOVE IT ALL

While I've seen lovely gardens featuring only plants that tolerate wet soils, most of us prefer more choices. If your drainage problems are mild, the easiest way to expand your planting options is to simply set sensitive plants higher than the surrounding grade. A good rule of thumb is to only bury the bottom half of the root ball of trees or shrubs below grade; use soil excavated from

the hole to create a gradual slope out from the root ball on all sides.

Similarly, you can build raised beds, particularly for vegetables and fruit trees. As a bonus, the saturated soils below the raised beds will provide a long-lasting and consistent supply of water to your plants, and some will perform better than they would in sandy soil. However, the depth of soil above the surrounding grade must be sufficient to accommodate the root depth of the plants you are growing. I've seen successful raised beds that were no more than six inches in depth, but 12 to 18 inches will support a broader range of plants.

Even sloped areas may have poor drainage. If this is the case on your property, consider terracing the slope before planting. Retaining walls made of stone, brick, or textured concrete are expensive but won't need much maintenance. Wood treated for outdoor use is less expensive but will need to be replaced when it eventually rots. To prevent water pressure from destroying the integrity of the wall and to prevent pooling, create weep holes directly behind the wall's base to allow excess water to exit.

IMPROVING SOIL TILTH

Mixing organic matter, such as well-rotted compost, into the top few inches of soil helps build a fluffy, loose layer that is more hospitable to roots. In heavy soils, adding calcium in the form of gypsum or lime into the soil forces the clay particles to bond into larger units that behave more like silt or sand in terms of their physical properties. But because it can take a massive amount of calcium to affect this change, this technique is practical only for a small area. If you go this route, have your soil tested by a lab (your local Extension service can help you find one) and ask how much calcium you need to improve soil tilth and what amendment you should use.

INSTALLING DRAINAGE PIPES

If pooling is a problem near a downspout, a fairly easy solution is to redirect the flow of stormwater by extending the pipe away from the area (see the photo on the right).

For larger areas with really poor drainage, you can install underground perforated pipe if the problem spot is at a higher elevation than the area you will be draining to. If you are considering drain-

Gardening Q&A with Scott Aker

GALLS ON RHODODENDRONS

When visiting a garden in Maine, I noticed an odd growth on rhododendrons. It was as large as some of the leaves. It appeared to be fleshy with a silvery white surface. What might have caused this, and what would the treatment be?

The growth is a gall caused by a fungus (*Exobasidium vaccinii*). It is fairly common on blueberries and azaleas, but is sometimes also found on rhododendrons [see the photo, right]. It doesn't cause much long-term damage. You can remove the galls to prevent spread of the disease, but dry weather conditions keep it in check.



SLOW-GROWING BLACK COHOSH

I have a black cohosh that has been very slowly establishing in my shade garden. This season, its flower racemes unfurled, but they never fully opened. Do you have any suggestions for how to encourage full bloom next year?

Black cohosh (*Actaea racemosa*) is naturally found in soils that tend to stay moist, so it needs consistent moisture to grow well. If your soil is sandy or if there is a lot of root competition from trees and other plants, it may have a hard time getting enough water when the heat of summer arrives to complete the development of its flower spikes. Next year, try to provide it with extra water. —S.A.

Send your gardening questions to Scott Aker at saker@ahs.org (please include your city and state with submissions).



A partly buried drainage pipe attached to the downspout of a house helps direct stormwater away from problem areas.

ing to a storm drain, check with your local government to see if you need a permit. And before trenching for a drainage pipe, be sure to have your local utilities mark underground infrastructure to avoid damaging it while digging.

Trenches should be deep enough that the pipes will be at least a foot underground. Once dug, place a few inches of pea gravel in the trench, lay the perforated pipe, and fill in with more gravel to a few inches above the pipe. Then, put soil back over the pipe. No point in the area you are trying to drain should be more than about five feet from the nearest pipe. Perforated pipes have a tendency to fill with soil and debris over time. You can buy perforated pipe covered in non-woven fabric if this is a concern.

Like most of what nature throws at us, moisture conditions are not always ideal. With some simple analysis and strategic projects, you can deal with soil that stays too wet.

Scott Aker is a horticulturist in the Washington, D.C., area.

Thornless Blackberries: All Pleasure, No Pain

by Keith Uridel



BLACKBERRIES ARE among the most rewarding fruiting plants to grow. They endure heat, humidity, and summer storms with ease, all while producing heavy yields of large, flavorful, juicy fruit.

These tough plants, which include several species and numerous hybrids in the genus *Rubus*, may be thorny or thornless, and upright or semi-trailing. While most blackberries produce their fruit on second year canes, called floricanes, several new selections bear fruit on the current season's growth—primocanes—as well.

GROWING GUIDELINES

Like all members of the *Rubus* genus, the blackberry's number one requirement is a planting location that has good drainage. Many selections are very early to bloom, especially thornless, upright cultivars, so

avoid planting in frost pockets. Blackberries are usually planted in rows; they can also be grown as large specimens.

Rows should be two feet wide with four to eight feet of spacing between plants for upright cultivars and eight to 12 feet for semi-trailing varieties. This is wider spacing than usually recommended, but I've found that wider spacing improves disease prevention and control, as well as managing the pruning for maximum fruit gain. Spacing between rows should be at least 10 feet.

Full sun is best for blackberries, though afternoon shade will not reduce yields too much. In USDA Hardiness Zones 8 to 11, AHS Heat Zones 11 to 8, afternoon shade can help reduce sunscald on some cultivars.

Plant bare-root stock in spring for USDA Zones 7 and colder; spring or fall planting for Zones 8 and warmer. Potted

stock can be planted anytime the soil can be worked.

SOIL PREPARATION

The majority of blackberry canes arise from their crown, although suckers occasionally sprout outside the row. To save time and energy, I prepare planting holes within the row, rather than till the entire row. I dig a hole about two feet in diameter for each bare-root or potted plant, then amend the soil with a shovel of compost and a few cupfuls of worm castings.

When planting potted stock, I add one cup of a balanced organic fertilizer, such as ReVita Pro (5-4-5), and a quarter cup of kelp meal, which provides essential micronutrients. Bare-root stock should be planted without fertilizers, but topdress them a few weeks after growth has started using the fertilizers mentioned for the potted stock.

If you plant in a raised bed, make sure the bed is at least three feet square, and plan on supporting the fruit-laden canes with stakes for easier harvest.

WATER NEEDS

Getting plants established their first year is critical, and if summers are hot and dry, they may need supplemental wa-



Immature blackberry fruits are red, above. They are ready to be harvested after they have turned black, opposite page.

tering up to three times a week. After establishment, they can endure blistering heat with just one good soaking a week—roughly five gallons of water per mature plant. I use two lines of drip irrigation, one running on each side of the row.

FERTILIZING AND PRUNING

For established plants, I provide one to two cups of balanced, organic fertilizer in late spring. Once growth has started and buds begin to appear, I apply liquid fertilizer once a month: per gallon of water I add two ounces of Neptune's Harvest Fish Fertilizer (2-4-2), one ounce of liquid kelp, and one ounce of blackstrap molasses, which helps stimulate beneficial soil microbes. Depending on the plant size, I apply a quart or two of solution to the root zone of each plant, and also spray leaves with it each week throughout the spring

into early summer. I topdress the plants again in June with one cup of the same fertilizer I used in spring. I have found that this second feeding, combined with the liquid feeding, greatly increases berry size and sweetness.

Blackberries, once established, will grow with abandon. Unpruned, upright cultivars can reach 12 feet or more; and the canes of semi-trailing cultivars can reach 25 feet in length. Proper pruning, however, will ensure a high yield of quality berries, and keep the plants manageable. Pruning for fruit production is done on the primocane—the new growth that arises from the crown in late spring.

For upright cultivars such as 'Apache' and 'Navajo', I like to keep the number of primocanes at four to six per plant. I remove or "tip" the ends of the new canes when they reach five feet tall. This stimulates the growth of many lateral shoots, which should be trimmed back to two feet in very late fall or very early spring, when plants are dormant. For semi-trailing cultivars such as 'Triple Crown' and 'Natchez', I tip the primocanes when they reach eight to 10 feet and later trim most of the laterals to two feet, as is done for the upright cultivars. If you forget to do this, don't worry; the plants will be more unruly, but you'll still have loads of blackberries.

When correctly pruned, upright cultivars are generally sturdy enough to not

require support. The canes of semi-trailing types, however, may need to be tied to a stake or a trellis.

PESTS AND DISEASES

If you follow the growing instructions above, especially the spacing and pruning advice, your plants are unlikely to have serious pest or disease problems. In areas where Japanese beetles are prevalent, foliage damage can occur. If you only have a few plants, it is easy to handpick the beetles and drop them into a bucket of soapy water. Otherwise, apply neem oil as a repellent.

RECOMMENDED CULTIVARS

Semi-trailing Types

'**Natchez**' (early) Large berries, very early, high sweetness.

'**Triple Crown**' (late) Last to bloom so avoids late frosts, medium to large berries, very sweet.

Upright Types

'**Prime Ark Freedom**' (early) First thornless primocane type (bears on current year's growth as well as second year growth), very early on floricanes yield, with very sweet berries.

'**Ouachita**' (early) Medium to large berries, good sweetness, very vigorous.

'**Apache**' (mid) Large sweet berries on well-anchored plant.

'**Navajo**' (mid) Medium-size berries with great flavor; canes need support when fruit load is heavy.

ENJOYING THE HARVEST

For full sweetness, pick berries when they have turned dull black; if you like them a tad tart, pick them when they are shiny black. The fruits store better if picked shiny black, but they will not get any sweeter once harvested.

Blackberries are delicious eaten fresh and also make wonderful jam and cobbler. At my family farm, the berries ripen during the hottest weather, making a perfect topping for a bowl of ice cream. It's hard for me to imagine summers without them.

Keith Uridel owns and operates Backyard Berry Plants (www.backyardberryplants.com), a family farm and nursery in Nashville, Indiana, that grows certified organic berries.

Sources

Hartmann's Plant Company. Grand Junction, MI. (269) 253-4281. www.hartmannsplantcompany.com.

Indiana Berry & Plant Company, Plymouth, IN. (800) 295-2226. www.indianaberry.com.

Stark Bro's, Louisiana, MO. (800) 325-4180. www.starkbros.com.

Harry P. Leu Gardens: A World Traveler's Botanic Garden

by Benjamin Whitacre

WHEN HARRY P. LEU began to build his business empire in Orlando, Florida, in the early 1900s, the future theme park capital suited cattle barons better than family caravans. Hoping to invigorate his agrarian hometown, the enterprising Leu used the money he earned through his industrial supply company to purchase a Spanish moss-draped, 50-acre estate on Lake Rowena. Here, he developed an obsession with camellias, shipping back



plants from his travels around the world. He donated the property to Orlando as its first botanic garden in 1961.

Today, Harry P. Leu Gardens—located just 20 minutes from one of the planet's most popular tourist destinations, Walt Disney World—boasts 40 plant collections with more than 8,000 species, a restored plantation mansion, a dozen educational gardens, and a newly expanded boardwalk onto the lake where exotic birds and other wildlife congregate. But the centerpiece of the gardens is still Leu's camellia collection, which has grown into one of the world's most acclaimed.



Above left: *Camellia japonica* 'Pink Perfection' is one of many varieties in the garden's world-renowned camellia collection. Above: Well suited to Orlando's tropical to subtropical climate, *Livistona decora*, an exotic Australian palm tree, towers above a group of cycads.

Additional Information

Harry P. Leu Gardens, 1920 North Forest Avenue, Orlando, FL 32803.
(407) 246-2620. www.leugardens.com.

- Open daily 9 a.m. to 5 p.m. except Christmas.
- Admission is \$10 for adults; \$3 for children in grades K–12; free for children four and under and Leu members. The garden participates in the AHS Reciprocal Admissions Program and offers free admission to current AHS members. On the first Monday of each month, admission is also free.

Other sites worth visiting in Orlando:

Lake Eola Park, www.cityoforlando.net/parks/lake-eola-park.

Walt Disney World, Behind the Seeds Tour. disneyworld.disney.go.com/events-tours/epcot/behind-the-seeds.

EXACTING STANDARDS

Yet the garden's current status as a public botanical gem was almost derailed by Leu himself, who kept a close watch on the property's transition from private to public.

"The story is that Mr. Leu was very, very disappointed with the way the city was handling it," says Robert Bowden, executive director of Leu Gardens since 1994. "He actually went to the mayor and said, 'My name is on that and I'm a respected man and I think you're being disrespectful. If you can't take care of it, I'll write you a check today and buy it back.' And that really shocked everyone."

Shortly afterward, the city hired a landscape architect to ensure that Leu's

property developed in a manner that met with his expectations.

A GARDEN FOR ALL SEASONS

If the vision of Leu and his collaborators dominated the gardens during Leu's lifetime, today's Leu Gardens focuses on both delighting and educating visitors. Twelve idea gardens are designed to address topics of interest to visitors, such as how to create gardens that attract birds, prosper in wet sites, or allow wheelchair access.

The rose garden, the largest formal collection in Florida, serves as a test plot for cultivars that can be grown successfully in regional gardens without the need for synthetic pesticides. The expansive camellia

collection—only rivaled by sites in California, Italy, and Spain, according to collector Ben George of Orlando—takes top billing. But Leu also has comprehensive collections of palm trees, mahonias, lilyturfs, bromeliads, and heliconias spread across the property. Arranged as much for charm as for science, these collections feature one-of-a-kind plant combinations seen almost nowhere else outside of a greenhouse.

"We're on the botanic cusp, where the southern tip of the temperate U.S. overlaps with the subtropical and tropical," says



The Idea Gardens Gazebo is the hub for 12 inspirational landscapes aimed at educating visitors on various aspects of gardening.

Bowden, "so we can grow this mix of things you wouldn't expect. I've been here 21 years, but I've never adjusted to seeing camellias growing next to banana trees."

A LASTING LEGACY

Leu died in 1977, but the world-class public garden that bears his name continues to live up to his exacting standards. "Leu Gardens makes the kind of things plant collectors love appealing to visitors who might not normally get excited about plants," says Katy Moss Warner, who headed horticulture and environmental initiatives at nearby Walt Disney World for 24 years beginning in 1976. "And it really succeeds in showing other gardens and cities what Leu understood—that beauty is a very real asset."

Benjamin Whitacre is an editorial intern for The American Gardener.

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Horticultural News and Research Important to American Gardeners



Researchers in Syria process seeds for storage. Conflict in the country led to an emergency withdrawal of regionally important seeds from a global seed bank in Norway.

FIRST WITHDRAWAL FROM ARCTIC SEED VAULT

Seed vaults provide plant breeders with stockpiles of genetic ammunition for the arms race against pests, diseases, and climate change. But even vaults built to withstand natural disasters are not immune to political instability.

Escalating conflicts in Syria forced the International Center for Agricultural Research in the Dry Areas (ICARDA), based in Aleppo, Syria, to suspend operations three years ago. ICARDA, which is the world's most important source of grains, became the first seed bank to withdraw seeds from the Svalbard Global Seed Vault in Norway when it accessed its backup supply of 780 taxa in September. It will use these seeds to stock temporary replacement sites in Morocco and Lebanon.

Without the backup collection at Svalbard—nicknamed “the doomsday vault”—seed banks and the scientists who depend on them could potentially have lost access to germplasm of some of the most heat- and drought-resistant grains.

The ICARDA collection is particularly vital because breeders “are focusing on breeding for climate change,” says Steph-

anie Greene, seed curator at the National Center for Genetic Resource Preservation in Fort Collins, Colorado. “Losing the ICARDA collection would mean losing important sources of resistance needed to weather climate change.”

Once ICARDA reestablishes its collection, it will grow the seeds out and restore the backup collection at Svalbard. There are more than 1,700 regional seed banks in the world. Since Svalbard opened in 2008, 66 of them have deposited seeds there.

NEW ROSE EVALUATION PROGRAM

For 75 years, the All American Rose Selection (AARS) rose trial program served as a sort of Good Housekeeping seal of approval for rose growers. Classic selections like ‘Julia Child’, ‘Dick Clark’, ‘Peace’, and Knock Out™ all got the nod from AARS.

AARS was phased out in 2013, but leaders of the American Garden Rose Selections (AGRS), a new national rose trial program, believe they have created a model that will be more relevant to gardeners and landscapers, who increasingly prioritize characteristics like easy maintenance over spectacular flowers.

“The key to success with roses is growing the right rose for the right location,” says Patricia Shanley, president of the American Rose Society and coordinator of AGRS. “Clearly not every rose will grow well in every part of the country.”

The new program weights scores heavily toward disease resistance and regional performance, something Shanley says the AARS assessment did not do. It also assigns greater value to overall landscape effect than it does to the appeal of individual flowers.

Test gardens across the United States will evaluate roses for two years and grant regional awards in six regions: Northwest, Southwest, North Central, South Central, Northeast, and Southeast. This year’s inaugural winners—for multiple regions—are



Dee-Lish® ranked high for fragrance.

Phloxy Baby™ (“Raddcleome”), which has flower clusters resembling those of phlox, and the thornless shrub rose ‘Thomas Affleck’. A citrus-scented, heirloom-style rose called Dee-Lish® (“Meiclusif”) won the national fragrance award. To learn more, visit www.americangardenroseselections.com.

HURRICANE SANDY FUNDS DEVOTED TO NATIVE PLANT RESTORATION

The U.S. Department of the Interior has set aside \$2.3 million for the first major Federal seed-collecting project on the East Coast.



Populations of native plants in areas destroyed by Hurricane Sandy in 2012, such as Oakwood Beach on Staten Island, above, will be restored with regional seed stock, left.

As part of the Seeds of Success program, seeds of native plants will be used to restore coastal plant populations wiped out by Hurricane Sandy in 2012, and to help limit erosion from future storms. Unlike previous coastland restorations, which often used seeds from across the country, each region will be repopulated only with seeds gathered from nearby populations of plants.

“Translocating plant species of one ecotype to an area of different environ-

mental conditions can result in planting failures,” says Ed Toth, director of the Mid-Atlantic Regional Seed Bank, one of the partners in the project. “Also there is considerable scientific evidence suggesting that introduction of new genetic material in an area can genetically damage existing local populations.”

The Mid-Atlantic Regional Seed Bank and its partners, the New England Wild Flower Society and the North Carolina

Botanic Garden, will spend two years collecting seeds of 50 species from up to 1,400 sites. By approximating natural genetic diversity in replantings, the project will minimize disruptions to ecosystems.

“Funding of the Hurricane Sandy Recovery program is reflective of the change in the way people perceive biodiversity, healthy ecosystem function, and plants and their importance in supporting and protecting human society,” says Toth.



NICE DIGS!

The OXO Good Grips Trowel is constructed of high-grade 420 stainless steel for strength and durability. It features a soft, non-slip handle with a gel insert that flexes to provide cushioning when digging into tough and compacted soil. Easy-to-read markings provide clear and convenient depth measurement and serrated edges tear through tough soil and weeds.



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U.S. BRACES FOR NEW TOMATO PEST

America's favorite summer vegetable (or fruit, if you prefer) may soon get a lot more expensive to grow. The tomato leafminer, a South American insect smaller than a tomato seed but capable of destroying entire tomato crops, is considered a threat to invade the United States.

The tomato leafminer (*Tuta absoluta*), arrived in Spain in a plant collector's lug-



Although tiny, the larval stage of tomato leafminers can do a lot of damage.

gage in 2006. Since then, it has rapidly infested swaths of Europe, the Middle East, and Africa, and is currently heading for Asia. Recently the pest also started moving

into Central America, which has led to concern about the potential to reach the United States. The insect escapes containment and spreads so quickly in areas where its natural predators are absent that the U.S. Department of Agriculture, Animal and Plant Health Inspection Service has prohibited importing the insect for research.

"It will cost millions of dollars to manage this pest if it gets introduced," says Muni Muniappan, an entomologist at Virginia Polytechnic Institute and State University in Blacksburg, who is heading global efforts to control the tomato leafminer. "Tomato prices may go up at grocery stores, and although home growers may not have to rethink growing tomatoes, the cost of production will likely go up."

The tomato leafminer consumes tomatoes in its destructive larval stage, then develops wings and spreads as an adult. In addition to tomatoes, it feeds on other solanaceous crops, such as potatoes, eggplants, peppers, and tobacco. Control methods include pheromone traps, biopesticides, parasitoids, predators, and mass trapping.

OVERCOLLECTION THREATENS CACTI

The picturesque spines, tolerance for heat and drought, and attractive colors that keep cacti alive in brutal environments and make them popular easy-care ornamentals may now be working against them.

Thirty-one percent of cacti species around the world are endangered, making them the third most threatened plant group after cycads and conifers, according to a study released in October in *Nature Plants*. Illegal plant collection and land development pose the biggest threats to cacti, according to Barbara Goettsch, lead author and co-chairwoman of the International Union for Conservation of Nature's Cactus and Succulent Specialist Group.



Many cacti species, such as these old man cacti, are popular in gardens but endangered in their native habitats.

Several traits make cacti species particularly vulnerable, according to Goettsch. Cacti species often occur in very small areas where they have evolved to grow only in specialized soils. Factoring in that many cacti species have a limited ability to disperse seeds, "it is often difficult for seedlings to establish," says Goettsch. "Also they tend to be slow growing species, so it takes them a long time to reach maturity and be able to reproduce."

"Our study now allows us to know which cacti species are affected by which threats and where, so effective conservation planning can be done," says Goettsch.

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Photo © David Schrichte

MUTANT PLANTS TO FIGHT POLLUTION

When the smoke clears after munitions explode, residual chemicals from the blast bond with soil and can create a toxic cocktail that poisons plants and animals. Not relevant to my backyard, you might say, but it does affect 24.7 million acres—or a swath of land bigger than the state of Indiana—of military-owned land in the United States that is contaminated by TNT from bombing runs and ordnance testing.

But that may change now that researchers at the University of York in the United Kingdom have discovered the enzyme that makes TNT toxic to plant cells.

By engineering plants to stop producing the enzyme, or by selecting mutant plants that do not produce it, it may be possible to clean soil and repopulate barren land through phytoremediation—using plants to remove the toxic compounds.

TNT resists water like a wax “so it tends to remain at the site of contamination as it will bind to organic materials and clay in soil,” says Neil Bruce, who is leading the research. Bruce expects that mutant plants will extract TNT through their roots, many other plants can remove toxins such as heavy metals and arsenic from contaminated soil.



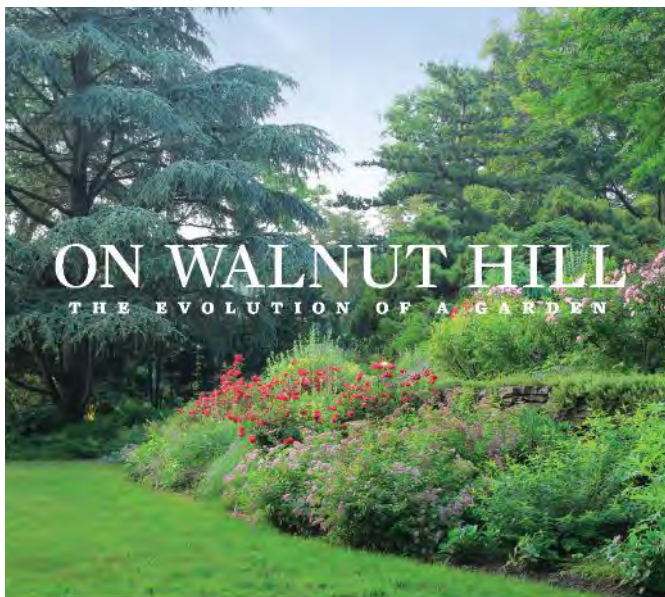
When exposed to TNT, normal *Arabidopsis* plants, shown on the left in each of the photos above, struggle to grow while mutant ones, on the right, appear unaffected.

BALL ACQUIRES CONARD-PYLE

Conard-Pyle, a family company at the forefront of American rose culture for more than a century, has been sold to Ball Horticultural Company, headquartered in Chicago, Illinois. Ball plans to retain all of Conard-Pyle’s operations and staff in West Grove, Pennsylvania.

Over the past few years, several prominent rose nurseries in North America—including Pickering and Vintage Gardens—have closed. As a result, Conard-Pyle, whose Star Roses launched the highly successful Knock Out™ series, downsized its wholesale operations in 2010 while expanding its plant genetics, patents, and licensing programs. The merger with Ball will give Conard-Pyle access to Ball’s extensive marketing and distribution branch, according to Steve Hutton, CEO of Conard-Pyle.

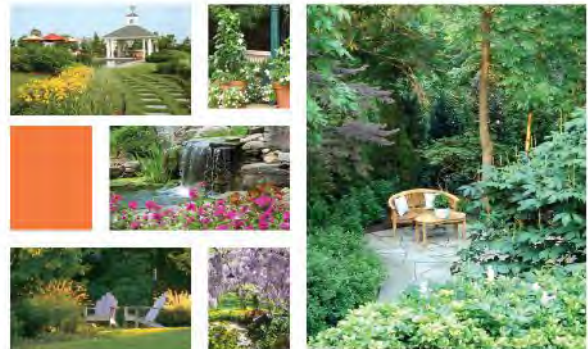
Benjamin Whitacre, Editorial Intern



On Walnut Hill: The Evolution of a Garden
Chronicling the garden of A.C. and Penney Hubbard
as designed by Kurt Bluemel

By Kathy Hudson, Foreword by Allen Bush,
Photography by Roger Foley
Available now at onwalnuthill.com

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Attracting Birds to Your Garden

by Rita Pelczar

IF YOU OFFER food, water, and shelter, songbirds will flock to your yard. Providing these essentials involves a combination of plant selection and the incorporation of a few bird-friendly accessories. In return, the birds will enliven your garden with their antics.

SETTING THE TABLE

Along with growing a variety of seed- and fruit-bearing plants, you can further diversify the menu by installing bird feeders and keeping them filled—especially in winter when other food sources may be scarce. Place feeders where they are convenient to observe and replenish, in a quiet area near trees and shrubs (but away from potential hiding spots for outdoor cats), so birds can roost safely between visits.

Different feeder styles suit various feeding habits. Platform feeders—either elevated or on the ground—attract the widest array of wild birds. A hopper feeder is equipped with a chamber where the seed is contained, protected from weather, and gradually released. Tube feeders are simply hollow cylinders with ports and perches for feeding. They can also be constructed of wire mesh, to which small birds such as finches and nuthatches cling. A suet cage is a wire basket designed to contain high calorie suet. And nectar feeders—containers that dispense sweet liquid food—are a must for hummingbirds.

You can build your own feeders—there are plenty of good plans available on the Internet—or you can purchase ready-made feeders. Duncraft (www.duncraft.com) makes a very nice small platform feeder called the **Universal Deck Rail Feeder**, which attaches with a single screw to a standard four-inch deck rail. The clear plastic roof protects the seed from rain without blocking your view.



Mighty Mesh Feeder



Universal Deck Rail Feeder

Both the **Terrific Tube Feeder** and **Mighty Mesh Feeder** from Coles (www.coleswildbird.com) are equipped with bottoms that can be removed with the push of a button, which means cleaning the feeder—something that should be done regularly—is very easy. Coles also offers a variety of bird foods. Two that I like for winter feeding, when birds need extra energy to stay warm, are **Suet Kibbles** and **Nutberry Suet Blend**.

LIBATIONS

When it comes to birdbaths, a basin with a gentle slope is easiest for birds to enter, and a depth of one to two inches is sufficient. Site your birdbath where



Terra Cotta Birdbath

you can conveniently refill and clean it frequently; smooth surfaces—glazed, glass, or plastic—are easier to clean than old-fashioned concrete basins.

Lee Valley (www.leevalley.com) offers a **Terra Cotta Birdbath** with a smooth glazed surface that's a breeze to clean. It comes in both hanging and standing models. The hanging model supports the basin in a metal ring with three 24-inch chains that can be secured to a branch or



Argus Peacock Glass Birdbath

deck overhang. A metal tripod supports the basin of the standing model.

The gentle sound of water splashing is a pleasant addition to any garden and it appeals to birds as well. All Solar Fountain (www.allsolarfountain.com) has several styles of bubbling birdbaths that are solar powered so they require no additional wiring. The **Argus Peacock Glass Birdbath** adds color and sound to the garden, not to mention water for your birds. At 20 inches in diameter, the shallow glass basin makes a sizeable splash pool for your feathered guests. A solar panel and pump keep water bubbling through a central tube whenever



Heated Birdbath

the sun is out. The basin rests securely on a 24-inch-tall metal stand.

If winter temperatures regularly dip below freezing in your region, consider adding an immersion-style heater to prevent ice formation. You can also purchase birdbaths with built-in heaters. The **Heated Birdbath** from Songbird Essentials (www.songbirdessentials.com) has an attractive cedar frame, which helps hide the electrical cord, and is available in both free-standing and deck-mounting styles. Both are equipped with a thermostat that turns on the heating element when temperatures drop low enough, preventing the

water from freezing in temperatures as low as -20 degrees Fahrenheit.

NESTING SITES

One of the most rewarding backyard birding activities is watching birds build their nest to hatch a brood. Plans for building species-specific nest boxes are readily available, but if you're not the DIY type, there are plenty of ready-made options, too.

Eastern bluebirds seem to thrive in the open woodlands on my property, so I've installed several boxes for their use. Lee Valley's **Cedar Bluebird House** is one of the sturdiest and best-equipped bluebird boxes that I've come across. A copper shield surrounds the portal to prevent bigger birds or squirrels from enlarging the entrance and stealing the nest. There are holes for ventilation and drainage, a metal screen to elevate the nesting site, and a screen-ladder on the front wall for fledglings when they're ready to take flight. Hinged sidewalls provide access for cleaning; one side has a clear acrylic insert so you can observe the nest without disturbing it.

Many birdhouses double as garden art. Gardener's Supply Company (www.gardeners.com) offers a **Woven Bamboo Birdhouse** that sports an attractive teardrop shape. Sized for small birds such as nuthatches and titmice, it is well constructed of woven bamboo that provides good ventilation and drainage. It has a metal hanging loop and a convenient clean-out door on its backside.

MAKING NEW FRIENDS

Learning to recognize each bird and its habits can be as much fun as growing new plants. The **Cornell Lab of Ornithology** (www.allaboutbirds.com) offers extensive information about backyard birding, from identification and migration, to building feeders and nest boxes. I often turn to its website to help me identify new avian friends that show up to feast at my feeders.

If you really become passionate about attracting birds, you might enjoy participating in various citizen science initiatives, such as **Project FeederWatch** (www.feederwatch.org) that tracks the movement of birds in winter.



Cedar Bluebird House



Woven Bamboo Birdhouse

Rita Pelczar is a contributing editor for The American Gardener.

Recommendations for Your Gardening Library

Heirloom Harvest: Modern Daguerreotypes of Historic Garden Treasures

By Amy Goldman with photographs by Jerry Spagnoli. Bloomsbury USA, New York, New York, 2015. 192 pages. Publisher's price, hardcover: \$85.

AMY GOLDMAN is the award-winning author of *Melons for the Passionate Grower*, *The Compleat Squash*, and *The Heirloom Tomato*, and a longtime champion of heirloom plants. In *Heirloom Harvest*, she takes her expertise and dedication a notch higher, collaborating with photographer Jerry Spagnoli to artfully chronicle the unique world of heirlooms.

The book is anchored by Goldman's personal account of her 25-year journey restoring a historic house and the surrounding 200-acre farm in Dutchess County, New York. As her gardening experience grew, so did her love affair with heirlooms and her determination to preserve the genetic and cultural diversity they represent.

Along the way, she embarked on a 15-year collaboration with Spagnoli, one of the world's foremost practitioners of daguerreotype photography. The daguerreotype process produces ethereal images with a silvery, luminous depth. Their timeless beauty seems uniquely suited for documenting the rich diversity of heirloom vegetables, fruits, and herbs. "What better way to pay homage to heirloom plants than to marry them to the most heirloom of heirloom photography?" Goldman writes.

An afterword written by M Mark, founding editor of the *Village Voice Literary Supplement*, documents Spagnoli's thoughts on the origin of his collaboration with Goldman, the process of documenting her garden over time, and the challenges of daguerreotype photography. And a useful appendix matches common and scientific names for the plants shown in the book.

"*Heirloom Harvest* is an act of preservation and a way of honoring the diversity, and history in the face of pressure not to garden, not to save seeds," writes Goldman.

This book is an eloquent reminder that many of the treasured heirlooms depicted might have been lost if not for the dedication of Goldman and other seed savers over the years. Hopefully it will inspire readers to learn more about growing and preserving these heritage varieties themselves.

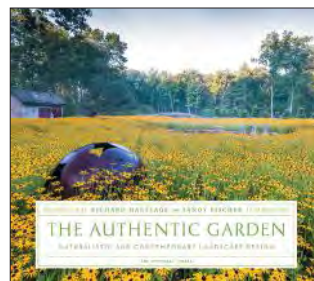
—Ellen Ecker Ogden

Ellen Ecker Ogden is the author of several books, including The Complete Kitchen Garden (Stewart, Tabori and Chang, 2011). Find her online at www.ellenogden.com.

The Authentic Garden: Naturalistic and Contemporary Landscape Design

Richard Hartlage and Sandy Fischer. The Monacelli Press, New York, New York, 2015. 224 pages. Publisher's price, hardcover: \$50.

A COMMON FAILING of books about contemporary gardens is they don't place the work of today's landscape architects



and garden designers within a historical context. Fortunately, in *The Authentic Garden: Naturalistic and Contemporary Landscape Design*, authors Richard Hartlage and Sandy Fischer take a more holistic approach. While the book is not a work of garden history per se, the authors do connect

the dots between significant gardeners of the past, including William Robinson (1838–1935) and Gertrude Jekyll (1848–1932), and more than 50 firms working today.

Hartlage and Fischer, principals of the Seattle-based firm Land Morphology, introduce readers to a variety of important designers and horticulturists whose work has significance not only to today's public gardens and private estates but also to average American gardeners. More than 200 color images, many taken by Hartlage, showcase the versatility and scope of the practitioners' work.

By grouping planting styles into categories such as architectural, naturalistic, meadow, matrix, graphic, and ecological, the authors imply the arrival of a new kind of "landscape gardening." Although the designers showcased in this book may choose to work within one or several of these categories, the common thread is that they make plants and planting design the centerpiece of their work and create environments that connect people to the beauty of nature.

Hartlage and Fischer's underlying thesis, that the pursuit of beauty for beauty's sake is an appropriate *modus operandi* within the garden realm, is a significant departure from the streamlined, rectilinear, and "restrained" gardens that have prevailed in landscape architecture over the past decade or so. Although they do not argue their point as vociferously as they might, their gentle advocacy makes this book stand out in comparison with other recent publications on design.

As a result, *The Authentic Garden* offers knowledge, insight, and inspiration to both professionals and home gardeners alike.

—Susan Hines

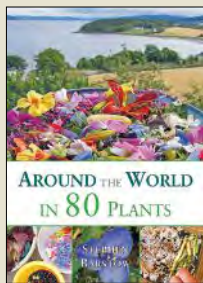
Susan Hines is a former staff writer for Landscape Architecture magazine. She lives and gardens in Hyattsville, Maryland.

GARDENER'S BOOKS

Armchair Exploration

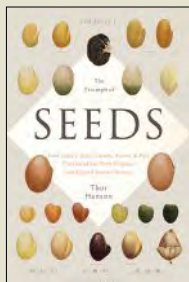
Good gardening books are never more welcome than when the days are short and summer's final fruits and flowers are finding new life in dried arrangements and wreaths. These recent releases will guide you from the garden of Eden, across the world, and back to your own landscape—with fresh ideas for next year's plantings and new eyes for old favorites.

Around the World in 80 Plants (Permanent Publications, 2015, \$29.95) culls unexpected edibles for every garden from six continents. Author and “extreme salad man” Stephen Barstow blends unusual recipes, botanical details, and personal adventure in a book of particular interest to permaculturists or home gardeners looking to experiment in the kitchen. The hybrid format makes this the rare herbal suited as much for pleasure as for reference.

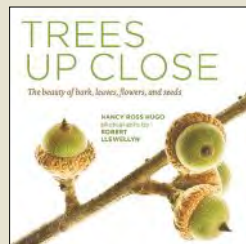


Occasional evangelizing and new coinages, such as “edimental” for edible ornamental, suggest that the author aims for wider impact than the breezy title suggests.

From our clothes, food, and medicines, to the design of war planes, seeds shape almost every part of our lives. In ***The Triumph of Seeds*** (Basic Books, 2015, \$26.99) conservation biologist Thor Hanson chronicles the symbiotic relationship of humans and seeds through a series of anecdotes that spans the biblical expulsion from Eden to the Arab Spring. Hanson's cinematic accounts of his own research and his interactions with the experts behind his stories set this apart from other era-hopping historical narratives. Useful appendices provide specialized scientific terminology and extended historical details.



Trees Up Close (Timber Press, 2014, \$15) features balletic images of common trees created through a special process designed for microscope slides. Photographer Robert Llewellyn and author Nancy Ross Hugo have created a book whose concise text and almost pocket-size dimensions make it perfect for tree-watching in the backyard or forest. A water- and dirt-resistant cover makes it easy to wipe off



the book before returning it to the shelf.

—Benjamin Whitacre, Editorial Intern



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GIFTS FOR THE GARDENER

Here are plant- and garden-themed gift ideas sure to inspire visions of gorgeous gardens in the depths of winter.



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(703) 768-5700. www.ahs.org/floralmugs.



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Handmade from recycled glass, this elegant hummer feeder hangs from a rustic tin cupola. It holds six ounces of nectar and features bee-proof feeding tubes. \$63.99. (410) 672-0082. www.gardenartisans.us.

Products profiled are chosen based on qualities such as innovative design, horticultural utility, and environmental responsibility; they have not necessarily been tested by the American Horticultural Society. Listed prices are subject to change.

REGIONAL HAPPENINGS

Horticultural Events from Around the Country

NORTHEAST

CT, MA, ME, NH, NY, RI, VT

RAP NOV. 21–JAN. 3. **Christmas at the Newport Mansions.** Tours. Green Animals Topiary Garden. Portsmouth, Rhode Island. (401) 683-1267. www.newportmansions.org.

RAP NOV. 27–DEC. 13. **Festival of Trees.** Display. Massachusetts Horticultural Society Gardens at Elm Bank. Wellesley, Massachusetts. (617) 933-4900. www.masshort.org.

JAN. 7 & 8. **New Directions in the American Landscape.** Symposium. Connecticut College Arboretum. New London, Connecticut. (860) 439-5020. www.conncoll.edu/the-arboretum.

JAN. 22–24. **Annual Organic Farming and Gardening Conference.** Northeast Organic Farming Association of New York. Saratoga Springs, New York. (585) 271-1979. www.nofa.org.

MID-ATLANTIC

DC, DE, MD, NJ, PA, VA, WV

RAP DEC. 4. **Documenting the Natural World through 3D Printing and Digital Technology.** Workshop. The Pennsylvania

Horticultural Society. Philadelphia, Pennsylvania. (215) 988-8800. phsonline.org.

RAP DEC. 4–6. **Fabulous Wreaths.** Tour and workshop. Hillwood Estate, Museum & Gardens. Washington, D.C. (202) 686-5807. www.hillwoodmuseum.org.

RAP DEC. 9. **Edible Ornaments for Birds.** Workshop. Mt. Cuba Center. Hockessin, Delaware. (302) 239-4244. www.mtcubacenter.org.

RAP DEC. 26. **Walking in a Winter Wonderland Scavenger Hunt.** Family event. The Frelinghuysen Arboretum. Morris Township, New Jersey. (973) 326-7601. www.arboretumfriends.org.

Botanical gardens and arboreta that participate in AHS's Reciprocal Admissions Program are identified with the **RAP** symbol. AHS members showing a valid membership card are eligible for free admission to the garden or other benefits. Special events may not be included; contact the host site for details or visit www.ahs.org/rap.

SOUTHEAST

AL, FL, GA, KY, NC, SC, TN

NOV. 27–JAN. 2. **Magic Christmas in Lights.** Outdoor holiday display. Bellingrath Gardens and Home. Theodore, Alabama. (251) 973-2217. www.bellingrath.org.

RAP DEC. 1. **Fragrant Flowers, Trees and Shrubs.** Class. Harry P. Leu Gardens. Orlando, Florida. (407) 246-2620. www.leugardens.org.

RAP DEC. 17. **Caring for Mature Trees.** Tour and lecture. South Carolina Botanical Garden. Clemson, South Carolina. (864) 656-3405. www.clemson.edu/public/scbg.

RAP JAN. 19. **Native Plants for Your Garden.** Lecture and forum. Sarah P. Duke Gardens–Duke University. Durham, North Carolina. (919) 684-3698. gardens.duke.edu.

NORTH CENTRAL

IA, IL, IN, MI, MN, ND, NE, OH, SD, WI

RAP NOV. 28–JAN. 3. **The Gift of Nature: 10 Plants that Changed the World.** Exhibit. The University of Michigan Matthaei Botanical Gardens and Nichols Arboretum. Ann Arbor,

Winter Garden Classes

EVEN IN THE coldest regions of the country, winter is an ideal time of year for certain outdoor tasks, such as pruning. But for gardeners who start to develop cabin fever, public gardens and other educational venues offer a variety of classes and workshops that cover everything from plant identification to seed saving, garden design, and getting the most out of the vegetable garden.



Deciduous trees in winter at the Arnold Arboretum

On December 5 and 12, the **Arnold Arboretum of Harvard University** in Boston, Massachusetts, will use its historic 281-acre collection to teach students how to identify deciduous species without the aid of foliage and flowers. “People seem to be tree blind in winter,” says Pam Thompson, manager of adult education at the Arnold Arboretum. “But looking at trees in winter, stripped of their leaves, opens a window onto details to observe and offers the opportunity to better appreciate trees.” Participants will learn how to use twigs, buds, bark, fruit, and the distinctive branch structure of trees to make positive identifications. A winter pruning workshop follows on January 30. For more information or to register for classes, visit my.arboretum.harvard.edu.

On January 30, 2016, as part of the **Annual Southern Gardening Symposium** at Callaway Gardens in Pine Mountain, Georgia, author and botanist Larry Mellichamp will introduce attendees to the best blooms and bark as well as ornamental and edible vegetables that put on their show when other flowering plants are dormant. In the presentation, standbys such as camellias, hellebores, witch hazels, wintersweet, and kale are paired with less-common choices such as native chokeberry and *Edgeworthia chrysantha*. To find out more about the symposium, which begins on January 29, visit www.callawaygardens.com.

—Benjamin Whitacre, *Editorial Intern*

Michigan. (734) 647-7600. www.lsa.umich.edu/mbg.

RAP DEC. 5 & 19. **Butterfly Blizzard**. Hands-on display. Reiman Gardens-Iowa State University. Ames, Iowa. (515) 294-2710. www.reimangardens.com.

RAP JAN. 9-MAR. 6. **Orchids**. Live plant exhibit. Franklin Park Conservatory and Botanical Gardens. Columbus, Ohio. (614) 715-8000. www.fpconservatory.org.

SOUTH CENTRAL

AR, KS, LA, MO, MS, OK, TX

RAP NOV. 8-JAN. 3. **The 12 Days of Christmas**. Display. Dallas Arboretum and Botanical Garden. Dallas, Texas. (214) 515-6500. www.dallasarboretum.org.

RAP NOV. 21-DEC. 31. **Holiday Lights**. Display, free concerts. Garvan Woodland Gardens. Hot Springs, Arkansas. (501) 262-9300. www.garvangardens.org.

RAP NOV. 27-DEC. 23. **Christmas in Rose-land**. Display gardens of the American Rose Society. Shreveport, Louisiana. (318) 938-5402. www.rose.org.

RAP NOV. 27-DEC. 31. **Holidays in Bloom**. Live plant display. San Antonio Botanical

Garden. San Antonio, Texas. (210) 207-3250. www.sabot.org.

RAP DEC. 1-31. **A Natural Winter**. Display. Texas Discovery Gardens. Dallas, Texas. (214) 428-7476. www.texasdiscoverygardens.org.

SOUTHWEST

AZ, CO, NM, UT

RAP NOV. 27-DEC. 31. **Las Noches de las Luminarias**. Display. Desert Botanical Garden. Phoenix, Arizona. (480) 941-1225. www.dbg.org.

DEC. 17-JAN. 17. **Kadomatsu in the Japanese Garden**. Workshop. ABQ BioPark Botanic Garden. Albuquerque, New Mexico. (505) 768-2000. www.cabq.gov/culturalservices/biopark/garden.

JAN. 15-17. **Maricopa County Home & Garden Show**. Arizona State Fairgrounds. Phoenix, Arizona. (602) 485-1691. www.maricopacountyhomeshow.com.

WEST COAST

CA, HI, NV

RAP DEC. 12. **A Walk in the Clouds: Inside the Mesoamerican Cloud Forest**. Tour. San Francisco Botanical Garden at

Strybing Arboretum. San Francisco, California. (415) 661-1316. www.sfbotanicalgarden.org.

RAP DEC. 21. **Making the Case for Agriculture at Botanic Gardens**. Lecture. Santa Barbara Botanic Garden. Santa Barbara, California. (805) 682-4726. www.sbbg.org.

NORTHWEST

AK, ID, MT, OR, WA, WY

RAP NOV. 26-JAN. 3. **Winter Garden aGlow**. Display. Idaho Botanical Garden. Boise, Idaho. (208) 343-8649. www.idahobotanicalgarden.org.

DEC. 7. **Growing Cacti and Succulents Indoors**. Class. University of Washington Botanic Gardens-Center for Urban Horticulture. Seattle, Washington. (206) 685-8033. depts.washington.edu/uwbg.

CANADA

RAP NOV. 14-JAN. 3. **Holiday Traditions**. Outdoor light display, train show, and special seasonal activities. Royal Botanical Gardens. Burlington, Ontario. (800) 694-4769. www.rbg.ca.



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PRONUNCIATIONS AND PLANTING ZONES



Most of the cultivated plants described in this issue are listed here with their pronunciations, USDA Plant Hardiness Zones, and AHS Plant Heat Zones. These zones suggest a range of locations where temperatures are appropriate—both in winter and summer—for growing each plant. USDA Zones listed are still aligned with the 1990 version of the USDA's map.

While the zones are a good place to start in determining plant adaptability in your region, factors such as exposure, moisture, snow cover, and humidity also play an important role in plant survival. The zones tend to be conservative; plants may grow outside the ranges indicated. A USDA zone rating of 0–0 means that the plant is a true annual and completes its life cycle in a year or less.

A–C

Acer rubrum AY-ser ROO-brum
(USDA Hardiness Zones 3–9, AHS Heat Zones 9–1)

A. saccharum A. sak-AH-rum (4–8, 8–1)

Achillea millefolium ah-kih-LEE-uh
mih-lih-FO-lee-um (3–9, 9–1)

Actaea racemosa ack-TEE-uh ras-eh-MO-suh
(3–8, 9–1)

Anemone ×hybrida uh-NEM-o-nee
HY-brih-duh (4–8, 8–1)

Artemisia schmidtiana ar-teh-MEEZ-yuh
shmit-ee-AN-uh (5–8, 8–4)

Asarum canadense uh-SAR-um kan-ah-DEN-see
(2–8, 8–1)

Athyrium niponicum var. pictum uh-THIH-ree-um
nih-PON-ih-kum var. PIK-tum (5–8, 8–1)

Brugmansia ×candida brug-MAN-see-uh
KAN-dih-duh (10–11, 12–1)

Brunnera macrophylla bruh-NEH-ruh
mak-ro-FIL-luh (3–7, 7–1)

Calendula officinalis kuh-LEN-djew-lah
o-fiss-ih-NAL-iss (0–0, 6–1)

Carex appalachica KAIR-eks ah-puh-LACH-ih-
kuh (4–7, 7–1)

C. divulsa C. dih-VUL-suh (4–9, 9–3)

C. leavenworthii C. leh-vun-WORTH-ee-eye
(4–9, 9–1)

C. pansa C. PAN-suh (4–8, 8–1)

C. pensylvanica C. pen-sil-VAN-ih-kuh
(4–8, 8–1)

C. praegracilis C. pre-GRASS-ih-lis (4–8, 8–1)

C. tumulicola C. toom-yoo-LIK-o-luh (5–9, 9–4)

Carya glabra KEH-ree-uh GLAB-ruh (5–8, 8–1)

Cerastium tomentosum sair-ASS-tee-um
toh-men-TOH-sum (3–7, 7–1)

Cercis canadensis SUR-siss kan-uh-DEN-siss
(4–9, 9–3)

Cestrum nocturnum CES-trum nok-TUR-num
(9–11, 12–8)

Chimonanthus praecox kim-o-NAN-thus
PREE-cox (7–9, 9–6)

Choisya ternata CHOY-see-uh ter-NAY-tuh
(8–10, 10–8)

Chrysogonum virginianum krih-SOG-on-um
vur-jin-ee-AN-um (5–8, 8–5)

Convallaria majalis kon-val-LAIR-ree-uh
muh-JAY-lis (2–7, 7–1)

Crataegus phaenopyrum krah-TEE-gus
fee-no-PY-rum (4–8, 8–1)

Cyperus papyrus sy-PEER-us puh-PY-russ
(10–11, 12–6)

D–H

Daphne odora DAF-nee o-DOR-uh (7–9, 9–7)

Datura innoxia duh-TOOR-uh in-NOK-see-uh
(0–0, 12–4)

D. wrightii D. WRIGHT-ee-eye
(8–11, 12–1)

Dennstaedtia punctilobula den-STET-ee-uh
punk-tih-LO-bew-luh (3–8, 8–1)

Dudleya brittonii DUD-lee-uh brit-O-nee-eye
(8–10, 10–7)

Euphorbia characias yew-FOR-bee-uh
chuh-RAY-see-us (7–10, 10–7)

Eurybia divaricata yew-REE-bee-uh dih-vair-ih-
KAY-tuh (3–9, 9–1)

Fraxinus pennsylvanica frak-SIH-nus
pen-sil-VAN-ih-kuh (4–9, 9–1)

Gladiolus murielae glad-dee-O-lus
myur-ee-EL-ee (8–11, 11–5)

G. tristis G. TRIS-tis (8–10, 10–8)

Gleditsia triacanthos gleh-DIT-see-uh
try-uh-KAN-thos (3–7, 7–1)

Gymnocladus dioica jim-no-KLAD-us dy-o-EE-
kus (5–9, 9–5)

Hakonechloa macra ha-kon-eh-KLO-uh
MAK-ruh (5–9, 9–2)

Helleborus foetidus hel-eh-BOR-us FEE-tih-dus
(5–8, 8–6)

Hibiscus rosa-sinensis hy-BISS-kus
RO-zuh-sih-NEN-siss (9–11, 12–1)

I–P

Ilex opaca EYE-leks o-PAH-kuh (5–9, 9–5)

Ipomoea alba ih-po-ME-uh AL-buh
(10–11, 12–5)

Iris cristata EYE-riss kris-TAY-tuh (4–10, 10–1)

I. reticulata I. reh-tik-yew-LAY-tuh (5–8, 8–5)

Jacobaea maritima juh-KO-bee-uh
muh-RIT-ih-muh (7–10, 10–7)

Lathyrus odoratus LATH-ih-rus o-doh-RAY-tus
(0–0, 8–1)

Leersia monandra LEER-zee-uh muh-NAN-druh
(7–9, 9–6)

Leymus triticoides LAY-mus trit-ih-KOY-dees
(4–8, 8–4)

Liriope spicata lih-RY-o-pee spy-KAY-tuh
(4–8, 8–4)

Magnolia grandiflora mag-NOLE-yuh
gran-dih-FLOR-uh (6–9, 9–6)

Matthiola longipetala mah-tee-O-luh lon-jih-
PEH-tal-uh (8–10, 10–8)

Mirabilis jalapa mih-RAB-ih-liss jah-LAP-ah
(9–11, 12–1)

Nicotiana sylvestris nih-ko-shee-AN-uh
sil-VES-triss (10–11, 10–1)

Nigella damascena ny-JEL-luh dam-uh-SEE-
nuh (0–0, 12–1)

Osmanthus fragrans oz-MAN-thuss FRAY-granz
(7–10, 11–7)

Pachysandra procumbens pak-ih-SAN-druh
pro-KUM-benz (5–9, 9–3)

Picea abies PY-see-uh AY-beez (2–8, 8–1)

P. pungens P. PUN-jenz (2–8, 8–1)

Pinus banksiana PY-nus bank-see-AN-uh
(3–8, 8–1)

P. virginiana P. vir-jin-ee-AN-uh (5–8, 8–5)

Polypodium virginianum pawl-ee-PO-dee-um
vir-jin-ee-AN-um (5–8, 8–5)

Polystichum acrostichoides pah-LIS-tih-kum
uh-kros-tih-CHOY-deez (3–8, 8–1)

Q–Z

Quercus prinus KWER-kus PRY-nus (4–8, 8–3)

Q. rubra Q. ROO-bruh (4–9, 9–3)

Rhamnus alaternus RAM-nus ah-luh-TUR-nus
(7–9, 9–7)

Robinia pseudoacacia ro-BIN-ee-uh soo-doh-uh-
KAY-shuh (4–9, 9–3)

Salvia apiana SAL-vee-uh a-pee-AN-uh
(0–0, 9–1)

Sanguinaria canadensis san-gwi-NAIR-ee-uh
kan-uh-DEN-siss (3–9, 9–1)

Sassafras albidum SASS-uh-frass AL-bih-dum
(4–8, 8–3)

Sesleria autumnalis ses-LAIR-ee-uh
aw-tum-NAL-is (4–8, 8–1)

Stachys byzantina STAY-kiss bih-zan-TY-nuh
(4–8, 8–1)

Stephanotis floribunda stef-uh-NO-tis
flor-ih-BUN-duh (11, 12–1)

Symphotrichum cordifolium sim-fy-o-TRY-kum
kor-dih-FO-lee-um (4–8, 8–1)

Syringa vulgaris sih-REENG-guh vul-GAIR-iss
(3–8, 8–3)

Trachelospermum jasminoides tray-kel-o-SPUR-
mum jaz-mih-NOY-deez (8–11, 12–8)

Viburnum opulus vy-BUR-num OP-yew-lus
(2–8, 8–1)

Yucca filamentosa YUK-uh fil-uh-men-TOH-suh
(4–11, 12–5)

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—David J. Ellis, Editor



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Fragrant Wintersweet

by Daniel Scott

ONE PLANT that makes the task of shoveling snow less onerous for me is fragrant wintersweet (*Chimonanthus praecox*, USDA Hardiness Zones 7–9, AHS Heat Zones 9–7). Starting in January, the delicate pale yellow blossoms with purplish centers that dangle from its bare branches permeate the air with a spicy-sweet springtime fragrance. On a warm winter day, with the wind just right, I have caught the scent of fragrant wintersweet from several hundred yards away.

Native to China, fragrant wintersweet is a multi-stemmed deciduous shrub that can reach 15 feet in height and 10 feet wide at maturity. It generally develops a vase-like to rounded habit but can also be pruned as a small tree. The flowering season lasts four to eight weeks, depending on the severity of the weather. Stems can be cut and brought indoors to perfume a room for up to two weeks. A few selections are offered. One is ‘Grandiflorus’, which, although reportedly less fragrant than the species, boasts flowers that are nearly twice as large. More difficult to locate is ‘Luteus’, which has very fragrant, pure yellow flowers.

Fragrant wintersweet’s glorious winter display is tempered for the remainder of the year, when the shrub tends to fade into the background. The three- to six-inch-

long, rough-textured, pointed, oval leaves are medium-green in spring and summer, sometimes turning yellowish in fall. In late summer, one- to two-inch-long, urn-shaped brown fruits hang from the gray-brown

stems. The stems benefit from occasional thinning immediately after flowering, especially if they become overly dense.

An ideal site for fragrant wintersweet is a sunny to partly shady location protected from winter winds; it may even flourish north of Zone 7 if placed in a warm microclimate. Adaptable to average or moist, well-drained soil with a near neutral pH—and not prone to major pest or disease problems—it will dutifully reward its caretaker with year after year of winter delight. On a large property, fragrant wintersweet is worth growing as a specimen plant, preferably in a location where its scent can be readily enjoyed. In more modest gardens, it is probably best placed in a mixed shrub border, where it can await its star turn on the garden stage among

companions that offer more engaging summer and autumn displays.

If you’d like to share your wintersweet, propagation is pretty easy. Lower branches can be encouraged to layer—that is, root into the soil—by pinning them down with a brick or a u-shaped metal pin. In my experience, however, the simplest method is to wait until midsummer and then transplant two- to four-inch-tall seedlings that tend to emerge beneath the parent plant. Despite its readiness to self-sow, fragrant wintersweet is not invasive.

If you are fortunate enough to be able to grow fragrant wintersweet, you may find yourself looking forward to winter days when you can step outdoors, with or without a shovel in hand, and sniff the frosty air for a hint of this shrub’s heady scent.

Daniel Scott is a landscape supervisor at George Washington’s Mount Vernon estate and gardens in Fairfax County, Virginia.



Top: Fragrant wintersweet’s flowers open in the dead of winter. Above: The selection ‘Luteus’ bears pure yellow flowers.

Sources

Forestfarm at Pacifica, Williams, OR. (541) 846-7269. www.forestfarm.com.

Woodlanders, Inc., Aiken, SC. (803) 648-7522. www.woodlanders.net.



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