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Using a Beneke shearing machine, Virginia grower Al White carefully prunes and shapes one of his 50,000 Christmas trees on a hot summer's day.

Front Royal-Warren Sentinel photo by Ginger Perry

The Business of Christmas

If you have ever thought that growing Christmas trees might be an undemanding part-time occupation, think again. It's a commitment that requires year-round attention and nonstop effort during the holiday season. It's also extremely competitive and ties up capital for many years.

Al White, owner of the Glen Manor Christmas Tree Farm in Front Royal, Virginia, started his Christmas tree business in 1979, three years before he retired from the U.S. Department of Education. Inspired by a national Christmas tree growers' conference, he researched the idea of starting a tree farm to keep him busy during retirement. Today he and his partners—brother-in-law Stuart Rudacille and sons Mark, Steve, and Jeff White—are all kept busy by their thriving 50,000-tree farm. "It's a full time job now," he chuckles.

For White the Christmas year begins in early March, when he plants thousands of two-year-old white pine seedlings purchased from the Virginia State Forestry Service. He has planted as few as 6,000 seedlings, but in recent

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years has been planting 10,000 every spring. Although he rents a planting machine to reduce labor, "somebody still has to hold the seedling over the hole," he notes.

Several times a year, he must spray the trees with herbicides, fertilizers, and insecticides, and in summer, there is the never-ending chore of mowing the grass between the trees. Because the expense far outweighs the benefit, Christmas trees are not irrigated, and grass that might rob them of moisture and nutrients must be constantly cut down.

Summer Shearing

In the middle of summer, just when Christmas is furthest from most minds, the enormous task of tree shearing begins. Between June 15 and July 15, all 50,000 trees must be pruned and trimmed to produce a compact shape and to encourage the central leader to branch. With only 30 days to complete this task, White enlists the help of his partners, family, and part-time employees. This two-step process requires small hedge clippers, shearing knives, and a battery-operated Beneke shearing machine. As one person trims back the central leader of the tree with shearing knives, another uses the Beneke to trim the side branches and shape the tree into an inverted cone. Although time is short and the staff must work swiftly, they must also concentrate to avoid accidents with the sharp knives and tools.

Tagging and Harvesting

Several weeks later, mature trees are measured and tagged with colored ribbon to denote height so that staff can easily spot and cut specific trees in December when filling an order. Most of the trees White sells are from six to nine feet tall; a few taller ones are sold for commercial display. Christmas-tree growing ties up capital anywhere from four to 12 years, depending on the species involved. It takes White's two-year-old pines six to seven years to reach salable height.

Cull trees—too scrawny or misshapen for living room display—are cut and used for wreaths and greenery. Because of the added labor and expense in making wreaths, cull trees realize less of a net profit than living room specimens, and some trees are a total loss. Of the 10,000 seedlings he plants each spring, White expects about 20 percent to be lost to dryness or insects (seedlings are particularly susceptible to moisture loss). The losses may be even heavier in years of severe drought or insect infestations. In 1986 White lost all 10,000 seedlings due to drought. However, in some years, severe losses can be caused by too much rain.

Advertising and Marketing

One aspect of the business that would-be growers rarely think about is how to market and sell the trees. "It's a competitive market," says David Baumann, associate executive director for the National Christmas Tree Association in Milwaukee, Wisconsin. "It forces growers to become marketers." A few years ago, that wasn't necessary; consumers would practically knock down a grower's door and beg for good trees. But while the business of producing plantation-grown trees is less than 30 years old, it has now matured to the point that there is an overabundance of high quality trees, Baumann said.

Around Thanksgiving, White mails flyers to past customers. "I have heard other people advertise on the radio and I may do radio someday too," he says. The Glen Manor Farm sells to both wholesalers and retailers, and part of the farm is devoted to a "choose and cut" field where families can select a tree and cut it down themselves. Many growers draw customers by staging holiday festivals at the farms.

A Full-Time Business

Because of this overproduction, Baumann advises anyone contemplating entering the market within the next five years, at least, to think long and hard about where their trees would be sold.

If you are going to produce quality trees, you can't think of it as a hobby, agrees W.T. Francisco, president of the Virginia Christmas Tree Growers Association. "It's a full-time business and you need time to devote to the business." Before you plant your first seedling, he advises, take about two years to research the business, analyze the cost and time factors, visit state and national meetings, and create a sound business plan.

Fortunately, there is help available to both new and long-time growers. The National Christmas Tree Association has plenty of literature, business and marketing information, plus yearly meetings for people to meet fellow growers and to learn the latest techniques. State affiliates of the national association also provide cultural assistance and business advice. Two state agencies, the State Forestry Service and the State Extension Service, provide advice and solve cultural problems for growers in their areas.

Photos courtesy of The National Christmas Tree Association

Left: Rows of perfectly groomed conifers bring promises of satisfied customers and happy Christmases. Right: Protected by knee guards, field workers must trim the trees carefully yet swiftly.

Although the Northwest is the highest producing region of the country, all 50 states have plantation-grown Christmas tree farms. Hybridization of pine trees has allowed Christmas tree production to extend into Southern states such as Florida, Georgia, Mississippi, and Texas. Southerners may have to shear trees twice a year and insects may be more of a problem, but these trees have significantly increased the nation's supply of live trees. The national association estimates that over 35 million trees will be sold during the coming Christmas season. This is an increase of over 890,000 trees since last Christmas and, if the estimates prove true, this year will be a record breaker. Of those, 90 percent will have been grown in this country specifically for Christmas and 10 percent will have been raised on Canadian farms; most artificial trees are manufactured in Asia. The business not only aids the U.S. economy by providing 100,000 jobs and taxes from $1.2 billion in income, but it also benefits the environment. Christmas tree production uses more than one million acres in the United States and benefits the environment by replenishing the oxygen supply, increasing soil stability, and serving as a wildlife habitat.

—Peggy Lytton

AHS will be selling white and Scotch pine trees from Al White's Farm during the Christmas Open House at River Farm.

If you are interested in starting your own business contact the National Christmas Tree Association at 611 East Wells St., Milwaukee, WI 53202; (414) 276-6410.

After the Holidays

- **Christmas trees can be placed in your back yard to be used as bird feeders.**
- **Trees can be shredded into mulch for the garden. Remember, fresh wood must decompose sufficiently before being applied to plants.**
- **Needles can be used for potpourris, floral arrangements, and aromatic pillow stuffing.**
- **Large quantities of trees can be used for effective sand and soil erosion.**
- **Trunks can be carved into trinkets, buttons, and ornaments.**
- **Live trees (balled and burlapped) can be planted in the yard after Christmas or donated to a charitable organization.**

Fall Prevention for Scales and Mites

Dormant oils, a means of controlling scales and mites on trees and shrubs, have traditionally been applied in the early spring. But you can opt to spray in the fall once your plants are no longer actively growing.

Formed from petroleum products, oils suffocate scale and mite eggs but do not harm plants except maples and evergreens, which are sensitive to older, traditional dormant oils, says Jeffrey Hahn, entomologist with the University of Minnesota's Extension Service.

"There are some newer, more refined dormant oils that are much less harmful to sensitive trees," said Hahn. "Unfortunately, these dormant oils are not readily available at this time."

When you spray, he said, it is important that the temperature is around 50° F. Spraying when the temperature is too warm will cause burning; cold weather will cause adverse reactions.

Just one application in the fall will help prevent a heavy infestation of scales or mites next summer. Dormant oils are an inexpensive preventative and the older types are available at major nurseries. They are also easy to use; just remember to read the label directions and not to spray plants that are still flourishing.

Members' Forum

Can we clarify a story for you, get more information, or pass along a gardening tip? Let us know!

Anthracnose on *Cornus kousa*

To my great regret, this letter is the bearer of bad news. *Cornus kousa,* growing in my allée of 30 trees at Barnard's Inn Farm, has definitely been attacked by the *Discula* organism. Kousa dogwood can no longer be considered immune to dogwood anthracnose.

To be sure, all signs were favorable this spring for the disease to develop on Martha's Vineyard. My trees were stressed due to years of drought, prolonged far into this late spring. The 1989 weather through April, May, and June 15 was cold, damp, gray, and "late." So when the leaves and flowers were unfolding, *Discula* was there and coming on strong.

Richard Bir of North Carolina State University Research and Extension Center was here June 28 and took samples. They were cultured in his lab. He wrote me July 17: "The assay came back positive, i.e., your *kousa* has *Discula,* the new anthracnose organism...We do not know if it will be fatal."

A very few of my trees appear to be immune. My kousa dogwoods isolated in the open fields do not appear affected. Fruits of affected trees, by and large, seem to be ripening normally. They were sprayed with Dithane July 25, in hopes that it might help.

Polly Hill
Vineyard Haven, Massachusetts

Reports on this virulent and still mysterious dogwood anthracnose, including one in our July News Edition, indicate that Discula *is still confined primarily to* Cornus florida, *the native dogwood, when it is growing in crowded conditions such as a forest.* C. kousa *has been suggested as a substitute for home landscapes.*

However, experiences such as Mrs. Hill's point out that while C. kousa *is resistant to* Discula, *it is not immune. Craig R. Hibben of the Brooklyn Botanic Garden Research Center, who has conducted much of the research on this dogwood anthracnose since it was first observed about 10 years ago, said that he has seen two cases on* Cornus kousa, *but in both cases, the trees were exposed to excessive moisture. In one, the trees were subject to overhead irrigation, and the others were on an ocean site similar to Mrs. Hill's.*

"I would still recommend them as a good substitute for florida," *he said. Being resistant means that while the trees may show some symptoms, their reaction to the fungus should be minimal, except perhaps where they are exposed to very wet conditions.*

A plant pathologist in the Mid-Atlantic region said that alarm over the anthracnose there seems to be spreading faster than the fungus itself. Discula *has remained confined to the mountains in that region and has not spread to any new counties, he said. Of 284 samples their lab was asked to check for* Discula, *only 20 were positive. He said it has been a bad year for spot anthracnose, which causes leaf drop and defoliation similar to* Discula, *but does not infect the wood.*

'Greenhouse' Impact?

On a recent visit to Canada, I was interested in several discussions of the "greenhouse effect," and was startled to see various plants that usually bloom in succession there all blooming at once.

Heaven knows the climatic changes during the past weeks in the Washington area have been dramatic. A recent *Washington Post* article talked of palms along the Potomac. It noted that trees that don't grow south of here could be weakened by rising temperatures, and undesirable southern species, such as kudzu, could begin to march north.

I think we're witnessing something really serious. I would like to hear if other AHS members have witnessed evidence that the greenhouse effect has changed their gardening season in any way.

Faith Jackson
Washington, D.C.

Two University of Minnesota researchers, Margaret Davis and Catherine Zabinski, have estimated that a one-degree temperature rise could shift a tree species habitat northward 60 to 90 miles! But the effect may actually help some plant species fare better *(see page 14).*

Is Vinegar Toxic?

I found your July News Edition most interesting and helpful, particularly the article on mycorrhizal fungi. I have ordered the "Nutri-Link" product mentioned in the article from Smith & Hawkin to give it a try. I have also been using the Nitron enzyme formula that you have advertised.

One item on page 16 in the article "A Sour Note" particularly caught my eye. It states that ascetic acid (vinegar) is a toxic substance.

My major horticultural interest (obsession actually) is bonsai. Most of my trees were all staying alive and growing but they were not as vigorous as I thought they should be and just did not "look right." After much thinking about the problem, I finally traced it to watering them with municipal water. The utility maintains the pH at a constant 8.3 to prevent corrosion in the mains. This is apparently the standard practice everywhere. All of my pots checked out decidedly alkaline and I began trying to find a way to neutralize my water.

I first used a liquid soil acidifier, but it is terribly expensive and rather messy to use and contains so much sulphur, it can quickly create anaerobic conditions. I had heard other persons, including extension agents, recommend vinegar. It is much less expensive and does not require much to effect the desired reading—about one teaspoon to one tablespoon per gallon. Mixing enough in a whiskey half-barrel to water all of my trees requires a half cup to one cup per 20 gallons of water, according to my little pocket-sized electronic pH meter. This would appear to be a negligible concentration.

Hauling all of that water around, a gallon at a time, in our stiffling summer heat is too much for my arthritic back. I now use a Hyponex siphon and a "fan" nozzle (necessary to create a rapid enough flow for the siphon). Two cups of vinegar in a five gallon bucket siphoned into the hose flow brings it out of the nozzle at 6.5 pH. At a siphoning rate of 1:16, this is approximately two cups of vinegar to 90 gallons of water. The results on my bonsai have been nothing short of astounding! Their color and vigor have increased dramatically.

Now I note in your article that vinegar is toxic. Considering the low concentration that I am using and the

dramatic results I have obtained, do you think that I am "heading for a fall?" If so, which substance would you recommend? I might add that I also occasionally give each tree a light sprinkling of a granular iron sulphate (MAGNO soil acidifier).

The subject of pH is seldom mentioned, much less emphasized, in the literature, particularly for plants in small containers. I have had the devil of a time in convincing other bonsaiists but once they try it, they are dumbfounded. More attention and emphasis should be given to it.

Any information that you can give me concerning the use of vinegar, in low concentrations, will be most sincerely appreciated. I shall be hoping to hear from you.

William L. Wilie Jr.
Beaumont, Texas

Ascetic acid (vinegar) is a very acidic solution with an extremely low pH level and, by itself, would be toxic for plants. Diluting vinegar with water, however, is recommended for increasing the pH level to a non-toxic solution for plants. If you think of pH as the relative concentration of hydrogen ions in a solution, then adding water (H_2O) would increase the amount of hydrogen ions, thus increasing the pH level to an only slightly acid solution. It isn't the vinegar that is harmful, it is the pH level or relative concentration of hydrogen ions in the soil. You have hit upon an excellent and cheap method of changing the soil's pH to benefit the bonsai—keep using it!

And please let us know the results you obtain by using Nutri-Link. Although AHS does not evaluate or recommend products, we are happy to pass the word along when our members find that a procedure or product has made gardening easier.

Defending 'Striped Moss'

I write to you to defend the honor of the old garden rose, 'Striped Moss'. This charming rose has had bad fortune—and bad press—at the hands of Graham Stuart Thomas, who simply did not like this rose. Thomas is deeply respected and his opinion is very persuasive; I notice that Roses of Yesterday and Today has stopped offering this rose.

Over a period of many years, I have owned two bushes of 'Striped Moss'. Both bushes were my favorites. My present 'Striped Moss' is grandly happy on its trellis. It can and does act as a climber for me. It provides exquisite bouquets, charming garden ornament, and reliable good health.

Jacquelyn W. Trimble
Olympia, Washington

Whether or not it's the fault of Thomas's writing, 'Striped Moss' has not been a big seller for Roses of Yesterday and Today, which announced six years ago that it would stop selling the rose, said owner Patricia Stemler Wiley. They make such announcements two years before they discontinue a rose, to give customers a last chance to buy it, she said.

Wiley only partially agrees with Thomas. She said the rose was a strong grower for them with good fragrance and foliage, but that its two-inch bloom is fairly insignificant compared to striped cultivars of gallicas or hybrid perpetuals.

Heritage Rosarium of Brookville, Maryland, still grows 'Striped Moss' on a custom basis, which means that it takes about two years to obtain a plant. Write them at 211 Haviland Mill Road, Brookville, MD 20833, (301) 774-2806.

Deer Fear

Your September issue gives two plans for deer-proof fences. These seem to me like a lot of work.

We have had excellent success using "bird-scaring tape," obtainable from Brookstone and elsewhere. A couple lengths of this between steel posts produces strange noises when the wind blows and the deer won't come near it. It works too well. We no longer have deer in the field behind the house, a sight we used to enjoy. The deer are still around, however; I keep startling them in the woods and they ate rose buds in our (unprotected) front garden.

Sam Bowne
Edinboro, Pennsylvania

Root Record

The September article "How Small is Small" gave the numbers of various organisms in a pound of soil, but did not mention the amount of roots that may be present. *The Guinness Book of World Records* gives the record for densest root growth as 387 miles of root in 1.83 cubic feet of soil or 12 kilometers per liter. The record is for a single winter rye plant grown for four months in a greenhouse at the University of Iowa during the winter of 1935-36.

David R. Hershey
Assistant Professor
Department of Horticulture
University of Maryland

Feeding Bananas

With respect to your answer on banana fertilizing (September) you might want to be aware that more potassium is required of trees that are intended for fruiting. You do not need the high phosphorus of a 20-20-20 fertilizer, and even nitrogen can be lower.

K. Criley
University of Hawaii at Manoa

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Saving an American Giant

There's a birthday party at the home of Farmer Gray;
It'll be the perfect ending to the perfect day.
We'll be singing the songs we love to sing without a single stop,
At the fireplace where we watch the chestnuts pop—pop, pop, pop.

From "Sleigh Ride" by Mitchell Parish and Leroy Anderson, ©1959, Mills Music, Inc., New York.

The image of chestnuts has long been associated with the holidays. But while most of us have heard Johnny Mathis warbling about chestnuts roasting on an open fire, that smell and taste—like the exhilaration of a sleigh ride—is something that few of us have a chance to experience.

In colonial times, a quarter or more of all the trees in America's Eastern forests were chestnuts. But in 1904, the effects of a chestnut blight imported from Asia were spotted in a New York park, and by 1940, the American species (*Castanea dentata*) was all but destroyed.

Chestnuts can still be had for roasting—at an exorbitant price. Inferior Chinese chestnut trees are widely available. It's also possible to grow your own American chestnuts from seed: in five years, compared to 15 for an oak tree, you will be gathering your own nuts. But only through severe pruning and babying will the seedling be kept alive for very long. No longer can we see chestnuts 90 feet tall and five or six feet in diameter.

But there is some hope on the horizon. In 1983, a group of scientists at the University of Minnesota formed the American Chestnut Foundation. Geneticist Charles Burnham was convinced that the tree could be saved, in spite of the skepticism of other scientists.

There are several approaches that show promise: cross-breeding the American chestnut with resistant Oriental chestnuts; using a less virulent, or hypovirulent strain of the *Endothyia* fungus to weaken the virulent strain so that the chestnut trees can survive even though infected; and, in the future, genetic engineering.

The cause is now being led by then-graduate student Philip A. Rutter, whose determination is akin to that of his distant cousin, John (Johnny Appleseed) Chapman.

Courtesy of The Morris Arboretum

The American chestnut stars in this 1878 etching, "Scenes in Fairmont Park."

Why bother to bring back the chestnut? Rutter is sometimes asked. There are abstract considerations of beauty and heritage. Rutter explained that the above lyrics from the Christmas pop tune, "Sleigh Ride," refer to a spin-the-bottle-type kissing game, in which the teenager whose chestnut pops first when tossed into the fire gets to buss the partner of his or her choice.

But the chestnut has many practical virtues. In a spring 1988 article in *Forest World,* author Loyal D. Rue called it a "super tree"—a fast-growing, lightweight, long-lived, straight-grained hardwood, "sturdy as oak, as easy to work as pine, and as rot-resistant as redwood." An acre of chestnut seedlings was capable of producing two tons of the tasty, protein-rich nuts as a cash crop for Appalachian families, he added.

The Chestnut Foundation notes that everything in the forest—from mouse to bear to wild turkey and once, the passenger pigeon—ate the chestnuts. The fact that a fourth of forest trees reliably produced one-to-three bushels of nuts each fall may have accounted

for the abundant wildlife noted by early explorers and settlers.

The blight did not completely kill the trees, only their tops. Stump sprouts still go through cycles of growth and then, after as long as 25 years, renewed epidemic. It is rare for new seedlings to take hold in the forest, however.

Last April, groundbreaking took place for the first scientific research facility entirely devoted to the American chestnut tree. Meadowview Farm near Abingdon, Virginia, will be the collection and breeding point for chestnut trees that have shown a resistance to the fungus.

Operations will be supervised by Fred Hebard, formerly of the University of Kentucky. The first trees were planted this year. The chestnut foundation has been guaranteed use of the land for 30 years, and hopes to raise enough funds, through public donations, to eventually buy the land outright.

The breeding program used by Rutter in Minnesota (which will be used by Hebard in Virginia) uses a technique called successive backcrossing, in which a desirable trait is transmitted through a series of generations. A blight-resistant gene can be retained in one generation, by crossing an American chestnut with a Chinese chestnut, but the Chinese tree is scrubby and short-lived, and a first-generation offspring would be unable to compete in American forests. It takes about four years for a backcross to flower; about one-fourth of the trees from the first backcross are expected to be worthy of selection for a second cycle. Rutter estimates that a blight-resistant and truly American strain could be produced by the third backcross, so that reforestation could begin to take place sometime after the year 2000.

This fall, Rutter was going to China, where he was promised a trip into the original range of wild-growing chestnuts. The Chinese chestnuts now growing in the United States came from orchard stock, he explained. If researchers could use genetic material from the wild trees, it may allow disease resistance to evolve sooner.

In the meantime, there are a number of "tricks" that can be used by those who want to keep the American chestnut alive on their own property, Rutter said. The trees should be planted in full sun and away from any weeds or sod. No attempt should be made to grow what looks like a tree. The seedling should be pruned into the form of a multiple stemmed bush and kept to about 15 feet tall.

Even with these precautions, blight will eventually occur. If the bush is cut back to even one or two stems, they will continue to fruit, and the roots will continue to send up suckers.

The truly determined go through what Rutter called a somewhat "nasty" process, in which affected areas are injected with the weakened form of the fungus, containing viruslike particles called plasmids. The area then needs to be wrapped with an "earth bandage"—a black plastic bandage filled with dirt—for about three months; the treatment will not cure cankers elsewhere on the chestnut.

Seed, Seedlings, and Support

Through the following organizations, you can support professional research on the American chestnut, participate in efforts to identify surviving trees, or cooperate in raising and reporting on the progress of new seedlings. Any of the groups can also offer tips for growing chestnuts from seed and keeping seedlings alive:

✦The American Chestnut Foundation, College of Agriculture and Forestry, 401 Brooks Hall, P.O. Box 6057, West Virginia University, Morgantown, WV 26506-6057.

✦American Chestnut Cooperators Foundation, 2100 Jefferson St., Bluefield, WV 24701.

✦The American Chestnut Revival, c/o Carol Klinger, Rt. 1, Dowelltown, TN 37059.

For those interested in trying to grow their own American chestnuts, the following are potential sources:

✦Bear Creek Nursery, P.O. Drawer 411, Northport, WA 99157 (seedlings and grafted trees).

✦Wexford Soil and Water Conservation District, 200 West 13th St., Cadillac, MI 49601 (seedlings).

✦Louis Lipovsky, RFD, Brunswick, ME 04011 (seedlings).

✦Benhart Rajala, 3030 Isleview Road, Grand Rapids, MN 55744 (seed).

✦Donald Rudisuhle, Rt. 3, Box 216, Caladonia, MN 55921 (seed).

Eucalyptus Susceptible

Studies in Japan have shown that some eucalyptus species are susceptible to the chestnut blight fungus, according to a report in *American Nurseryman*. Australian agriculture officials are concerned that the fungus may wreak ecological havoc there if the fungus comes to their country on imported nursery stock. Introduced eucalyptus on America's West Coast could also be decimated if the fungus were to slide through quarantine regulations.

New Patented Chestnuts

Chestnut lovers take heart! If you don't have the patience to experiment with the American chestnut or wait for a disease resistant backcross, you can purchase an Asian-American cross. Two new Dunstan hybrids have received U.S. plant patents (only the second and third chestnuts to hold patents) and are available for planting. Both are resistant to blight, produce high quality nuts and timber, and begin to bear in three to five years.

✦ 'Heritage' is a tall, straight-boled, timber form tree similar to the original American chestnut. It has deeply dentate, lustrous green leaves and produces medium-sized (45 per pound) nuts with the sweet, rich flavor of the American nut and chinkapin. It is said to be a superb landscape or timber tree.

✦ 'Carolina' chestnut is an upright, spreading tree bearing very large (24 to 28 per pound), very sweet, glossy dark chocolate brown nuts. It is an excellent tree for planting with 'Revival' (genetically related to both 'Heritage' and 'Carolina' and the first chestnut to receive a U.S. plant patent) as a pollinizer and is suitable for both commercial nut production and as an ornamental landscape tree.

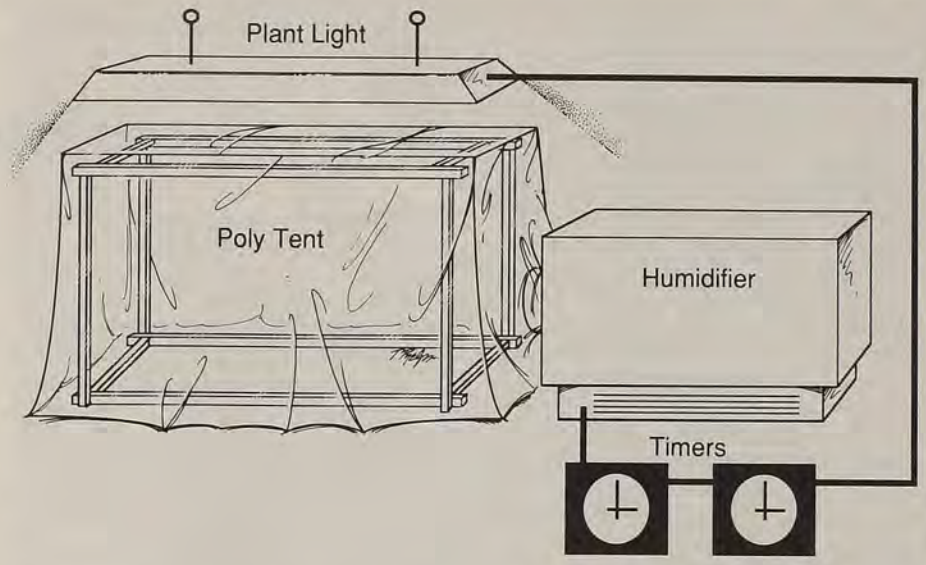
Both new trees are available from Chestnut Hill Nursery, Inc., who points out that chestnuts are high in carbohydrates and protein; unlike other nuts, very low in fat; and are delicious roasted, steamed, dried as flour, or puréed and candied. For more information and some chestnut recipes, contact the Chestnut Hill Nursery, Route 1, Box 341, Alachua, FL 32615, (904) 462-2820.

Cuttings a Flop? Try a Mist Bench

November may find many gardeners confined inside with nothing to do but dream of that faraway spring garden. But not to despair! Here's a do-it-yourself project that may help dispel those gray weather doldrums.

If you're ready to get more serious about propagating your own plants, you may have longed for the type of misting bench that many commercial greenhouses and arboreta use to start cuttings. Home gardeners can take a similar approach on a smaller scale, using materials that are readily available in hardware and department stores. Ken Asplund, curator of living collections at The Arboretum at Flag-staff, Arizona, has devised some simple directions for constructing a rooting chamber similar to the one the arboretum uses. According to Asplund, "This method is recommended for those who've had modest success in propagating stem cuttings and want to improve their odds. It's a notch above the poly-bag-over-a-clay-pot method."

Although you can't take cuttings until next spring or summer, of course, the winter months are a great time to build the chamber and test its timing devices so the apparatus will be ready when you need it.



Tim Phelps

What You'll Need

Gather the following equipment:

1. PVC plastic pipe or wood strips
2. Clear "poly" plastic film
3. Clear plastic packaging tape
4. Fluorescent light fixture
5. Two four-inch plant lights
6. Two programmable appliance timers
7. Two skyhooks
8. Humidifier

With the plastic pipe or wooden strips, construct a square or rectangular frame that resembles the outline of a box. The frame can be any size and made of almost any sturdy material—plastic pipe will result in the most long-lasting chamber. Wood that has been treated to resist moisture is also a good choice. Drape the plastic film over the frame to make a tent. Gather one end of the film and attach it securely over the mouth of the humidifier with clear plastic packaging tape.

It's best to use a sonic humidifier. An atomizing humidifier will also work, and may be a better choice if the chamber will be used in a humid area where mold is a problem because it moves more air. A vaporizer is not recommended because it creates steam and doesn't circulate the air. Both types of humidifiers are available at hardware and general stores.

Plug the humidifier into one of the timers. This timer should be set to run the humidifier for 30 minutes every two hours or 15 minutes every hour during daylight hours.

Suspend the light fixture so that it will be no more than 10 inches above your rooting trays. Plug the fixture into the second timer. Lights should be on for at least 14 hours per day. Note: do not suspend the lights inside the tent since the moisture could destroy the fixture.

Plug the humidifier timer into the light timer and the chamber is ready to begin its duties. Ordinary room temperatures are ideal for the rooting chamber; it should not be placed in direct sunlight.

A rooting chamber such as this works well with greenwood cuttings such as pyracantha and herbaceous to semi-woody perennials. Asplund hasn't tried this method with a large range of cuttings. He suggests that it probably wouldn't work well with hardwood cuttings, "although heating cables could be added to increase the odds of propagating more difficult cuttings."

Ready to Root

The Flagstaff arboretum follows the following procedure for new softwood tip cuttings:

✦ Prepare the rooting medium using sand, vermiculite, perlite, or some combination of these. (The arboretum usually prepares a mixture of half sand and half perlite.)

✦ Take three- to five-inch cuttings in the spring or early summer, depending on the plant's life cycle.

✦ Nip the leaves, along with any flower buds or growing tips, from the lower half of the cutting.

✦ Dampen the lower half and dip it in a rooting hormone such as "Rootone" or "Hormex" according to the package instructions.

✦ Wet the rooting medium and punch holes in it, then firm the prepared cuttings into the holes.

✦ Place the finished trays of cuttings in the tent and wait for the new plants to sprout. Rootings may take three to six weeks or longer.

When new leaves begin to grow, lift up one or two cuttings to check the roots. Plants can be repotted when the new roots begin to grow. Generally these new roots are fibrous and don't break easily. To transplant the cuttings gently lift each one with a fork along with a small ball of the rooting medium and place them in an ordinary potting mix.

Newly planted pots should be hardened off in a spot out of direct sunlight for one to two weeks.

The arboretum is located 3.8 miles south of Flagstaff on Woody Mountain Road. Hours are Monday thru Friday, 10 a.m. to 3 p.m. Call (602) 774-1441.

Is Your House Plant Feeling at Home?

When we move across the country or even across town, it usually takes us some time to adjust to our new surroundings. Likewise, plants need to adjust to new environments. Moving plants from outdoors to indoors, greenhouse to home, room to room, or even window to window requires a "settling in" period. Since plants can't move, they must change to meet the existing conditions, a process called acclimatization.

Plants exhibit their greatest response to change several weeks after being moved from bright to poorer light; this change is greatest when they are moved from the outdoors or a greenhouse into a home.

House plants that were returned to their winter homes or newly purchased in early fall are still undergoing acclimatization, according to Ray Rothenberger, Missouri's state horticulture specialist. But if the change in environment has been too abrupt, leaves may yellow, begin to drop, turn brown around the edges, or exhibit other changes, depending on the environmental conditions and the kind of plants involved.

The key to successful acclimatization is maintaining a balance in the plant's "compensation point." At this point the amount of sugars and carbohydrates produced by the plant for food—from water, carbon dioxide, soil nutrients, and light—are equal to the sugars and carbohydrates burned up by the plant during respiration. When food is available the plant grows, but when there is a deficiency of food the plant loses leaves, stops growing, or, if the condition persists, it dies.

You can avoid such damage by ensuring that acclimatization takes place gradually. Slow changes over several weeks will result in the development of new leaves that are able to utilize poorer light to make food more efficiently. Other leaves will gradually turn toward the light source to catch more light from nearby windows. While plants may still drop leaves, the drop should be minimal.

Some growers may acclimatize plants in the greenhouse by increasing the amount of shade over them as they grow, bringing plants near the intensity of light they might be exposed to in the average home. Plants grown this way will probably cost a little more, but will perform better once they have been moved into a new environment.

The best way to determine if a plant has been acclimatized is to ask the grower. Learn as much as possible about the growth process of the plant—include questions about the light levels used and the plant's fertilization program. Not only the leaves, but also the root system, need to acclimatize. That process can be helped along by reducing food and water.

Fertilizer should be cut to about half that needed for normal production in bright light. This reduces top growth while the roots continue to grow.

Less water helps harden the foliage so it will be less sensitive to the lower humidity found indoors. Even if conservative watering causes plants to wilt slightly, they will almost always recover once watered a bit more. Overwatering, on the other hand, may kill roots by suffocation or disease; plants that wilt because their roots are dying rarely recover.

To help plants acclimatize, gradually decrease the light level by moving the plant to an interim location with less light than its previous position, but more light than its final destination. Using a grow light to make light available 12 to 15 hours a day will also help the plant adjust by allowing it to reduce its use of food reserves and decreasing stress.

Relocation can be difficult, but gradual changes in environment should ensure a healthy life for our house plants and encourage their adaptation to a new home.

The Scientific Explanation

Acclimatization helps transform leaves that were formed in or exposed to high light levels to low-light leaves. These leaves are more efficient "light catchers" on two different levels.

In high-light leaves, the chloroplasts, which form starch through photosynthesis, are positioned near vertical cell walls. As plants are acclimatized, the chloroplasts disperse throughout the cell in order to capture more light, which in turn increases food production.

Within the chloroplasts are grana—stacks of parallel membranes that contain chlorophyll pigments. Light energy reacts with chlorophyll in the grana. In high-light leaves, grana are stacked in an upright position to reduce captured light intensity. During acclimatization, grana spread throughout the chloroplasts, creating a greater surface area to intercept light energy. As a plant is acclimatized to low light, chlorophyll levels expand, further increasing the plant's ability to produce food.

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Regional Notes

Colorful Succulents

Winter is the most colorful season for The Huntington Botanical Garden in San Marino, California, where more than 12 acres of cacti begin to bloom around the end of the year. Especially spectacular around New Year's, says Joe Clements, curator of the Huntington's succulent garden, are the aloes, which bloom in red, yellow, orange, and occasionally white.

In January, Clements and John Trager of the Huntington Desert Garden staff will be conducting a workshop on growing succulents, followed, as are most of their lectures, by sale of the featured plants. Clements said the most frequently asked question about succulents is how often to water them. As is the case with any plant, water needs will vary a great deal. "We usually water about once a week in summer, and cut down on that in winter," he said.

During the growing season, succulents should be fertilized three or four times full strength, or better yet, fed at one-fourth or one-third strength with each watering.

Succulents are no different from other plants in needing organic matter in their soil. The Huntington amends its beds with redwood compost, "although you have to be somewhat cautious"—uncomposted redwood steals nitrogen, Clements said. Other possibilities are oak leaf mold and peat moss. A good mix is one-third coarse builders sand, one-third pumice or perlite, and one-third composted organic matter.

It's not hard to get succulents to bloom if you can grow them outdoors, said Clements, who feels that they require too much sun to make good house plants.

Also in bloom at the Huntington this winter will be cup-of-milk vine, crassulas, floss silk trees, Himalayan cherry, Hume's coral tree, iceland poppies, mallee eucalyptus, poinsettias, roses, and sasanqua camellias. For more information call (818) 405-2160.

New Facilities in North Carolina

One of the nation's newest gardens, the North Carolina Arboretum, expects to dedicate its education center this month, and will soon be constructing a state-of-the-art support facility to include a greenhouse complex, head house, and grounds maintenance area.

Horticulturist Rich Owings said the 7,000-square foot greenhouse will include a fog propagation system that will enable rooting of difficult plants such as rhododendrons, which can take so long to root that the humidity to which they are exposed leaches most of the nutrients from their leaves.

The head house will be the site of much of their research, including tissue culture, micro-propagation, and isozyme analysis. The latter is a type of DNA staining that will be useful in the arboretum's conservation work, said Owings. It will enable them to determine if a wild plant is a pure species, or has been genetically compromised by hybridization with other species.

The grounds maintenance portion of the building will house facilities for welding, plumbing, carpentry, and electrical work, in a courtyard concept designed for minimal aesthetic impact on the natural surroundings.

The arboretum, purchased in 1986, has no public display gardens as yet. Longterm goals include education, display, research, and conservation of plants native to the southern Appalachians. Led by director George Briggs, they also hope to support the green industry in their area, and to aid the region economically through tourism of the facility.

They are affiliated with the 16-campus North Carolina University. The 424-acre arboretum is located just outside Asheville in the Pisgah National Forest, with an entrance off the Blue Ridge Parkway. For more information call (704) 665-2492.

Rare Orchid Blooms

An endangered Ecuadorian orchid, the Huntleya wallisii, recently bloomed for the first time in the Fuqua Conservatory at the Atlanta Botanical Garden. It was cloned in a test tube by Susan Determann in the tissue culture lab at the Marie Selby Botanical Garden in Florida. Her husband, Ron Determann, superintendent of the Fuqua Conservatory, has nurtured the plant for five years, and sees this success as an indication of the value of tissue culture as a means of protecting and propagating plants that are disappearing from the wild.

Paul G. Birnkammer

Reciprocal Agreement

The Dallas Arboretum and Botanical Garden has entered into a reciprocal agreement with 58 other arboreta and gardens in the United States, Australia, Canada, and the U.S. Virgin Islands.

The agreement allows members of any of those gardens free general admission, plus other member benefits, when visiting another participating garden or arboretum. For more information call (214) 327-8263.

Name Change in Toledo

Crosby Gardens in Toledo, Ohio, is now officially the Toledo Botanical Gardens. Garden officials believe the name change will make the garden's location more immediately recognizable.

The name of George Crosby, who donated the first 20 acres that eventually became the Crosby Gardens, will continue to be connected to the garden: a new conference center, a new lake system, and the garden's annual arts festival will all bear his name.

Rose Garden Honored

Kansas City, Missouri's, Laura Conyers Smith Municipal Rose Garden won the 1989 All-America Rose Selections Bronze Achievement Award for an outstanding public garden.

The 58-year-old garden, located in Jacob L. Loose Memorial Park, contains some 4,000 roses of 100 varieties. It is maintained by the Kansas City Rose Society and the city's parks and recreation department.

Growing Sod on Sludge Provides Double Benefit

Research aimed at producing healthier sod is also benefiting the environment by using up municipal waste.

Two men who have pioneered in producing sod on treated sludge began the experiment as a result of very different goals. One wanted to grow sod faster and cheaper by sowing it on top of an impermeable plastic base, and needed a plentiful and inexpensive growing medium. The other began growing sod by accident, when he dropped some seeds on some sludge residue he was processing.

Henry Decker, president of Buckeye Bluegrass Farms of Ostrander, Ohio, estimates that if the sod-growing method he has developed were used for only five percent of the country's annual cultivated sod production, it could use up all the dry sludge produced by Boston, New York, Philadelphia, Washington, and Chicago combined.

The greatest difference between traditional sod-growing and the method used by Decker is that his sod is started on a one-sixth millimeter-thick sheet of polyethylene. By being grown on the plastic, the grasses' primary roots rapidly form a fibrous mass that binds the sod, allowing it to be harvested in only a few weeks, rather than the more usual one to two years. And because the sod is harvested with the root system intact, rather than being severed with a sod cutter, the sod also binds and roots rapidly to the new site where it is laid, Decker says.

Production Advantages

When the sod is harvested, the plastic is left in place, ready for the next crop; thus, the sod production requires considerably less growing surface. The speed of the process means that the sod needs less water, fertilizer, and mowing than in conventional methods. And because the roots aren't bound around heavy topsoil, it's easier to move; it is usually harvested and laid in rolls that are five feet wide and 45 feet long, thus saving much hand labor.

Decker, an adjunct professor at Ohio Wesleyan University who began experimenting with growing grasses on an impermeable medium in the 1960s, says progress has been slow partly because composted sludge was not widely available until this decade. The method has not caught on commercially, he speculates, because it is not very successful at producing bluegrass sods. His most remarkable results have been achieved with tall fescues. Bluegrass is more popular among homeowners, but on any growing medium, it tends to grow more slowly and less vigorously, is more disease-prone, not as drought-tolerant, and requires cooler temperatures than most other grasses. "A hot summer on plastic is probably asking too much of bluegrass," he says.

Tall fescues may become more popular if drought continues to be a problem for much of the nation. However, Decker and his colleagues have been studying the effects on bluegrass seedlings of deep, intermittent well-watering, and will be looking for bluegrass cultivars that offer more of fescue's advantages. He adds that the economic feasibility of the approach has also been hindered by the need for machinery that will cut the sod without cutting the plastic, and the difficulty of transporting the composted sludge long distances.

Virginian Jack Kidwell is among those helping to make treated municipal sludge more widely available, but he agrees that transporting it is one deterrent to using it more widely for sod and other crops.

Kidwell, as head of United Bio-Fuel Industries, had joined with the University of Arkansas under a U.S. Department of Energy grant to build a system for processing municipal waste. They used a technique developed by Gulf Oil Co. to produce ethanol, while extracting the approximately 30 percent of every ton of waste that can't be recycled. The byproduct that contains vegetative matter, wood fragments, and bits of paper is dubbed the heavy organic fraction.

Lucky Accident

One day, he said, "we accidentally dropped a seed on it." Its potential as a growing medium was immediately apparent. Because it holds water like a sponge, he said, it stops run-off and is ideal for erosive soils. It is also high in nutrients, and analysis has found only a small trace of the heavy metals that, in the infancy of sludge processing, made it unusable for food crops.

Kidwell said the nutritional value of high organic fraction should benefit nurseries growing container stock. He would like to extend its use beyond sod to growing agricultural crops such as small grains and corn, but has found that farmers and others remain concerned about what the high organic fraction might contain. Farmers' reluctance is understandable, he said, since they have to pay to ship the material and may not see its full benefits for three years. He plans to establish five- to 10-acre demonstration plots of different crops to demonstrate the payoff of the investment and the wait.

Courtesy of Henry Decker

After only five weeks, tall fescue sod grown on municipal sludge on top of plastic sheeting is ready to be rolled up and transplanted.

Ten AAS Winners for 1990

All-America Selections (AAS) has chosen four vegetables and six flowers as award winners for 1990.

For more than 50 years, the nonprofit organization has been evaluating new seed-grown flowers and vegetables from around the world for home and garden performance. The 10 cultivars found to exhibit superior qualities in this year's trials represent a total of 70 to 100 years of breeding and research.

AAS awards are given in three categories: bedding plant flowers (grown only in the greenhouse); flowers (started in the greenhouse then moved outdoors); and vegetables. Flowers in either category are judged for color, blossom form, fragrance, and resistance to insects and disease. Vegetable judging is based on flavor, texture, disease and heat resistance, yield, and space efficiency.

Bedding Plant Performers

✦ Petunia 'Polo Salmon', a multiflora petunia, is tolerant of heat, drought, and summer storms. Plants do not require cutting back or deadheading to encourage continuous bloom. The cool salmon blooms completely cover the foliage and blend beautifully with shades of blue or white. Petunia lovers will find this selection at most local garden centers come spring.

✦ Petunia 'Polo Burgundy Star' was highly rated by judges for its uniform pattern of stars bordered in deep burgundy as well as its outstanding garden performance. Plants provide continuous bloom without pinching, pruning, or deadheading and tolerate heat, drought, and severe weather. Plants should be available at local garden centers.

Above: Petunia 'Polo Salmon'. Above right: Petunia 'Polo Burgundy Star'. Below: Achillea 'Summer Pastels'. Bottom, left to right: Pansy 'Jolly Joker', Celosia 'Pink Castle', Zinnia 'Scarlet Splendor'. All photographs courtesy of All-America Selections.

Flower Winners

✦ Achillea 'Summer Pastels' creates a flowering hedge only two feet tall, and requires only 18 inches of space per plant. This is an improvement over other *Achillea millefolium* plants that can reach three to four feet in height and may need staking. Flower arrangers should appreciate the habit and variety of these perennials, which bloom in shades of pink, apricot, beige, blue, and red to pure white. 'Summer Pastels' thrives in full sun, is drought-tolerant, and requires little maintenance. Plants can be grown from seed by novice gardeners.

✦ Pansy 'Jolly Joker', with its rich, velvety purple flower and orange face, should be a real attention grabber. The unique flower faces are held upright on short stems. Judged highly for its above average heat and weather

Top, left: Squash 'Cream of the Crop'. Top right: Squash 'Sun Drops'. Bottom left: Pepper 'Super Cayenne'. Bottom right: Bean 'Derby'.

tolerance, 'Jolly Joker' requires little garden care once established, needing only water and possibly fertilizer for maintenance. 'Jolly Joker' can be grown from seed; bedding plants may be available from local garden centers in the spring.

✦ Celosia 'Pink Castle' offers gardeners cool, pastel pink plumes in a semi-dwarf plant. A seven- to eight-inch central plume is surrounded by secondary plumes that work well in fresh flower bouquets. This reliable garden annual is heat- and drought-tolerant, requiring only minimal water and possibly fertilizer for summer-long flowering performance. 'Pink Castle' can be grown from seed or purchased as bedding plants.

✦ Zinnia 'Scarlet Splendor' is a scaled down plant with huge four- to five-inch blooms. The mature plant needs only two feet of garden space and reaches only two feet tall. In full sun the plants create a flowering hedge filled with semi-ruffled scarlet blooms. The strong stems are long enough for cut flower displays and, as the flowers are cut, new flowers are produced. Plants can easily be grown from seed planted directly in the garden or started indoors about four weeks before the last frost date.

Vegetable Victors

✦ Squash 'Cream of the Crop' is the first creamy white acorn squash to be honored as an AAS winner. The compact bush habit of this winter squash requires less garden space than most squashes and the creamy skin color makes it easy to locate among the leafy greens. The two- to three-pound squash is ready to harvest in about 85 days. It can be grown easily from seed; bedding plants also may be available. 'Cream of the Crop' stores well, has a nutty flavor, and is excellent when baked (especially with brown sugar and butter or maple syrup).

✦ Squash 'Sun Drops' is the first oval summer squash available to North American gardeners. The yellow squash matures in about 50 to 55 days and can be harvested when three to four inches in diameter; however, immature squash can also be gathered for a gourmet vegetable dish. Perfect for smaller size gardens, the plant is a compact bush that can be spaced 20 to 24 inches apart and grown using the same cultural procedures as any summer squash. Seeds and bedding plants are available.

✦ Pepper 'Super Cayenne' reaches only two feet in the garden, and is perfect in patio containers surrounded by flowering annuals. These peppers were judged highly for their superior yield of long (three- to four-inch), thin peppers that can be harvested while green or left to mature to red. 'Super Cayenne' is easily grown from seed or bedding plants. Judges say that these beauties are equally good fresh or dried, but not for the faint-hearted—one bite will send the tender-mouthed scurrying for a cold drink!

✦ Bean 'Derby's' long, thin pods are ready for picking in approximately 57 days. A green bean with improved bush plant habit, its tender pods are enhanced due to slow seed development. 'Derby' is a strong, upright plant resistant to lodging and common bean mosaic virus. It is easily grown from seed sown directly into warm garden soil and requires only water and possibly fertilizer for sustained bean production. The pods slip easily from the stem without the pedicel. Seed will be available in mail order catalogs and in seed packets sold by retail stores.

The All-America trials were launched in 1932 by Southern seedman, W. Ray Hastings, who felt that a series of national seed trials would invigorate the seed industry. His vision included most aspects of the trials today: testing new introductions; promoting winners nationally; and awarding gold, silver, and bronze medals to truly exceptional new plants. Medals are not awarded every year; none of the 1990 selections was a medal winner.

This year's trials began last spring, when 36 flower and 26 vegetable trial grounds received seed. Judges are required to observe the plants and take notes on the plants' performance throughout the growing season. Plants are then scored on a scale of zero to 10; winners are those with the highest average scores from all the judges. Once the winners are determined they are sent to approximately 220 display gardens across North America. Gardeners can locate them by the red and blue AAS emblem on seed packets and plant markers.

Shiitakes: A Tasty Challenge

Fall is a good time to make the preparations for growing a popular new crop: shiitake mushrooms (*Lentinus edodes*). Widely used in oriental cooking, they're high in nutrition, and currently sell for about $8 a pound.

Shiitake-growing is becoming increasingly attractive as a small business, and can also be a challenging project for a home gardener who enjoys exotic produce. A major requirement for growing shiitakes is a supply of fresh hardwood. Oak of any species is the most reliable growing medium; some growers, concerned that consumers will be put off by the name shiitake (she-TAH-key) refer to them as oak mushrooms. The mushrooms are grown from a spawn placed in holes drilled into the fresh-cut logs.

Paul and Nan Goland, owners of Hardscrabble Enterprises in Cherry Grove, West Virginia, say the logs should be a standard length, from 30 to 60 inches long, for easy stacking. The oak trees should be young and healthy, preferably with bark less than a quarter inch thick. The trees will need to be inoculated at least 15 days after cutting, but no more than 90 days.

Fall is the best time to cut the trees because the sap is down; cutting in the summer makes the bark fall off and reduces the log's useful life, which is usually five to six years. Logs should be inoculated while the temperature is above freezing.

The spawn is commonly available in two forms: wooden plugs that are tapped into the holes in the logs; and a sawdust and grain based paste, which is pushed into the holes.

The mushroom does best in partial shade, say the Golands. After inoculation, logs need to be sprinkled every four or five days, and occasional restacking of the logs seems to "shock" the fungus into fruiting more consistently. A first harvest can be expected in about six months; the spawn will continue to produce for three to six years.

Minnesota shiitake-grower Joe Deden said that the most difficult variable in shiitake growing is moisture control. The moisture content of the log is what causes the mushrooms to fruit. In Japan, where they occur naturally, rainfall is 60 inches a year and more, he noted. "There are very few areas of the United States that receive that much rain." A relatively inexpensive moisture content scale can be the key to success, he said.

He suggested that gardeners without access to oak logs may be able to obtain reliably fresh wood from state agencies, or they may want to experiment with other types of wood. Deden is affiliated with the Forest Resource Center in Lanesboro, Minnesota, which conducts research and disseminates information on shiitakes. In one study, they evaluated 50 different spawns that are available commercially, and found a 700 percent difference in production from the best to the worst. They then took the five best producers and inoculated 10 different types of logs. They had success not only with oak, but also ironwood and hard maple; sweetgum might work well for Southern growers, he added.

Courtesy of the Forest Resource Center

Uniform fruiting of shiitake mushrooms.

The Forest Resource Center publishes a newsletter, Shiitake News. *To subscribe, or for more information, write Route 2, Box 156 A, Lanesboro, MN 55949, or call (507) 467-2437. The Golands can provide more detailed growing information, including the Harris "box method" for inoculation in seasons other than spring. Contact them at Route 6, Box 42, Cherry Grove, WV 26804, (304) 567-2727.*

Plant Competition: Rules Changing?

The changes in the earth's atmosphere known as the greenhouse effect have been blamed largely on increased carbon dioxide from the burning of fossil fuels. The assumption is that this trend toward warmer temperatures will be harmful to plants and people in the long run.

But in the meantime, the increased CO_2 levels may give some plants an increased ability to compete for water and minerals. Most plants of interest to gardeners should benefit, but ranchers may have cause for worry.

Hyrum Johnson, a U.S. Department of Agriculture range ecologist in Temple, Texas, believes that troublesome rangeland brush is proliferating at the expense of prairie grasses because the brush benefits more from the higher carbon dioxide levels. "Most plants do better with higher carbon dioxide levels if they are alone," says Johnson. "But in a competitive situation, those who get the biggest boost will compete most successfully. If you give a cotton plant twice as much carbon dioxide, it will grow almost twice as fast, but bluestem won't. So we're almost obligated to say that if there's a change in the carbon dioxide concentration, that will change the mix of species present."

Johnson said the plants that benefit most from higher CO_2 levels are those that use a photosynthesis process known as C3. These include most broad-leafed plants, including trees and shrubs, and what he called the "showy" wildflowers. Plants that seem to benefit less use a C4 photosynthesis process; these include corn, sorghum, and the warm season grasses that grow in the West. Over the next three years, he will be checking his theory by comparing how mesquite, a C3 brush, fares compared to little bluestem, a C4 grass, at today's CO_2 levels and at the level that existed in 1860.

Past CO_2 levels were estimated by extracting air trapped between ice layers that have formed over thousands of years in Greenland and Antarctica. In 1860, the carbon dioxide level was 26 percent lower than today.

Johnson says if he confirms that carbon dioxide levels are significantly related to vegetational change, people who use the past to predict the future must take that into account. "Rainfall, temperature, and light are not the only things we have to look at," he says. "And this research affects almost all ecological theory as to what we can expect in the future."

Gardener's Q&A

Crisis? Curious? Our staff horticulturists are happy to help.

Q: I have creeping thyme growing in the cracks of my flagstone walk and a friend of mine said I could use this thyme in my cooking just like one would use common culinary thyme. Is this true?
—S.C., San Diego, California

A: Creeping thyme is a true thyme and all thymes are edible; however, the flavor of creeping thyme is considered inferior to that of culinary thyme. You can certainly experiment with creeping thyme, but just to be on the safe side, experiment when you are not expecting company. Remember that chemical sprays may have been used on or near the creeping thyme, which would make it unsafe to eat until the spray decomposes or until it is washed off.

Q: I am new to this area and the local nurseryman recommended a Chinese pistache tree for my yard but I have never heard of it. Can you give me any information on it?
—B.W., Fairfax, Virginia

A: The Chinese pistache, *Pistacia chinensis,* is one of those hidden treasures waiting to be discovered by homeowners, landscapers, and gardeners. This tree offers the combination of vibrant fall color and minimal disease and insect problems. The Chinese pistache has a medium growth habit, oval to round outline and reaches about 35 feet high at maturity. The leaves are pinnately compound and deciduous. The flowers are insignificant and the fruits are about a quarter of an inch long, fleshy, with a single seed. They are red at first and then turn a robin's egg blue. In the fall, the leaves turn a brilliant crimson making it a good fall color tree for the South. They are remarkably insect- and pest-free and can withstand poor, dry soils and urban conditions. They are hardy to Zone 7.

Q: I am growing the blackberry lily for the first time and I love the flowers and seed pods. Can I save the seeds and grow more plants from my originals?
—S.L.F., Erie, Pennsylvania

A: Blackberry lilies produce beautiful, shiny black seeds similar to blackberry fruits. They self-sow readily and are easy to germinate. Collect and save the seeds in the fall; place in a cool, dry place where they will not collect moisture. In the spring, plant the seeds in flats inside and supply them with a temperature range of about 70 to 85° F. You can start seeds directly outside (where you would like to establish them) but wait to do this until early summer when the weather has warmed up. Although you shouldn't have any problems germinating blackberry lily seeds, you may have to wait about three weeks to see any signs of life. Plants that are grown from seed usually don't flower until the second year of growth.

Q: I have been gardening for years and I read many gardening books but I always come across conflicting information concerning the best time to cut back asparagus and rhubarb. When do you recommend that I cut these plants back?
—H.J.G., Kansas City, Missouri

A: The ferny growth of the asparagus plant should be cut down in the fall after the first frost and after the leaves have turned brown. You want the tops to stay green and active as long as possible so that they can produce food and energy to strengthen the roots for next year. As it gets colder they will die back. When you see this dieback and browning, cut them off to the ground.

The same goes for the rhubarb. You want the leaves to produce as much food as possible so don't cut the leaves back if they are still green. Rhubarb leaves should be removed in the late fall or early winter after they have turned brown.

—Peggy Lytton
Assistant Editor

Plants Wanted

✦ *Clivia miniata* **(kaffir lily—a yellow-flowered form). Kaffir lilies have fleshy roots with long, strap-shaped green leaves growing directly out of the root in a fan pattern. Would like a yellow-flowered form, not the red or orange-red-flowered species. Anne Gehin, 223 Forest Ave., Lake Pine, Medford, NJ 08055.**

✦ *Danae racemosa* **(Alexandrian laurel). A member of the lily family, this evergreen shrub grows to four feet and has slender, smooth, evergreen stems. The flowers are tiny, yellowish white, and borne on terminal racemes. Fruits are small red berries. Georgia B. Orr, Rt. 2, Box 408, High Point, NC 27260.**

✦ *Ferula sambul* **(musk root). A member of the carrot family, this genus is known for its fragrant roots. Would appreciate seeds, plants, or information on other species of** *Ferula.* **Elizabeth Gates, 41 N. Delaware Ave., Yardley, PA 19067.**

✦ *Heliopsis* **species. These are sunflowerlike, herbaceous perennials that are erect, loosely branched, and have opposite, toothed leaves with three main veins. Would like seeds or plants of any of the species but most interested in** *Heliopsis brachactis, H. parviceps, H. parviflora,* **and** *H. rubra.* **Denny Schrock, 1421 S.E. 3rd Ave., Rochester, MN 55904.**

✦ *Robinia kelseyi, R. boyntonii, R. hartwigii, R. elliottii.* **These shrubs are typical members of the pea family: butterfly flowers, flattened pods, and alternate, pinnate leaves. Please send seeds, plants, or information to Brian Pearson, W3452 Peters Rd., Marinette, WI 54143.**

Gardener's Bookshelf

A Proper Garden

Gardeners who have followed Elisabeth Sheldon's articles in *American Horticulturist, Flower and Garden,* and *Horticulture* will enjoy more of the same in this collection on perennial gardening. Using her upstate New York garden as background, Sheldon guides us toward creating English cottage gardens and formal mixed borders in areas with less than ideal—"even manic-depressive"—weather. *A Proper Garden* contains a bushel of information on achieving harmony through color, shape, and texture; gaining control; and creating a balance of color throughout the seasons, along with everything we need to know about lavenders, geraniums, windflowers, salvias, campanulas, dianthus, veronicas, yarrows, and asters. Sheldon extols the virtues of garden planning, but also encourages us to leave room for surprises. "Unexpected things happen . . . (a) poppy may unfold its crimson-magenta cup over a little patch of 'Silver Carpet' lamb's ears—a combination so good the gardener wonders why he hadn't planned it." By Elisabeth Sheldon. Stackpole Books, Harrisburg, Pennsylvania, 1989. 224 pages. Black and white drawings and color photos. Publisher's price: hardcover, $19.95. AHS member price: $15.95.

Easy Care Perennials

This book's breezy style and fundamental message makes it an excellent choice for the beginning gardener. According to Patricia Taylor, "It is written for people who want the simple joys of gardening without complicated challenges." The 50 plants reviewed here were chosen because they don't need rich soil, fertilizer, or pesticides. Plants are divided (one per page) into seasonal subheadings. Each listing includes the botanical and common name, temperature range, plant/bulb/seed sources, a full-color photo, potential pests, bloom period, and the author's experiences growing the plant, with an occasional bit of history and folklore. A section entitled "Putting It All Together" contains photos of the first three years of a garden, along with design, foliage, and flower suggestions by season for three gardens: shade, semi-shade, and full sun. By Patricia A. Taylor. A Fireside Book, Simon and Schuster, Inc., New York, New York, 1989. 157 pages. Color photos. Publisher's price: softcover, $12.95. AHS member price: $10.35.

A Year of Flowers

Fans of Peter Loewer, another frequent *American Horticulturist* contributor, will enjoy this account of his year-round adventures in gardening. Packed with information, this book is a month-by-month description of annuals, perennials, bulbs, wildflowers, trees, and shrubs that can be grown indoors and out. Each month contains a "flower feature" (orchid cactus for April, *Ligularias* for September) and a garden plan. The latter range from windowsills of flowering bulbs and houseplants (January and December), to a wildflower garden (May), to a cutting garden (August). A bit of plant lore is thrown in with recommendations for planting and growing, landscape plans, and directions for constructing various window greenhouses. An abundance of Loewer's black and white drawings spill across the pages. By Peter Loewer. Rodale Press, Emmaus, Pennsylvania, 1989. 254 pages. Black and white drawings and color photographs. Publisher's price: hardcover, $21.95. AHS member price: $17.55.

—Mary Beth Wiesner

Wild and Wonderful Flowers for Your Home

This book recognizes wildflowers as flowers in their own right, suitable for both formal and informal arrangements in the home. Using native flora, authors Irma Fleck and Marcia Stevens create striking designs with vases and containers found in Riverdale, New York, homes. The book begins with basics such as conditioning, preserving, line, color, form, and balance and moves on to more elaborate efforts such as wreaths, bridal bouquets, and seasonal features. Many color photographs are used to illustrate the effectiveness of simple flowers against formal furnishings. The book does raise one major concern in that the authors have used only New York native flora. However, many of these species are found in other parts of the country, and the photographs are only examples of how native plants can be used as effectively as florist-shop blooms. By Irma Fleck and Marcia Stevens. Timber Press, Inc., Portland, Oregon, 1989. 172 pages. Black and white and color photographs. Publisher's price: hardcover, $39.95. AHS member price: $33.95.

Lawns and Landscaping: 1001 Gardening Questions Answered

An excellent book for the neophyte, *Lawns and Landscaping* details the mechanics of creating a lawn and landscape for the average suburban home. While the format is primarily question and answer, informative sidebars and charts are provided for almost every topic and technical points are clearly illustrated with line drawings and color photographs. The first part of the book covers the basics of starting a lawn (either by seed or sod), year-round care, and taking care of the inevitable weeds, diseases, and pests. The second part helps the reader build on the foundation of a good lawn: planning the landscape, choosing appropriate trees, shrubs, and groundcovers, and utilizing typical garden structures such as fences and pathways. A hardiness zone map, glossary, index, and a list of books for further reading are included. By the editors of Garden Way Publishing. Storey Communications, Inc., Pownal, Vermont, 1989. 149 pages. Black and white drawings and color photos. Publisher's price: hardcover, $16.95. AHS member price: $13.55.

The Houseplant Library

For the American reader, *The Houseplant Library* will prove to be a pleasant deviation from most house plant books. Not only do the plants hail from all parts of the world, but many of what we typically grow outdoors—*Gomphrena, Gerbera,* and *Passiflora*—are suggested for indoor use. For "sunny rooms," suggestions include unfamiliar but beautiful plants such as *Lapeirousia laxa, Lotus berthelotii,* and, my favorite, *Anigozanthos manglesii* or Mangle's kangaroo paw. The challenge will be in trying to obtain these foreign beauties, but at least you will know that, yes Virginia, there are still exciting new house plants to grow. Plants are presented in alphabetical order of the botanical name with color photos and symbols for cultural requirements; there is also a short glossary. *The Houseplant Library* consists of four 64-page books: *Plants for Sunny Windows, Plants for Warm Rooms, Plants for Shady Corners,* and *Fragrant Plants*. By Kenneth A. Beckett. Salem House Publishers, Topsfield, Massachusetts, 1989. Publisher's price for each book: $8.95. AHS member price: $6.45.

—Peggy Lytton

Book Order Form

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Need a Book List?

A list of all the books currently offered at a discount to AHS members was printed in the September issue. If you lost yours or need an extra copy, mail a self-addressed, stamped envelope to: Book List, AHS, 7931 East Boulevard Drive, Alexandria, VA 22308.

Correction

The hardcover price of *Successful Southern Gardening* by Sandra Ladendorf, reviewed in September should have been listed as $21.95.

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Gardener's Dateline

✦ **Through Nov. 26. Japanese Chrysanthemum Display.** Brookside Gardens. Information: 1500 Glenallan Ave., Wheaton, MD 20902, (301) 949-8230.

✦ **Nov. 1, 16, Dec. 6. Professional Tree Care Courses.** Morris Arboretum. Information: Jan McFarlan, Morris Arboretum of the University of Pennsylvania, 9414 Meadowbrook Ave., Philadelphia, PA 19118, (215) 247-5777.

✦ **Nov. 2-4. Fall Plant Festival.** Overseers' Room & Garden Terrace. Information: Catherine Babcock, The Huntington, 1151 Oxford Rd., San Marino, CA 91108, (818) 405-2147.

✦ **Nov. 2-22. Landmark Show of 19th Century French Flower Paintings.** Didier Aaron, Inc., 32 East 67th St., New York, NY 10021. Information: Deborah Semel, Harriet Weintraub & Assoc., (212) 935-1033.

✦ **Nov. 4. Annual Native Plant Sale.** Information: Rebecca Coleman, Rancho Santa Ana Botanic Garden, 1500 North College Ave., Claremont, CA 91711, (714) 625-8767.

✦ **Nov. 4-5. Ikebana Show.** Descanso Gardens. Los Angeles Chapter of Ikebana International. Information: LuAnn Munns, (818) 446-8251.

Beyond Boughs of Holly

While there's nothing wrong with pumpkins and gourds, pine cones and sleigh bells for holiday centerpieces and mantle trim, American Horticultural Society "arranger-in-residence" Leonard Tharp encourages decorators to reach for materials less prosaic.

Any arrangement of Tharp's is apt to contain non-floral material, such as fruits, vegetables, and dried grasses. What could be more appropriate for Thanksgiving than a cornucopia spilling over with the sensuous shapes and colors of peppers, squashes, ears of corn, and garlands of beans or berries?

"When things begin to berry in the fall," he says, "I think you begin to have one of the most appealing times to gather materials. So many of the berrying branches you can swipe from just outside your car window are things you can use months later."

Tharp is likely to include dried materials in an arrangement any time of year, but they seem especially right in autumn, when Nature is drying all her own designs. "Particularly with the grasses and weeds you find just by plugging along a country road—you wind up with wonderfully big arrangements that can dazzle even though they're no longer fresh," Tharp notes. In addition to grasses and dried flowers, Tharp employs branches of autumn leaves, bark, lichens, mushrooms and toadstools, vines, seed heads, alliums, ornamental kale, and dried berries. He uses grasses to create the look of "containerless" arrangements by wrapping the grasses vertically around a cylindrical container, and tying them with more grass. In the midst of this dry material, he may put tropical blooms or leaves from a common house plant, or non-plant material, such as statuary.

One of his favorite materials for Christmas is juniper, both branches and berries. Coxcomb is a flower that dries well and adds the traditional red in a surprising way. In an arrangement done while living in Houston, Tharp constructed a wreath of coxcombs, bromeliads, and huge white toadstools that grow in that area.

He makes extensive use of native plant material. For one mantlepiece arrangement in Texas, he gathered armloads of Chinese tallow berries, which are rampant throughout the Gulf Coast, shucked them to reveal their white interior. He formed them into a huge wreath that was tied with a ribbon with a botanical print and hung with a long tendril of ivy. On each side of the wreath, he filled green cachepots with more tallow berries and another sprig of ivy.

He employs fruit extensively at Christmas, too—not only apples and oranges, but peaches, crab apples, and pomegranates. In his book, *An American Style of Flower Arrangement,* he notes that pomegranates are a symbol of fertility. A Christmas rangement in that book features pomegranates that have been torn open to reveal their seeds, paired with sprigs of various berries, and a rope of elaborate beading from a formal gown.

In another Christmas display, he has surrounded a creche with boughs of fir, berried juniper and holly, garlands of brussels sprouts, and baskets of fruits and baby vegetables. The effect is one of an offering to the newborn Jesus.

Tharp's philosophy is that there is no limit to the plant—and non-plant—material that can be used for holiday decorating. "Just don't be afraid to gather and use a lot of it," he advises.

A wreath of coxcombs, bromeliads, and huge white toadstools adorns a front door in Houston.

Leonard Tharp and his partner Tom Stovall will be conducting six classes at River Farm in November. Classes on Nov. 7 and 8 will focus on fresh and dried materials for autumn arrangements. Classes on Nov. 17, 18, 27, and 28 will offer ideas for wreaths, garlands, and swags. The three-and-a-half hour classes include lunch. For more information, call (800) 777-7931.

On November 30, Tharp will conduct a class on floral art for the holidays aboard the Annabel Lee, a paddleboat that sails the James River near Richmond, Virginia. Students will be served a Southern plantation brunch, then disembark at historic Westover Plantation, from which they will be transported to Evelynton Plantation, a manor house designed by Duncan Lee. For more information, call (804) 829-5075.

✦ **Nov. 4 and 11. Courses on Winter Protection of Landscape Plants, Propagating Trees and Shrubs.** Holden Arboretum. Information: 9500 Sperry Rd., Mentor, OH 44060, (216) 946-4400 or (216) 256-1110.

✦ **Nov. 4-19. Mums on Stage.** Gage Park, Hamilton. Information: Parks Division, Dept. of Public Works, City Hall, 71 Main St., W. Hamilton, Ontario L8N 3T4, (416) 526-4212.

✦ **Nov. 5, 12, 19. Workshops on a Garden for Hummingbirds, New Landscaping Design, and Holiday Wreaths and Topiary Decorations.** Botanical Garden, New Orleans City Park, New Orleans, LA 70119. Information: Ann Spicer, Director of Public Relations, (504) 482-4888.

✦ **Nov. 6-9. Professional Lawn Care Association of America's 10th Annual Conference and Show.** Las Vegas. Information: (800) 458-3466.

✦ **Nov. 10-11. Lecture and Workshop on Winter Care of Trees and Shrubs.** Boyce, Virginia. Sponsored by the Friends of the State Arboretum of Virginia at Blandy Experimental Farm. Information: (703) 837-1758.

✦ **Nov. 11-12. Green Team Trade Show, "Gateway to the '90s."** Cervantes Convention Center, St. Louis, Missouri. Information: (301) 667-1833.

✦ **Nov. 12. Fruits of Fall Walk.** Scott Arboretum, Swarthmore College, Swarthmore, Pennsylvania. Information: Laurie Jeffers, (215) 328-8025.

✦ **Nov. 12-15. The 1989 International Irrigation Exposition and Technical Conference.** "40 Won-drous Years of Irrigation." Anaheim, California. Information: R.C. Sears, (703) 524-1200.

✦ **Nov. 16. Celebrating 20 Years—With Chrysanthemums.** Brookside Gardens, Wheaton, Maryland. Information: Rebecca J. Zastrow, (301) 949-8231.

✦ **Nov. 16-18. Landscape Maintenance Association's Second Annual Meeting and Equipment Demonstrations.** Orlando, Florida. Information: Charles E. Bingaman, P.O. Box 728, Largo, FL 34649-0728, (813) 584-2312.

✦ **Nov. 18-19. Bonsai Show.** Los Angeles State and County Arboretum. Information: LuAnn Munns, (818) 446-8251

✦ **Nov. 19. Lecture on positive proof that plants clean the air.** Bill Wolverton, NASA scientist. Information: Lisa Frank, Atlanta Botanical Garden, Piedmont Park at The Prado, Box 77246, Atlanta, GA 30357, (404) 876-5859.

✦ **Nov. 19. African Violet Care and Culture.** Display by the South Coast African Violet Society. South Coast Botanic Garden. Palos Verdes Peninsula, California. Information: LuAnn Munns, (818) 446-8251.

✦ **Dec. 2-3. Camellia Show.** Pacific Camellia Society. Information: LuAnn Munns, (818) 446-8251.

✦ **Dec. 4-6. Annual Missouri Lawn and Turf Conference.** Clarion Hotel, St. Louis. Information: (314) 882-4087.

✦ **Dec. 13-15. Desert Turfgrass/ Landscape Conference and Show.** "Water in the Future—Bridging the Gap." Riviera Hotel, Las Vegas, Nevada. Information: Linn Mills, Nevada Cooperative Extension, 953 East Sahara Ave., Suite 207, Las Vegas, NV 89104, (702) 731-3130.

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AHS Bulletin

Dear Santa...

AHS may be 67 years old, but it's just a kid at heart. And were you to get its caretakers on Kris Kringle's knee, we'd admit there are a few things we would like to find in our stockings this year to make River Farm more beautiful and enjoyable for our members to visit.

Main House

Large refrigerator for storage of flowers and seeds.
A clothes washer and dryer.
Repairs to our freight elevator.
Repairs to ceilings in the drawing room, foyer, back hall, and ballroom.
Roof replacement.
Interior painting.
Luncheon and dinner china for 30.
China coffee service for 30.
Silver coffee and tea service with creamer and sugar bowl.
Silver-plated coffee urn.
Silver and brass candlesticks.
Linen tableclothes and napkins.
Porcelain vases, bowls, and tureens.

Library, Carriage House

Library table and chairs.
Card catalog stands.
Books.
Historical items.
Prints relating to the history of horticulture.
Rewiring.
Water tank, plumbing repairs.
Interior and exterior painting.
Air conditioning condenser.

Grounds

Medium-sized truck or van.
Truckster.
Front-deck mower.
Weedeaters.
Utility cart.
Hand tools.
Soaker hoses.
Pruning equipment.
Push mowers.
Plant collections.
Garden furniture.

In addition, several areas in all of our buildings need new carpeting. Remember, all donations to AHS are tax-deductible.

Pat Connaughton

River Farm had another tree loss in September—an especially sad one. A hard rainstorm toppled a black walnut believed to have been planted by George Washington. Two remain farther down the river bank, but this was a favorite because it shaded picnic tables—one of which the tree took with it when it fell.

New Staff

If you've called AHS for assistance or advice in recent months, you may have run into a number of new names and voices.

Our new director of marketing and programs, Joseph M. Keyser, has been a conservation writer in the Washington, D.C., area for the past 15 years. His most recent experience was at the American Forestry Association, where he worked to develop community tree-planting programs. He is also currently conservation chairman of the Potomac Appalachian Trail Club, leading major reforestation efforts along 700 miles of trail in Maryland and Virginia.

Our new membership director is Kathleen B. Amberger, who also comes to AHS from the American Forestry Association. Amberger has more than 16 years of experience in membership development and member services. She is a Washington, D.C., native currently living in Virginia, where she gardens as often as her new AHS schedule permits.

A. Renée Blondin, director of communications, was public relations assistant at the Society of American Foresters in Bethesda, Maryland, before joining AHS in early August. Blondin's experience includes working with Keyser to promote the American Forestry Association's Global ReLeaf initiative, an urban tree-planting project aimed at countering the greenhouse effect. AHS is a major supporter of the Global ReLeaf effort.

New to the publications staff is assistant editor Mary Beth Wiesner. Her background includes two years as publications coordinator at the Ohio Historical Foundation in Columbus, where she was editor of the quarterly newsletter and developed special fundraising projects, including a wildflower and butterfly cross-stitch series. Her skills at desktop publishing are largely responsible for the new look of this issue of your News Edition.

Columns Restored

Thanks to Mrs. Harry Van de Kamp of Paso Robles, California, our former first vice president, restoration is nearly complete on the 10 columns around the side portico of the main house at River Farm. Two of the columns no longer had caps and three other caps had crumbled badly and were being held together with putty.

Of greater concern, some of the oak spacers between the concrete columns and the steel beams holding up the portico roof were disintegrating so that the roof had begun to sag from the pressure. The porch was jacked up, the spacers replaced, and the elaborate Scamozzi-style caps are being replaced by a specialty company in Philadelphia.

The column repair follows exterior painting and minor structural repair to the exterior of the main building last fall, donated by Mrs. Ellice McDonald Jr. of Montchanin, Delaware.

A big thank you to both of these members for helping to keep our headquarters beautiful for all the rest of our friends and visitors!

Our New Look and Size

If the News Edition looks different to you this month, it's because it's the first issue typeset and produced in-house at River Farm on our new desktop publishing equipment. The change will not only make our production process more cost-effective, but will allow us to bring you news and events on a more timely basis.

Our September issue also marked a change, from a 16-page format to a 24-page format. Ordinarily, the decision to publish more pages is based on advertising. That's not the case with us. We felt strongly that our members deserved a substantial publication once a month, and our Board of Directors gave us the go-ahead for more room for more news: more gardening tips, more features, more horticultural research that you can use, and more space for members to talk to each other.

You'll notice some changes in our regular columns and features. Regional Notes, which has been a compendium of seasonal gardening reminders, will become a place to find news of botanical gardens and arboreta around the country. There will still be some tips from the experts at those gardens, but we'll also bring you news of garden expansion, new services, research breakthroughs, and other happenings.

Our letters column is now the Members' Forum, where you can comment on articles, ask for clarification or more information, offer tips to other members, or ask for their advice and observations.

Our tight space had persuaded us to shorten our Gardener's Dateline column, so that we were only listing horticultural events of wide regional interest and had eliminated listings of professional meetings. We are now restoring listings for events of more localized interest and trade meetings, since a proportion of our members are professionals, and many trade meetings are also open to amateur gardeners. In upcoming issues, we plan to regionalize those listings so it will be easier for you to find events occurring in your area.

We have also added a short index to our front page, so that it will be easier for you to find regular columns and other items of interest.

If there are other changes or other types of information you'd like to see in the News Edition, please let us know! That's what we're here for.

A Festive Affair

River Farm's annual holiday open house will be from 11 a.m. to 4 p.m. December 9. As usual, we'll have holiday decorations to buy, punch to drink, and goodies to eat. There will also be entertainment and a chance to see our parlor dressed to the nines for the season.

Lorna McManus

AHS President Carolyn Marsh Lindsay congratulates Liberty Hyde Bailey medal winner John Creech at last year's meeting in Minneapolis.

1990 Meeting Dates

The dates for the 1990 AHS meeting in Seattle, Washington have been changed to Tuesday, June 19 (when registration will start) through Friday, June 22. This will leave the weekend open for members to join optional tours or see the beautiful and fascinating Northwestern United States and Canada on their own. This year's meeting will include fewer lectures but more tours; including the world-famous private garden of Mrs. Pendleton Miller, the Rhododendron Species' Foundation grounds, and several public gardens. Local coordinator of the meeting is Glenn Youell of Bellevue, who will help plan activities and solicit community support.

AHS Sponsors Steele Exhibit

The AHS traveling exhibit featuring the work of landscape architect Fletcher Steele will open January 18 at the PaineWebber Gallery in Manhattan with a gala celebration. On January 19, PaineWebber will be the site of a symposium on Steele's work.

Most of the pieces in the exhibit first appeared last April at the Memorial Art Gallery in Rochester, New York, in conjunction with an AHS-sponsored symposium on the eminent designer, who practiced his art for six decades beginning early in this century. Several supplemental pieces can be seen in New York. These include pieces of original art, including drawings, sketches, watercolors, and sculpture, as well as three-dimensional objects—furniture, architectural remnants, and ornaments—from Steele-designed gardens.

Steele designed more than 500 gardens between 1914 and 1968. Those featured in the exhibit include the Charlotte Allen Whitney Garden in Rochester; the Standish Backus Garden in Grosse Pointe Shores, Michigan; the Gardens at Naumkeag in Stockbridge, Massachusetts; and the Camden Library Theater in Camden, Maine.

Thirty-five black and white photographs, representing these and other gardens deemed Steele's best work, were chosen as a two-dimensional exploration of his artistic approach to landscaping. The collection was taken from the State University of New York's School of Environmental Science and Forestry in Syracuse, New York.

Also in the exhibit is a series of color photos that capture the poetry and color of these gardens. Enlarged images help to explain various design methods that Steele used. Seven didactic panels illustrate design problems that confronted him, and their subsequent solutions.

The exhibit will be at the Paine-Webber Gallery from January 18 through March 30. It then travels to the Wave Hill Gallery in the Bronx, New York, where it can be seen from May 6 through July 29.

An article on Fletcher Steele appeared in the October 1988 *American Horticulturist.* A review of Robin Karson's book, *Fletcher Steele, Landscape Architect: An Account of the Gardenmaker's Life, 1885-1971,* was in the October 1989 issue.

Travel/Study Trips for the AHS Gardener

January 14-21 and January 21-28, 1990
Gardens of the Caribbean Windward Islands

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*Leonard Haertter Travel Company, 7922 Bonhomme Ave. St. Louis, MO 63105, (800) 942-6666

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Move Over Dutch Elm; Here Comes Oak Wilt

What is smaller than an acorn but powerful enough to kill a red oak in less than two months? Oak wilt, a fungal, systemic disease that attacks all oak species, especially in the North Central, Mid-Atlantic, and Midwest regions of the country.

First described in the 1940s, oak wilt has been observed in 21 states. Concern about the disease grew in the 1960s, when it began causing considerable damage to the forest economy and in residential areas. It has been especially prevalent in Texas and the Great Lakes states.

Symptoms differ on different oak species. The red oak group, which is the most susceptible, displays a rapid bronzing of foliage, wilt at the leaf petiole, and loss of leaves from the crown. In just four to five weeks, the entire crown will appear dead or defoliated and within a year the tree usually dies; few recover.

Live oaks, endemic to Texas, exhibit veinal chlorosis and may defoliate but seem to persist for several years. The fungus can spread through root grafts, which occur naturally when the root of one tree rubs against another. Live oaks frequently have common root systems that enable the fungus to spread through many trees in one area. The fungus can also be spread by insects, such as sap beetles.

In spite of a high mortality rate among oak trees in Texas for many years, it wasn't until recently that researchers pinned the blame on oak wilt. David N. Appel, forest pathologist with the Department of Plant Pathology and Microbiology of the Texas Agricultural Experiment Station, said they are developing a fungicide that "looks promising." Genetically resistant species and biological controls are a more distant hope.

Currently, the only way to control spread of the disease is through quick diagnosis and removal of diseased trees. Texas has such a management program to hold down the incidence of oak wilt, Appel said, "but it requires a lot of cooperation and research."

In Minnesota, rapid expansion of urban areas is causing the disease to spread more rapidly than it might otherwise. As lots are cleared in the spring and trees are either cut or damaged by construction, sap beetles carrying the fungal spores enter the tree's vascular system through the fresh wounds and infect the trees. There are now more trees dying there because of the oak wilt fungus than because of Dutch Elm disease.

Homeowners can help prevent the spread of oak wilt by not pruning (i.e., wounding) the trees in the spring, not moving firewood from diseased areas, and eradicating diseased oaks as soon as they are diagnosed. If trees are wounded or pruned for emergency reasons, they should paint over the wound immediately. If an oak displays symptoms of wilt, it should be tested by a trained arborist or county extension agent to make sure the cause is fungal disease and not just drought. You may lose your tree, but you will be able to prevent the fungus from spreading to other neighborhoods.

Volunteers Needed

Eager gardeners and plant lovers are needed to provide data on plants and their geographic hardiness for the U.S. Plant Performance Guide project—a computer database capable of helping nursery personnel select the best plants for particular geographic areas. The guide will become part of the U.S. Department of Agriculture's (USDA) Current Research Information System.

The first phase of the project was the creation of a new USDA hardiness map, which has now been completed. With the help of volunteers the database should be ready in two to three years.

According to Dr. Henry M. Cathey, director of the U.S. National Arboretum, "Anyone who is comfortable identifying plants" can help with the project. To become a data volunteer or for more information about the project write: Plant Performance Guide, U.S. National Arboretum, 3501 New York Ave., Washington, DC 20002.

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