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A Good Weed

There are actually some gardeners who think weeds are evil. They go about exterminating them with all manner of poisons and lethal weapons. But as the rest of us know, a weed is simply a plant out of place and, in times past, that place might well have been an herb garden. Many of the weeds that we routinely trample and spray and attack with hoes, such as dandelion and lamb's-quarters, are both tasty and packed with nutrition. Others show promise for curing serious diseases such as cancer and AIDS. Weeds are also good communicators. Those that choose to grow in our gardens can tell us what kind of soil we have and suggest how we can deal with its deficiencies. And weeds can communicate with each other in ways that researchers are just beginning to comprehend—both cooperating to warn each other of danger and telling other weeds to “get outa my space.” We hope by the time you finish this issue, if you’re not growing nettles and pokeweed on your windowsill, you’ll at least take these garden interlopers a bit less for granted.

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Let Them Eat Weeds

Now that Euell Gibbons is gone, who is there to advise us on which plant parts are edible? Two knowledgeable and entertaining foragers appear regularly in the pages of *The Business of Herbs*, a bimonthly publication for those who rely on herbs for their livelihood.

Dr. Peter Gail, director of Goosefoot Acres Center for Wild Vegetable Research and Education, holds a Ph.D. in plant ecology from Rutgers University and for 16 years was on the faculty at Cleveland State University. With Euell Gibbons, he developed a Wilderness Survival Training Camp for the Boy Scouts of America. On his first trip to Europe in 1978, he learned that Europeans eat many of our "weeds" as a matter of course and returned determined to teach his students and other Americans that "wild vegetables were a healthy alternative to food stamps."



Peter Gail.

Dr. James Duke, an ethnobotanist with the Agricultural Research Service of the U.S. Department of Agriculture, is known primarily for his advocacy of plants as medicine (see page 4), and calls his column "An Herb a Day." However, he frequently gnaws on weeds for pure pleasure and has recently published *Handbook of Edible Weeds*. Duke's books are full of cautions to forager wannabes, which we will repeat here. Even if you have a good field guide, and even at the elbow of a trained botanist, plants can be misidentified. Someone is bound to be allergic to almost any plant and any plant could be toxic in large amounts. Use every precaution when ingesting wild plants and always sample them first in minuscule amounts.

Some of Gail's favorites, like the dandelion, are common, easy-to-identify garden weeds. In his column, "On the Trail of the Volunteer Vegetable," he has also offered recipes for burdock, plantain, sorrel, milkweed, lamb's-quarters, and pokeweed. But some of these plants can cause skin reactions or, in the case of poke, are downright poisonous.

The fierce stinging nettle (*Urtica dioica*), says Gail, "is one of the finest foods in the whole plant kingdom." It's rich in vitamin A, vitamin C, proteins, iron, calcium, phosphorous, potassium, the B vitamins, and many essential plant minerals. But the nettles have to be collected in spring when the leaves are small and tender, and even then, gloves are a must.

A cheese incorporating nettles, says Gail, "was one of the best, tangiest

cheeses I have ever eaten," although he has so far been unable to obtain the recipe. But he has stir-fried, creamed, and pureed nettles, made nettle pudding and nettle fritters—his favorite. Nettles have also been made into soups, beers, wines, and teas.

Another "sticky" plant that's surprisingly versatile in the kitchen is burdock (*Arctium lappa* or *A. minus*). "Burdock," says Gail, "was brought to America by Europeans, who got it from Asia, where

it has always been valued as food." It is sometimes called elephant ears because of its large, hairy, rhubarblike leaves. The Japanese and Hawaiians collect the first-year roots of this biennial when they are about 12 inches long and a half-inch in diameter, cook it till tender—about 30 minutes—and add it to sauteed vegetables, soups, or meat dishes, or eat it by itself with butter, salt, and pepper. It can also be made into candy.

The Italians harvest the second-year flower stalk while the flower buds or burrs are small and their bristles are soft, shaggy, and green. When the bitter, fibrous outside is peeled away, it reveals a white or pale green pith that can be sliced and used raw in salads or steamed and treated like asparagus. A traditional Italian dish called *cardone* is made from burdock stems dipped in a batter containing parmesan cheese and garlic powder and either fried or baked.

While plantain won't sting you or stick to your dog, most gardeners are familiar with it—the broad-leaved *Plantago major* and the narrow-leaved *P. lanceolata*, or



buckthorn—as a common and indefatigable enemy of the Perfect Lawn. Gail defends plantain primarily on the basis of its nutritional value and many medicinal uses, rather than its taste. “Chemical analysis shows that, in addition to potassium, plantain is also rich in factor T (which arrests bleeding), vitamins A, C, and K, as well as calcium and sulfur,” he reports.

Older leaves become bitter and tough, but the tender young leaves, available spring through summer, can be added raw to salad or steamed as a vegetable and added to soups and stews. However, they should be eaten sparingly, as they are mildly laxative. (Psyllium seeds, from *P. psyllium*, are used in making fiber-type laxatives and the seeds of all plantains can be used to treat constipation.) The seeds have been cooked like rice, ground into a meal, and used to make pancakes or flatbread, thus earning it the name “poor man’s bread by the way” in England.

The name sorrel is applied to two unrelated plants—*Oxalis stricta* and *Rumex acetosella*—that both impart a lemony flavor because of the oxalic acid they contain. *Oxalis stricta* is sometimes called sour grass or sour clover because of its three heart-shaped leaves. Its little green fruits are especially pungent; Duke calls them wild pickles. *Rumex acetosella*, or sheep sorrel, packs only about half the pucker of oxalis when used in recipes.

“Stuff sorrel into a meat sandwich and it replaces both pickle and lettuce!” Gail suggests. “Sprinkle it on omelets when the eggs are almost completely cooked or add it to salads or cottage cheese.” Sorrel is a prime ingredient for *Zupa Szczawiowa*, a Polish soup.

The plant that Gail describes as his family’s favorite is one that the cook must treat with extreme care. The shoots, flower bud clusters, and young seed pods of milkweed (*Asclepias syriaca* or *A. speciosa*) must be cooked in two changes of boiling water to break down the milky juice that contains poisonous, bitter alkaloids. “If any bitterness is detected in the finished product, spit it out and wash your mouth out,” Gail warns.

He also notes that while milkweed is one of the most distinctive of plants, its young shoots can be confused with those of the poisonous dogbane or Indian hemp (*Apocynum cannabinum*). Of the milkweed’s edible parts, the Gail family prefers the bud clusters, served like broccoli with salt, pepper, and butter, or

in a cream sauce. Gail compares the shoots to asparagus and uses them the same way. The seed pods can be fried in a corn-muffin batter.

The common dandelion (*Taraxacum officinale*) is ranked among the 10 most nutritious vegetables, possibly ahead of broccoli and spinach. Rich in iron, dandelions are among the richest sources of Vitamin A and calcium. Several mainstream catalogs offer seeds of gourmet cultivars.

Gail has 600 dandelion recipes from 35 different ethnic groups. Their bitter taste, he says, can be reduced if they are gathered after the first frost or blanched by growing them in shade. The greens are often treated the same way spinach is, mixing them with cheese, hard-boiled eggs, vinegar, or lemon juice to mask the bitterness, or wilted with bacon fat.

Lamb’s-quarters (*Chenopodium album*) and redroot pigweed (*Amaranthus retroflexus*) also taste like spinach, and can be used in any spinach recipe.

Kudzu Ranching

Kudzu—the weed that ate the South—may itself someday be eaten on a commercial scale. A vine native to Japan, kudzu (*Pueraria lobata*) has handsome foliage, fragrant blossoms, and a phenomenal growth rate. Gary Wade, extension horticulturist at the University of Georgia, estimates that a kudzu stem can grow a foot a day, which may make it the world’s fastest growing plant. Kudzu was brought to the United States in the 1870s and promoted as an ornamental “porch vine,” then as a livestock fodder and ground cover.

Kudzu never caught on commercially, but it proved a terrifying ecological success. By 1950, at the height of its reign, it covered nearly a million acres of the South. The vine is still on the loose, but today it blankets less than 100,000 acres.

In Japan, kudzu is a celebrated ingredient in the national cuisine. Its roots are especially prized: these are powdered and used to make tea, soups, and various other dishes. Now a Japanese company, Sakae Bio, hopes

If cut before they get more than a foot high, the stems of the invasive Japanese knotweed (*Polygonum cuspidatum*) can be boiled for four minutes, sugared, and used as a “faux rhubarb” for sauces and pies. Like rhubarb, says Duke, it can be laxative.

Wild garlic (*Allium vineale*) and wild onion (*A. canadense*) can be used like their domestic counterparts, although they’re stronger. Duke says he likes the pot liquor of wild garlic but not the greens and finds that the cloves leave a bad aftertaste. Amateurs should be sure the plant in question has the characteristic garlic or onion smell; wild onion can be confused with the star-of-Bethlehem or even more deadly death camas.

Chickweed (*Stellaria media*), a lawn pest that likes damp and shady spots, is a tender, mild green that should be mixed with a stronger one in a salad. In sandwiches, it can be used like a cress or mixed into chicken- or egg-salad spreads. ♦

to profit from Japan’s appetite for the weed—and the weed’s appetite for America. Sakae Bio plans to grow kudzu on a 165-acre ranch in Alabama, for export to Japan. But as with its previous roles in this country, kudzu the export crop is sprouting unexpected problems. First, the ranchers reportedly had trouble propagating the vine. Now, with several thousand plants ready to go, “the Japanese are running into financial problems,” says Harry Amling, a retired horticulturist who is serving as consultant for the project.

Wade says other companies may decide to embark on a kudzu venture. But don’t count on the vine being promoted from weed to crop anytime soon. For one thing, Wade points out that harvest is likely to be a challenge. The vine’s immense tubers may lie under several feet of earth and weigh up to 300 pounds apiece. With a potential for 10,000 roots per acre, an established kudzu patch could give new meaning to the term “heavy yield.”



Favorites From Dr. Duke's "Farmacy"

Dr. James Duke, ethnobotanist with the U.S. Department of Agriculture, is without a doubt one of the nation's foremost proponents of medicinal plants. In his "An Herb a Day" column in *The Business of Herbs*, he has described recent findings about such low-life vegetation as ground ivy and purslane.

The crinkly leaves and blue flowers of ground ivy (*Glechoma hederacea*), also known as gill-over-the-ground and alehoof, can tempt a gardener to let it have its way. But on damp ground here in the Washington, D.C., area, it quickly becomes a bully.

Duke describes trying the ivy to alleviate nosebleed and ozena—a stench in the nose—brought on by anti-inflammatory drugs prescribed for him. His computerized folk medicine catalog credits alehoof as a treatment for more than 40 conditions, including abscesses, arthritis, corns, fractures, neuroses, and scurvy. It has also been used to treat cancers and other types of tumors.

More scientific evidence for it came from a 1986 issue of the journal *Cancer Letters*, in which Japanese scientists said two substances isolated from the ivy—ursolic acid and oleanolic acid—appear to inhibit tumor promoters. Duke explains that cancer formation seems to proceed in two stages: some substances, such as tobacco, initiate tumor formation and

others—some are found among the spurge—then promote tumor growth.

"Many of our herbs contain ursolic acid and oleanolic acid, and many have anti-inflammatory and chemopreventive reputations as well,"

he says. "In America the pharmaceutical trade is trending away from these natural compounds in search of synthetics, which are easier to protect by patents. Meanwhile, Japanese are busy cornering half of the world's patents on natural products."

While pokeweed (*Phytolacca americana*) was used widely both internally and externally as a folk medicine by American natives of many tribes, it is mitogenic, meaning that it can change cell physiology, and some experts recommend against handling it without gloves. Except for its spring shoots, eaten as cooked greens, all parts are highly toxic.

However, poke leaves and seeds contain antiviral proteins called ribosome-inactivating proteins or RIPs, which are being studied for potential use against cancer and AIDS. Normally, these RIPs kill most cells they enter—good cells along with bad cells. Modern biotechnology, says Duke in his *Handbook of Edible Weeds*, could allow RIPs or the poisonous ricin of the castor bean to be attached to antibodies and directed selectively toward the AIDS virus or tumors.

Another herb that may have potential against AIDS is *Prunella vulgaris*, a member of the mint family commonly called self-heal or heal-all. (Duke has found some 30 common names, including "eel oil.") The Chinese have found that extracts of this plant show anti-AIDS activity in the laboratory and researchers in California and Canada have also found evidence for the plant's anti-AIDS properties.

Duke says self-heal contains twice as much rosmarinic acid as does rosemary.



AGRICULTURAL RESEARCH SERVICE, USDA

James Duke.

As an antioxidant, it protects cell membranes from breaking down and may help prevent heart disease and cancer. This and two other active ingredients in self-heal are reported to have liver-protecting properties. Thus Duke notes with some irony that the mint in a mint julep might help prevent cirrhosis.

An article on medicinally promising weeds, Duke says, wouldn't be complete without mentioning St.-John's-wort (*Hypericum* spp.). Although there are a number of cultivated species, his interest is in the roadside variety. A 1988 National Academy of Sciences report indicated that two compounds in the plant showed "extremely effective" anti-AIDS action in mice. However, analysis of five species by researchers at the National Cancer Institute showed mixed results. Duke believes that the plants may have more biological activity while flowering, but he was unable to find the most common weedy species, *H. perforatum*, in bloom.

Duke and others have recently found that another noxious weed, purslane (*Portulaca oleracea*), contains high levels of a substance important for reducing heart disease and building cell membranes in the brain and eyes. This fatty acid, alpha-linolenic acid (ALA), has also been championed as a cancer preventative. ALA is an omega-3 fatty acid, which humans can't make efficiently. Because fish oils are a good source of this acid, they have been hailed as an anticancer food substance, but the fish themselves get the omega-3 from plants called phytoplankton.

A 100-gram serving of purslane has 10 times more ALA than spinach as well as six times more vitamin E according to the Agricultural Research Service. Because of its crunchy texture and mild, nutty taste, it has been compared to bean sprouts as a salad ingredient.

Perilla frutescens, a pasture weed in the mint family that is cultivated in Asia for its oil seeds, is also a rich source of ALA, according to Duke. It is commonly known as the beefsteak plant, purple mint, or wild coleus.

Duke calls common evening primrose (*Oenothera biennis*) his favorite weed. It contains gamma-linolenic-acid, said to prevent pre-menstrual syndrome, and tryptophan, used to treat insomnia.

Anti-Smart Weeds

Not all weeds are altruistic, as anyone knows who has ever been bitten by stinging nettle or had an agonizing bout with poison ivy. But weeds that will neutralize the irritants that these weeds contain can often be found in *materia plantarum* close at hand, says Peter Gail. Nettle stings can even be soothed with the juice of their own leaves or the crushed leaves of dock, which tend to grow near nettles. The crushed leaves of plantain or jewelweed will serve as an antidote to either of these scourges.



Yo Buddy—Outa My Space!

by Gail Dutton

Have you ever suspected that there is more going on in your garden than can be attributed to light, water, and fertilizer? Why, for example, do your prized penstemons inexplicably waste away while that particularly obnoxious weed conquers so much terrain? If questions like these lead you to wonder whether plants are capable of conspiracy, you're in good company.

Researchers are finding that plants really do communicate with each other, in a variety of ways. These are not skills that our fancier garden plants acquire at some European finishing school—even the ugliest desert weeds can “talk” to each other. Some species, for instance, release chemical messages that inhibit the root growth of their neighbors. Others may have developed ways to warn their fellows of an insect attack—and help them prepare for it.

The theory of allelopathy, which holds that plants release substances that inhibit the growth of their neighbors, has been debated in one form or another for centuries. The black walnut (*Juglans nigra*), for instance, is known to secrete compounds from its roots that discourage neighboring vegetation. But though particular cases of allelopathy have been recognized, its importance in shaping plant communities has remained open to question. Now there is evidence that it may be a major factor in the desert ecologies of the Southwest.

In experiments at the University of California-Santa Barbara, biologists Bruce Mahall and Ragan Callaway were able to demonstrate a complex pattern of interactions involving the roots of two shrubs common in California's Mojave Desert: the creosote bush (*Larrea tridentata*) and *Ambrosia dumosa*, usually called burro-weed—a name it shares with several other southwestern plants.

Mahall and Callaway grew seedlings of both species in boxes with plexiglass “windows” so they could see and measure root growth. They found that a burro-weed root would practically stop growing if it intruded into the root zone of a creosote bush. The same effect was

observed when the intruder was from another creosote bush: the invading root's growth slowed nearly to a halt. The scientists explained this behavior by suggesting that creosote bush roots produce a potent growth inhibitor. Thus far, they have not managed to identify the inhibiting agents, but they were able to confirm their hypothesis by adding activated charcoal to the soil. Since charcoal readily absorbs organic compounds, they

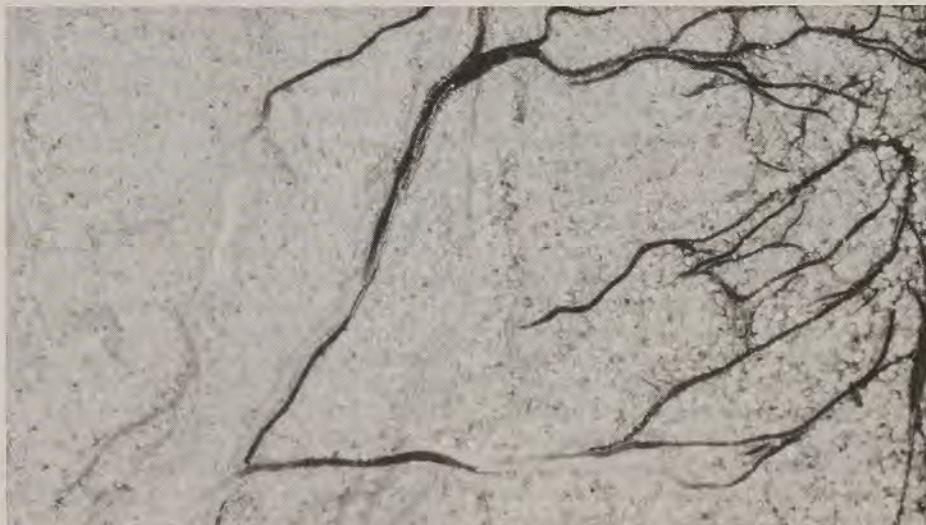
reasoned, it should soak up any growth inhibitor and negate its effect. That is exactly what happened.

Burro-weed roots proved less potent: they couldn't stop intrusive creosote bush roots. But they still had things to say to each other. When roots from two different burro-weeds touched each other, the researchers noted a decline in growth. Yet when roots from the same plant met, there was no

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PHOTOS COURTESY OF RAGAN CALLAWAY



Top: In the Mojave Desert, why do burro-weed and creosote bushes grow where they grow? Above: Part of the answer may lie underground, in what their roots are saying to each other.



Smart Weeds *Continued from page 5*

decline and the two roots tended to grow in the same direction thereafter. Since this form of communication appears to require direct contact, the scientists suspect that the burro-weed roots are not simply releasing a chemical into the soil. The mechanism underlying their behavior has yet to be identified. But whatever it is, the scientists argue that it clearly involves "a capability of self-nonselself recognition."

In a study they published last December, Mahall and Callaway theorize that "root communication mechanisms may play important roles in the structure of natural desert communities, and many field observations could be explained by an understanding of these mechanisms." For example, burro-weed shrubs sometimes act as "nurse plants" to creosote bush seedlings that germinate under them: they protect the seedlings from grazing. But the nurse plants tend to die prematurely. Could it be that their ungrateful charges are poisoning them?

Of course, allelopathy alone could never explain the complex dynamics of a plant community. Random distribution, other forms of competition, the availability of light, water, and nutrients—all are important in determining which plants grow where. But for gardeners, the study of allelopathy may lead to a better understanding of which plants make good neighbors. It may also affect succession planting, since growth-inhibiting chemicals may remain in the soil for some time.

But even though plants, like people, will squabble over resources, they can team up when pests threaten their health and well-being. Research at Illinois State University and at a U.S. Department of Agriculture laboratory in Florida has shown that corn plants can summon help when caterpillars start chewing on them. Scientists found that a plant attacked by caterpillars will release combinations of chemicals called terpenoids into the air. The terpenoids attract a species of wasp that parasitizes caterpillars, killing them in the process and freeing the corn from its agony. Researchers found the corn's reaction to be very specific: terpenoids are not released when the injury is inflicted by other means, such as a hoe-wielding human. The trigger seems to be secretions from the caterpillar's mouth.

Another chemical messenger, called



EDWARD FARMER AND CLARENCE RYAN

Encounter session in a bottle: a sagebrush tells a tomato of its wounds.

methyl jasmonate, may be the basis of an even more sophisticated defense strategy—one that involves the "cooperation" of plants from many different species. Methyl jasmonate, a common perfume ingredient, is produced in trace amounts by a wide range of plants. It belongs to a class of compounds that inhibit the activity of the enzyme proteinase, which plant-eating insects use to digest their meals. Proteinase inhibitors are produced in plant tissue when a wound is inflicted. If the injury has been caused by an insect, "the proteinase inhibitors make it more difficult for pests to digest the proteins" they extract from the plants, according to biologist Edward Farmer, who studied methyl jasmonate for several years at Washington State University. Therefore, a bug encountering a leaf laced with the substance in nature is unlikely to be a glutton. Insects forced to munch a steady diet of methyl jasmonate in the lab show higher mortality or stunted growth.

The production of these chemicals appears to be a standard defense. "Methyl jasmonate or other proteinase inhibitors are thought to be in all higher plants," says Farmer. Much of the time, the methyl jasmonate is produced in a nonvolatile form and remains in the plant's tissues, making them less palatable to marauding bugs.

But what intrigued Farmer was that when some types of plants are wounded, they release a volatile form of methyl

jasmonate. Once airborne, the substance is detected by other plants, which then produce proteinase inhibitors of their own, sometimes in greater amounts than if the plants had been injured directly. Volatile methyl jasmonate is fairly common. It is found, not surprisingly, in jasmine. But it also occurs in sagebrush (*Artemisia tridentata*) and in many common garden plants, including peas, potatoes, cucumbers, and sunflowers.

In the laboratory, Farmer and fellow researcher Clarence Ryan were able to demonstrate a response to volatile methyl jasmonate in several plant species. They found, for instance, that after only 30 minutes of exposure to the chemical, two-week-old tomato plants showed moderate proteinase inhibitor levels of their own. Continued exposure increased the levels. In tobacco, exposure boosted proteinase inhibitor levels from seven micrograms per gram of tissue to about 116—a 16-fold increase. In alfalfa, inhibitor levels increased about 11 times, rising from 33 to 385 micrograms per gram of tissue.

Researchers have yet to prove that volatile methyl jasmonate influences the behavior of natural plant communities. But Farmer thinks the odds are good that it does to some degree. "We know methyl jasmonate is quite long-lived. It's very stable and doesn't begin to degrade for about a week. It also can travel a long way," he says. But he adds, "I think it is likely to act best within short distances of about one meter."

Farmer's research has important implications for agriculture. It might be possible, for instance, to use methyl jasmonate on crops to increase levels of their own proteinase inhibitors. Such a procedure would have some clear environmental advantages over conventional pesticides. Farmer points out that methyl jasmonate is a naturally occurring compound. It's effective at low levels, it's nontoxic to people, and it doesn't affect the taste of fruit or vegetables. But whatever its future promise, Farmer's work also appears to confirm some old-fashioned gardening lore. "It's too early to say how these findings will affect home gardeners," he says, "but it seems there is some truth to gardening laws of planting sage near various plants." ♦

Gail Dutton is a free-lance writer based in Irvine, California.



To Know Thy Soil, Heed Thy Weeds

Weeds may be ugly. They obviously lack social skills, because they're always showing up where they're not wanted. But they're not dumb. They can communicate with each other (see page 5) and they can give us some clues about the general nature of our soil if we know how to listen.

Biodynamic farmer Ehrenfried E. Pfeiffer, author of *Weeds and What They Tell*, has classified weeds into three major groups according to the soil they thrive in—acid, hardpan or compacted soils, and disturbed or cultivated soils. Five minor groups indicate sandy, salty, alkaline, limestone, and poorly drained soils. *The Wild Foods Forum* reported Pfeiffer's findings in its June/July 1992 issue:

♦ **Acid Soil.** Cinquefoil, dock, hawkweed, horsetail, knapweed, lady's thumb, sorrel.

♦ **Hardpan or Compacted Soils.**

Chamomile, field mustard, horse nettle, morning-glory, pennycress, pineapple weed, quack grass.

♦ **Disturbed or Cultivated Soils.** Amaranth, buttercup, carpet weed, chickweed, dandelion, horehound, lamb's-quarters, mallows, nettle, plantain, prickly lettuce, prostrate knotweed.

♦ **Sandy Soil.** Asters, most goldenrods, yellow toadflax.

♦ **Salty Soil.** Russian thistle, sea aster, sea plantain, shepherd's-purse.

♦ **Alkaline Soil.** Sagebrush, woody aster.

♦ **Limestone.** Field madder, pennycress, peppergrass, and wormseed.

♦ **Poor Drainage.** Hedge bindweed, Joe-Pye weed, meadow-pink, mild water-pepper, smartweed, swampy horsetail, white avens.

Stuart Hill, a soil ecologist at the Macdonald campus of McGill University in Ste-Anne-de-Bellevue, Quebec, has made similar observations. For instance, if fertility is poor, deep rooted weeds—ragweed, daisy, mullein, Queen-Anne's-lace, mugwort, dandelion, wild radish, and wild carrot—will thrive. "These weeds penetrate deep into the earth looking for nutrients," he told *Canadian Gardening*. "The dandelion's taproot is like a giant syringe. If your lawn is covered with dandelions, it means the soil on the surface lacks nutrients such as calcium. The solution is to improve fertility,

not zap the lawn with herbicides."

Improving fertility doesn't mean a weed-less plot. Healthier soil welcomes other messengers—shallow-rooted weeds like chickweed, chicory, common groundsel, and lamb's-quarters. "If these weeds start to appear in your garden after you've added humus and compost, it means the fertility is improving," Hill said.

Weeds have been offering soil clues since 50 A.D. when Pliny the Elder observed that wheat grew well in soil

where wild plum, elder, oak, and thimbleberry thrived. "By being able to identify weeds and knowing what their presence indicates, we'll be in a better position to manage our soils wisely," Hill says.

Hill says weeds can also indicate what's missing in the soil. For example, a heavy growth of clover, vetch, or other leguminous weeds often indicates a soil deficient in nitrogen, at least under natural conditions. In his book *Designing and Maintaining Your Edible Landscape Naturally*, Robert Kourik observes: "Legumes also grow in nitrogen-rich soils, as you can prove by growing beans in your garden."

Legumes fall into a category of plants that accumulate a mineral even in soils that have a low concentration of that mineral. A second group of plants, Kourik writes, "thrive in soils with high concentrations of certain minerals or send their roots down to layers where the nutrients are in abundance. The concentration of minerals in their tissues is related more to the soil than to their powers as accumulators. These plants tolerate conditions in the soil that might be toxic to other plants."

Kourik compiled the following list of accumulator weeds from his own observations and those of other researchers. Grown in or around the landscape, these weeds can correct soil nutrient problems. Because plants hoard the substances they accumulate for the next generation, the weeds need to be tilled under at the end of the growing season:

♦ **Boron.** Spurge.

♦ **Calcium.** Chicory, coltsfoot, corn chamomile, creeping thistle, dock, German chamomile, garden sorrel, horsetail, lamb's-quarters, plantain, purslane, redroot pigweed, sheep sorrel, shepherd's-purse, silverweed, stinging nettle, toadflax, watercress.

♦ **Cobalt.** Eastern bracken, horsetail, vetch.

♦ **Copper.** Coltsfoot, dandelion, eastern bracken, plantain, purslane, silverweed, sow thistle, stinging nettle, vetch.

♦ **Fluorine.** Garlic, watercress.

♦ **Iodine.** Bladderwrack, devil's bit.

♦ **Iron.** Bladderwrack, burdock, Canada thistle, coltsfoot, creeping thistle, dandelion, devil's-bit, dock, eastern bracken, nodding thistle, plantain, redroot pigweed, Russian thistle, stinging nettle, toadflax, watercress.

♦ **Magnesium.** Bladderwrack, coltsfoot, dandelion, devil's-bit, *Continued on page 8*

Weeds Against Pests

"Two wrongs don't make a right," your mother always said. But when the two wrongs are weeds and garden pests, they might make a right—or least make things better—in the garden. Here are just a few of the weeds that can be steeped in water to make effective pesticides:

♦ **Wormseed.** Has shown promise against damping-off fungus, snails, soil nematodes, various beetles and weevils, and tobacco mosaic virus.

♦ **Lamb's-quarters.** Effective as a fungicide and used to control the bertha armyworm.

♦ **Stinging nettle.** Stinging hairs discourage snails. Inhibits celery rust in seedlings. When sprinkled over rose foliage, the liquid controls aphids, greenfly, and mildew. As a companion plant, heightens disease resistance in vegetables and increases essential oils in herbs.

♦ **Elder.** Discourages mice, voles, and moles. Leaves, twigs, and fruit-bearing branches used to cover plants protect against flea beetles or, when made into a liquid, discourage animal pests.

♦ **Horsetail and tansy.** Horsetail liquid is effective against rust in celery, celeriac, and mallows. Horsetail and wild tansy combined prevent fungal attacks on strawberries, tomatoes, and onions.



Weeds & Soil *Continued from page 7*

horsetail, sow thistle, toadflax, watercress.

♦ **Manganese.** Chickweed, eastern bracken, lamb's-quarters.

♦ **Nitrogen.** Cattail, lamb's-quarters, stinging nettle.

♦ **Phosphorus.** Chickweed, clover, dandelion, dock, eastern bracken, garden sorrel, garlic, German chamomile, lamb's-quarters, purslane, redroot pigweed, sheep sorrel, vetch, watercress.

♦ **Potassium.** Chickweed, chicory, coltsfoot, corn chamomile, creeping thistle, dandelion, dock, eastern bracken, German chamomile, lamb's-quarters, plantain, redroot pigweed, silverweed, sow thistle, stinging nettle, tansy, vetch, watercress.

♦ **Silica.** Dandelion, horsetail, plantain, valerian.

♦ **Sodium.** Dandelion, garden sorrel, sheep sorrel, stinging nettle, shepherd's-purse, watercress.

♦ **Sulfur.** Coltsfoot, garlic, plantain, shepherd's-purse, stinging nettle, watercress. Before looking to your weeds as

divining rods, remember that, in Kourik's words, "one individual plant says nothing." Others who have studied weeds and their relationships to the soil echo his observation that individual plants can grow in atypical situations and many species tolerate a wide range of soil conditions. If your weeds are sickly and undersized, they're probably not growing in a favorable habitat.

But healthy, lush plant communities—more than one plant of a single species along with other indicator plants—may be a useful signal of soil type, Kourik says. "It's pretty clear when you see a good stand of dock that the area gets flooded during the year," he says. "Basically, if you've got dock, don't plant your vegetables there." But weeds, he added, "can't replace a soil test." ♦

The list above is from a chart that appears in Designing and Maintaining Your Edible Landscape Naturally by Robert Kourik, published by Metamorphic Press, P.O. Box 1841, Santa Rosa, VA 95402.

Toxic Plant Combats Toxic Waste

Jimsonweed could be called a pretty plant, with its bushy habit, toothed leaves, and large trumpet-shaped pink or lavender flowers. In her 1917 book *Nature's Garden*, Neltje Blanchan wrote that "were it not for the rank odor of its leaves, the vigorous weed, coarse as it is, would be welcome in men's gardens." Although some relatives, like the petunia and tobacco, are quite welcome in our back yard plots, jimsonweed (*Datura* spp.) is made even less desirable for the flower bed by its extreme toxicity — ingesting any part of the plant can cause hallucinations. But jimsonweed may yet earn our gratitude. Certain species of this widespread toxic plant may be a valuable weapon against toxic waste.

When jimsonweed (*D. innoxia*) ingests water, it separates plutonium, cadmium, boron, and copper, then uses proteins to bind the chemicals into its cell walls. Once bound, the chemicals stay put. "This type of research goes back several hundred years," says Paul Jackson, the U.S. Department of Energy biochemist who discovered jimsonweed's unique properties. "Plants have been used to determine the presence of certain elements in the soil since the 1500s. For instance, the ashes of *Alyssum* species

can be used to determine the presence of nickel. *Uncinia* species grow in soil that overlays uranium ore. Locoweeds grow in soil where selenium is present."

Dead or alive, jimsonweed's cells remove plutonium from radioactive sludge. Jackson, who works at the energy department's laboratory in Los Alamos, New Mexico, has embedded powdered, dried plants into an effective filter for nuclear slurry. He has also found a way to grow jimsonweed cells in the lab.

The United States has more than 14 million, 55-gallon drums of radioactive sludge in storage. But dangerous chemicals account for only a minuscule amount of the total volume—sometimes as little as a thimbleful per barrel. Until Jackson's discovery, there was no cost-efficient way to separate the poisons from the sludge. Once jimsonweed separates the waste from water, the plant becomes radioactive, but it is estimated that the radioactive jimsonweed can be stored in one ten-thousandth of the current storage space. Jackson says living *Datura* species "are not toxic because they accumulate metals, but because of their alkaloid properties." Jimsonweed is found in waste places throughout the United States.

Resources

Here are some publications and books mentioned in our articles, plus a few others, to raise your good-weed IQ and make your foraging safer:

The Wild Foods Forum. This bi-monthly newsletter contains articles on foraging, upcoming events, and recipes. Subscriptions \$15. Write them at 4 Carlisle Way N.E., Atlanta, GA 30308, or call (404) 876-1441.

National Wild Foods Association, 226 Oakwood Road, Charleston, WV 25314.

The Business of Herbs. Columns by both Peter Gail and James Duke appear in this bimonthly publication, which, while written for those with a professional interest in herbs, should be of interest to amateurs as well. Subscriptions are \$20 a year, \$23 Canadian, \$28 elsewhere, in U.S. currency. Write Northwind Farm Publications, R.R. 2, Box 246, Shevlin, MN 56676-9535.

From Peter Gail:

Goosefoot Acres Volunteer Vegetable Sampler, a spiral-bound compilation of his columns with recipes, \$6; *Can There Any Good Thing Come From a Dandelion*, a collection of dandelion recipes, \$9.95; *The Delightful, Delicious Daylily*, with recipes, \$4. Shipping and handling \$2 for the first booklet, 80 cents for each additional booklet. Ohio residents add 7 percent sales tax. Write to Goosefoot Acres, P.O. Box 18016, Cleveland, OH 44118.

From James Duke:

Handbook of Edible Weeds. CRC Press, Boca Raton, Florida, 1992. 246 pages. Black-and-white drawings. Publisher's price, hardcover: \$24.95; AHS member price, \$21.95. Order code: CRC 100.

Peterson Field Guide of Eastern/Central Medicinal Plants (with Steven Foster). Houghton Mifflin, Boston, 1990. 366 pages. Color photographs and black-and-white illustrations. Publisher's price, hardcover: \$24.95. AHS member price, \$21.95. Order code: HOU 400.

Making a Difference

Mississippi's Horticultural Anarchists

In 1987, a group of gardening friends in Jackson, Mississippi, was energized by the plight of Mynelle Gardens, a six-and-a-half acre private estate donated to the city for use as a public garden. Budget cutbacks and a poor economic climate precluded the capital improvements and professional management needed at the deteriorating site.

Members of the loosely organized "Gardens' Group"—landscape architects and designers, horticulturists, garden writers, wholesale nurserymen, educators, Master Gardeners, and what one founder described as "just plain good gardeners"—were convinced that their collective talents were just what Mynelle needed.

But they wanted to gain credibility in the community before they took a master plan to the city and to funding sources. "Public relations was as much our goal as education," explains group member Felder Rushing, a horticulturist with Mississippi Cooperative Extension. "In order to get things going at Mynelle, we needed visibility in other areas." And Gardens' Group members proved quite adept at making themselves visible.

They established a butterfly garden and wildflower meadows at the local zoo after getting city and state officials to approve a controlled burn on the site with firefighters—and reporters—on hand.

When it appeared that state budget cutbacks would eliminate floral arrangements for official functions, the Gardens' Group designed and installed a cutting garden at the governor's mansion.

Perhaps one of the group's most impressive projects is at the Jim Buck Ross Agriculture and Forestry Museum. Outside a reconstructed 19th-century doctor's office, the group rejuvenated an overgrown, unlabeled herb garden, planting what one group member described as only the "very best, most useful, hardiest herbs" in the only public herb garden in the state.

But the real work starts just outside the traditional picket fence of the historic office. Here, the "Tough Plants Garden" shares a wealth of new—and old—ideas with often bemused visitors. The garden features only drought-, heat-, and pest-resistant plants, generally using natives and heirloom varieties.

Group member Susan Haltom enjoys pointing out that most of the plants used are "recycled" from the gardens of other members. But plants are just the beginning of the recycling efforts in this garden.



The Gardens' Group installed the Jackson zoo's butterfly garden.

What began as a trampled, compacted turf wasteland is now surrounded by a second-hand, woven hairpin fence. A "vine sculpture" has been welded together from old iron wheels, which mesh well with the wagons and buckboards found throughout the ag museum. Concrete rubble from an old parking lot was used to shape serpentine retaining walls and walkways are lined with crunchy, dark gray pellets of slag, a by-product from a steel mill.



Concrete rubble is recycled for a retaining wall.

Brown bottles, buried neck-down in a double row as an edging, rekindle memories of older Confederate gardens throughout the South. And nearby is a "bottle tree," its branches sporting a score of inverted bright-colored glass bottles, an African-American custom intended to capture evil spirits by night.

A buried iron sugar kettle provides a water feature and old

rubber tires are cut, painted, and made into planters for a variety of annuals. The garden soil itself has been amended with "Zoodoo," a composted manure from the zoo, and shredded Christmas trees provide mulch—some of it sparkling with errant bits of tinsel.

With such noteworthy projects under their belts, the group is ready to take on Mynelle Gardens. Some nursery owner members have donated planting material and dilapidated structures are being demolished. Architect members are ready with plans for a meeting facility.

Since its founding, the Gardens' Group has grown in scope and ambition, counting among its achievements an annual southern gardening symposium that brings in nationally known speakers. Group members are encouraging local nurseries to expand native plant offerings, each year promoting just a couple of the toughest, most dependable plants through the demonstration gardens they maintain. In keeping with the group's philosophy of recycling, each of these gardens features a compost system.

Rushing thinks of his gardening friends as anarchists with a cause that is sensitive to environmental issues and to the limited budget of the everyday gardener. They avoided naming themselves a society or association, he says, because "most of us are die-hard nonjoiners, and dislike being pegged." They are bonded strongly enough by their common love of plants and experimentation, a sense of fun and whimsy, and a commitment to their community.

—Joe Keyser
AHS Director of Programs

Regional Notes

Midwest Arboreta Take Aim at Deer

"I don't want to go out there and blast Bambi," says James Trager, the naturalist at the Missouri Botanical Garden's Shaw Arboretum, outside of St. Louis. But at this point, Trager doesn't think he has much choice.

As gardeners in the East and Midwest are well aware, deer populations have exploded in recent years. At the Shaw Arboretum, the expanding herd had turned the wildflower garden into a salad bar. In the newly created wetland, deer devoured the entire collection of 350 pickerel plants (*Pontederia*). And in the woodlands, the once plentiful trilliums have become a rare sight. "We haven't seen more than a handful of our native trilliums flowering in years," says Trager.

Less obvious but perhaps more serious is the longterm change in plant communities that the deer may be causing. Trager explains that the region's native forest consists mainly of oak and hickory. But the next generation of these trees is in trouble because the deer eat so many acorns and saplings. And racking, the bucks' habit of scraping their antlers against trees, is taking an additional toll. "Every time we scrape the litter away from a sapling to protect it from fire," says Trager, "a buck will come along and rack it." This pressure may cause the oak-hickory stands to give way to invading cedar, elm, and sugar maple—trees less readily suppressed by deer.

The arboretum responded by fencing off a "core horticultural area" of 120 acres. But with a total of 2,500 acres, the grounds are far too large to fence in completely, yet too small to establish predators. The inevitable solution is a hunt. "Hunting is not an attractive alternative," says Trager, "but it's what we've got, in the absence of the big predators."

So last January, for the first time since 1986, the arboretum was opened to 150 hunters, carrying antique muzzle-loading rifles. Trager says the antique rifles have a range of only 50 yards, so they are much safer than modern ones. As a further safety measure, the arboretum was closed during the two weekends of the shoot. The hunt was authorized by the Missouri Department of Conservation, which selected the participants by lot. Trager is confident that these occasional hunts do make a difference. But he concedes that it might be more effective to simply open the grounds annually, during the regular deer season.

Trager is not a hunter himself and he

says he understands why some people find the idea repugnant. "A lot of people ask me, can't you just move the deer? And the answer is yes, we could, but nobody wants them," he says. "Everybody has the same problem. You can't give them away—not alive anyhow."

It's not surprising, then, that deer are hunted at other arboreta. At the University of Wisconsin Arboretum in Madison, for example, deer control comes in the form of sharpshooters, who hunt under permit of the state's Department of Natural Resources. According to Steve Glass, the arboretum's operations supervisor, some 60 deer browse the two square miles of grounds. That's about 50 more than Glass would welcome.

The Madison program began after a review of deer control methods found no feasible alternative to hunting. Glass explains that expert sharpshooters are used because of the arboretum's urban surroundings. "People visit this place at all hours," he says. But during the program's nine years of existence, "we have never had an incident."

"We aren't able to kill all the deer that we would like," says Glass. But he thinks the kill produces tangible benefits, particularly for wildflowers and for trees by reducing

damage from racking. While the hunt remains a sensitive issue around Madison, Glass says, "we make no apologies for it."

In smaller areas, deer control can take less draconian forms. In Philadelphia, the Morris Arboretum of the University of Pennsylvania was losing 90 percent of the blooms in its rose garden to deer. But that was before Beanbag, the deer-chasing Jack Russell terrier, came on staff. Beanbag is well into his second year at the arboretum and the rose garden's deer population has stabilized at zero.



Beanbag, the Morris Arboretum's answer to rose-eating deer.

Gypsy Moth Enemy Spreads Through East

The rapid spread of a fungus that kills the gypsy moth has inspired hopes that the moth's career as a major forest pest may soon be over. In an experiment last spring, Anne Hajek, a researcher at Cornell University's Boyce Thompson Institute for Plant Research, released the killer fungus at sites in Pennsylvania and Virginia. The sites were at the advancing edge of the gypsy moth infestation, but beyond what was then the fungus's range in New England. The experiment was designed to see how quickly the fungus could spread. But in December, Hajek and her coworkers discovered that it had covered so much ground they could not distinguish the released populations from those migrating south under their own power. "We were stunned," she said.

The fungus, *Entomophaga maimaiga*, is native to Japan, where it attacks an Asian strain of gypsy moth. It kills by invading the caterpillar as a spore, then devouring the insect's insides. When the caterpillar dies, more spores are released

to infect others.

The gypsy moth was brought to Massachusetts from Europe over a century ago, in the hope of establishing an American silk industry. The industry failed but the leaf-devouring moth prospered, much to the detriment of the region's forests. During its worst outbreak, in 1981, it defoliated over 13 million acres of northeastern forest—an area about the size of Connecticut, Massachusetts, and Vermont combined.

In 1910, two Harvard scientists tried to control the moth by releasing imported samples of *E. maimaiga* around Boston. But the fungus disappeared, and releases in 1985 and 1986 seemed to fare no better. Then in 1989, Hajek found that the fungus was killing caterpillars in Connecticut. Since that time, she has traced its explosive growth over much of the gypsy moth's range. What caused its sudden triumph? Hajek says it's possible that the original colony never really died out, but took 80 years to adapt to North

Californians in Pursuit of Unusual Fruit

Don Gholston looks for fruit that won't freeze. Lately, the vice president of the California Rare Fruit Growers (CRFG), a 2,000-member nonprofit that promotes the cultivation of unusual fruits, is on to an avocado. The tree in question is growing in the Arboretum of the University of California at Santa Cruz, where it survived a week of hard freezes that struck the bay area in December 1990 (see "Cold Lessons in Berkeley," *American Horticulturist* News Edition, July 1991).

Gholston learned about the tree several months ago. "What intrigued me," he says, "is that it came through the freeze just totally unscathed—even the young fruit was unaffected." Ray Collett, the arboretum's director, says the tree's pedigree is uncertain, but it may be a 'Fuerte' avocado. "Cold hardiness wouldn't be at all remarkable for the 'Mexicola' kinds of avocado," he says, "but for the 'Fuerte' kinds it would be." And unlike the 'Mexicola' trees, the 'Fuerte' avocados produce marketable fruit.

With Collett's permission, Gholston has been offering budwood cuttings to anyone interested in giving the tree a try. Since his offer appeared in the December issue of CRFG's magazine, *Fruit Gardener*, he has had "eight or nine requests and we'll probably get a few more."

Publicizing hardy varieties of tropical and subtropical fruit is important to Gholston because "many of our members are living right on the edge of what these fruits will tolerate." But there is a broader agenda at work here too. "When we

identify something," he says, "one of our objectives is to try to get it out to nursery-men so it will have a surer future."

Gholston recalls a mango that used to grow in an abandoned lot in San Jose, well out of mangoes' normal range. This one bore fruit regularly and may even have survived light frosts. A few attempts were made to propagate it but when these failed, there was no systematic follow-up. A few years ago, the site was developed and now the tree is gone.

The Santa Cruz avocado may have a longer career. Collett thinks the tree might prove valuable in the home orchard. "But people are often finding a better avocado," he cautions, and these discoveries don't necessarily have much of an impact. It's also possible, he says, that the tree may simply be growing in a very sheltered microclimate. Gholston agrees but thinks "it could be quite significant, and only time will tell. It looks good to me and it's certainly worth passing around."

As a precedent for his optimism, Gholston cites the cold-hardy passion fruit discovered by another CRFG member in 1987. "Passion fruit," he says, "usually checks out at about 30 degrees." But though two degrees of frost will kill a normal *Passiflora edulis* to the ground, the cold-hardy plant survived down to 25 degrees. It may not sound like much, but "just adding two or three degrees of cold resistance can make a heck of a difference in the range." The plant, known as *P. edulis* 'Nancy Garrison', after the CRFG member who publicized it, is now sold by at least

one nursery and is being field tested for commercial production by another.

Some discoveries are made farther afield. The cherimoya (*Annona cherimola*) is a small, tropical tree producing heart-shaped fruits weighing up to a pound and tasting faintly like pineapple. It does not ordinarily tolerate frost. But in his back yard Gholston has a cherimoya that is the offspring of trees found growing at 7,000 feet in the Guatemalan highlands, where they endure frosts and even occasional snow. The tree died back during the big chill of 1990, but it survived. Gholston suspects that the secret of its success is its ability to "chill out," so to speak. "A lot of these tropical things don't pay any attention to cold weather," he says. "They just continue to grow. But this one has a dormant period." At three years, Gholston's tree measures about nine feet. Cherimoyas bear fruit as early as three years, so Gholston has hopes for the coming season.

In the meantime, there's always another report to check. For instance, there's the sapodilla tree (*Manilkara zapota*), a native of Central America with edible fruit and sap that is used to make chicle, the main ingredient of chewing gum. "It's pretty sensitive," Gholston says, "but I have it on good authority that there's a plant over here in the Central Valley that's growing well and sets fruit." And who knows what else is ripening out there?

CRFG is "the largest of the noncommercial fruit-growing organizations," and you don't have to live in California to join. Contact the growers at P.O. Box W, El Cajon, CA 92022, (619) 441-7395.

Ivies Moved

The American Ivy Society's East Coast Standard Reference Collection has been moved from Longwood Gardens at Kennett Square, Pennsylvania, to Lewis Ginter Botanical Garden at Richmond, Virginia.

The collection contains over 190 ivies, many of which are not represented in the society's other reference collection, at the Mendocino Coast Botanical Garden in Fort Bragg, California. The eastern ivies make up "the most accurate collection anywhere in the world," according to Patricia Hammer, president of the American Ivy Society. The collection has provided plants for all the ivy hardiness testing in the United States since 1985.

The ivies had been housed at Longwood since 1982. But because Longwood is not primarily a botanical garden, the management decided that such collections do not fit into the gardens' longterm plans.

America, or to the European gypsy moth. Or it could be that some recent, accidental introduction succeeded, for reasons not yet known.

"It won't prevent outbreaks," Hajek says of the fungus, "but it's quite possible that it will keep the populations of moths down." *E. maimaiga* attacks only gypsy moths and a few close relatives. In large-scale field tests, it killed nearly three-quarters of the caterpillars in heavy infestations. It's also effective against low-level infestations—an especially encouraging trait, since many biocontrols require a fairly dense pest population before they really "kick in."

Hajek believes the fungus would work as a commercial biocontrol agent but says production is still several years away. In the meantime, she plans to study the western edge of the moth infestation, in Ohio and Michigan. The fungus has not yet appeared there, and she hopes to learn more about the conditions that promote its spread. ♦



COURTESY OF DONALD SPECKER

Entomophaga maimaiga infects gypsy moth caterpillars as a spore, then it devours their insides. When the fungus emerges from a dead caterpillar (above), it releases more spores to infect others.

Members' Forum

Deadly Look-alikes

I was shocked to see that you recommend inviting children to eat the inflorescence of Queen-Anne's-lace (*Daucus carota*). The horrifying image of a child coming across poison hemlock (*Conium maculatum*) or water hemlock (*Cicuta maculata*) and ingesting it is, I believe, sufficient reason to warn against eating wild plant material.

Yes, tasting Queen-Anne's-lace may be safe if done under supervision of a person well-qualified in plant identification, but unfortunately, children may later take it upon themselves to experiment with plants in the field. Yes, there are diagnostic differences between the species mentioned, but unfortunately, children may focus on superficial similarities. The safest course is to "just say no" rather than to encourage ingestion.

Donald H. Voss
Vienna, Virginia

Caution is definitely in order regarding these look-alike plants. Foraging expert Peter Gail notes that there are some distinctive differences in the plants. Queen-Anne's-lace, or wild carrot, has a red floret in the center of its flat white flower clusters. The two poisonous plants can be identified by their purple stems. But botanist Jim Duke recalls in his Handbook of Edible Weeds that during one weekend class, "two of my introductory students ate the poison hemlock within less than four hours after they had been warned about it. Fortunately, they remembered my admonition to sample new things sparingly and had ingested only a bit of leaf."

Adults who are determined to forage for edible wild plants should have a well-illustrated field guide. Children should be taught that although many wild plants are edible, others are highly poisonous and they should never sample plants on their own.

News Edition Fan

In regard to your questions about which of your publications members find most valuable, I would like to speak for the news magazine [*American Horticulturist* News Edition]. I find its articles informative and useful. The most successful 1991-92 program at my garden club was based on your issue devoted to trees. The November issue highlighting gardening with children is fascinating and exciting.

I enjoy the magazine—its beautiful pictures and aspects of other gardens, and the pronunciation guide is super. Articles based on gardening as related to the history of the United States are especially appealing. But it is not as intellectually

stimulating as the news magazine.

Really, I would regret the demise of either.
Virginia Alexander
Cincinnati, Ohio

Reaching Out

The November News Edition was just marvelous. I especially loved "Giving Shelter—And Magic" by Maureen Heffernan. It reminded me of all the reasons I'm still in the seed business.

I have to read just about every garden magazine in the land as part of my job, but frankly, your journal is the one I really look forward to, for information, reviews, events, and new ideas. Thank you!

We at Shepherd's Garden Seeds work a lot with the Master Gardeners program, but we would also like to expand to working with more outreach of the kind you described in this issue. Please let responsible folks know we are happy to donate seeds to good projects.

Renee Shepherd
President, Shepherd's Garden Seeds
6116 Highway 9
Felton, CA 95018

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NEW RELEASES

Xeriscape Gardening

Connie Ellefson, Tom Stephens, and Doug Welsh

Hardcover. Retail price: \$30. AHS price: \$25.50.

Book code: MAC 400

Xeriscape Gardening encourages the creation of drought-tolerant landscapes through changes in garden design, watering methods, plant selection, or a combination of all three. Ideal for all areas of the country experiencing periodic droughts, this new volume outlines the principles of low-water landscaping and the practicalities involved in transforming a landscape to fit your climatic needs.

Yardening

Jeff and Liz Ball

Hardcover. Retail price: \$24.95. AHS price: \$21.25.

Book code: MAC 401

A homeowner's dream! How to create a healthy and beautiful yard without devoting excessive time to caring for it. This is a one-stop reference on lawn care, trees, shrubs, and vegetables. *Yardening* also addresses such environmental concerns as composting, water conservation, and pesticides.

Garden Design With Foliage

Judy Glattstein

Softcover. Retail price: \$17.95. AHS price: \$15.25.

Book code: GAR 037

Judy Glattstein takes a new perspective on garden design by tailoring the home landscape around leaf color and texture, rather than exclusively around flower color and bloom time. Glattstein shows how the selection of plants and combinations of plants for their foliage effects leads to tantalizing possibilities, whether one's garden is hot, dry, and sandy, or cool, moist, and shady.

One Man's Garden

Henry Mitchell

Hardcover. Retail price: \$19.95. AHS price: \$16.95.

Book code: HOU 500

For 20 years, Henry Mitchell has been delighting readers of the *Washington Post* with his wide-ranging adventures in a small city garden. His most recent columns, collected in *One Man's Garden*, reflect more zest and joy in gardening than a shelf of breathy inspirational tomes and more good advice than a dozen pedantic "how-to" books.

Illustrated Encyclopedia of Roses

Mary Moody

Hardcover. Retail price: \$39.95. AHS price: \$33.95.

Book code: TIM 500

This spectacularly illustrated volume combines complete information on the

care and cultivation of roses, with specific botanical, historical, and cultural information given for more than 1,100 individual varieties. A necessity for all rose lovers.

Japonica Magnifica

Don Elick and Raymond Booth

Hardcover. Retail price: \$150. AHS price: \$124.95.

Book code: TIM 505

This oversized, lavish volume unites the traditions of classic botanical illustration with artist Raymond Booth's elegant techniques in the school of magic realism. *Japonica Magnifica* captures the unique flora of Japan, some of it familiar, some exotic, but all painted in their natural settings and glorious to behold.

Gardening With Friends

George Schenk

Hardcover. Retail price: \$19.95. AHS price: \$16.95.

Book code: HOU 506

In the course of a year, as related in *Gardening with Friends*, George Schenk visits all of his friends and their gardens—to him, people and plants are so intermingled that both are equally his friends. The gardens range from a container planting on the terrace of a paraplegic hospital in Vancouver to a magnificent garden literally hacked out of the jungle on a remote Philippine island.

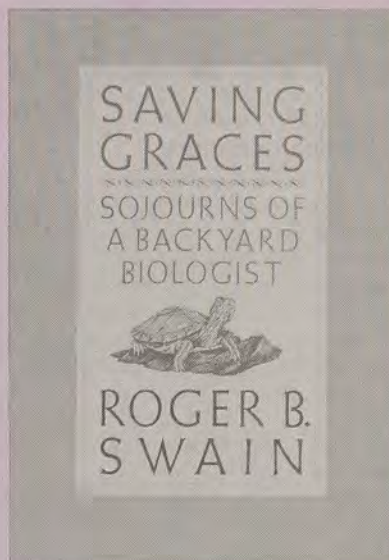
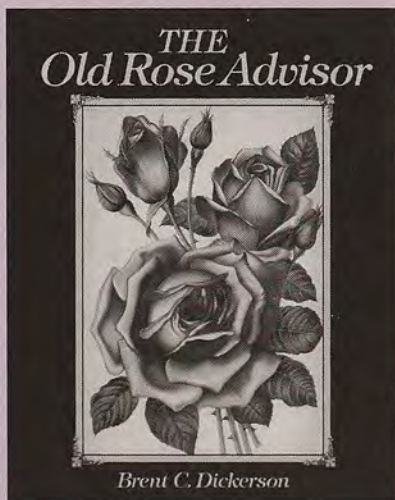
The Old Rose Advisor

Brent C. Dickerson

Hardcover. Retail price: \$65. AHS price: \$55.25.

Book code: TIM 502

A unique, authoritative, and gorgeous guide to reblooming "old" roses, those wonderful plants introduced primarily before 1920, many of which still give distinction and grace to the gardens of today. For those who love roses, this book is truly a rare treasure, celebrating not only their visual beauty, but also their colorful and fascinating history.



Saving Graces: Sojourns of a Backyard Biologist

Roger B. Swain

Hardcover. Retail price: \$17.95. AHS price: \$15.25.

Book code: LIT 500

An eloquent biologist and philosopher, Swain explores the natural world, capturing everyday miracles like the spiny shells and burnished beauty of horse chestnuts, the portable homes of hermit crabs, and the Milky Way behind a city night's smudge of stars.

OTHER TITLES

The Garden Tourist 1993

Lois Rosenfeld

Softcover. Retail price: \$9.95. AHS price: \$8.50.

Book code: TIM 777

Hortica

Alfred Byrd Graf

Hardcover. Retail price: \$150. AHS price: \$124.95.

Book code: ROE 400.

The Heirloom Garden

Jo Ann Gardner

Softcover. Retail price: \$16.95. AHS price: \$14.50.

Book code: GAR 033

Drip Irrigation for Every Landscape and All Climates

Robert Kourik

Softcover. Retail price: \$12. AHS price: \$10.25.

Book code: MET 001

Illustrated Encyclopedia of Orchids

Alec Pridgeon

Hardcover. Retail price: \$39.95. AHS price: \$33.95.

Book code: TIM 510

Shade and Color With Water Conserving Plants

James Walters and Balbir Backhaus

Hardcover. Retail price: \$39.95. AHS price: \$33.95.

Book code: TIM 506

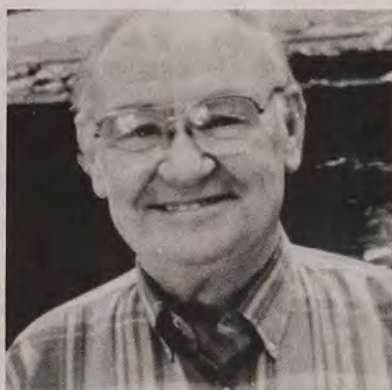
Garden Sensibly.



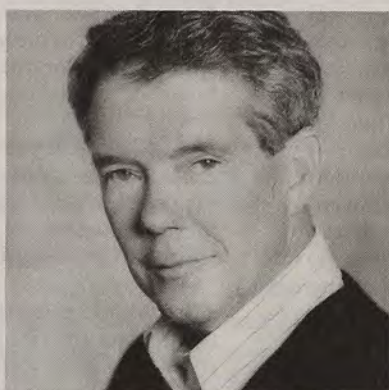
Katy Moss Warner, General Manager of Horticulture at Walt Disney World and AHS board member discusses the visual appeal of color.



Victory Garden Host Roger Swain offers "An Ear to the Ground: Listening to the Heartbeat of a Garden."



Robert Marvin, a South Carolina landscape architect, will speak on the visual elements of garden design.



Rayford Reddell, owner of Garden Valley Ranch in Petaluma, Calif., presents "Fragrance — Whose Nose Knows?"

Colonial Williamsburg and the American Horticultural Society present "Cultivating for the Senses: The Sights, Sounds and Aromas of the Garden"

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Williamsburg Garden Symposium April 4-7, 1993

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Garden Symposium includes six days of access to Colonial Williamsburg's exhibition buildings, craft shops, museums, and gardens; two receptions; and a full schedule of tours, talks, demonstrations, clinics, conversations and optional master classes.

Please send information on the Garden Symposium.

Name

Address

City State Zip

Telephone

Gardeners' Q&A

Q: After hearing recent stories about plant damage caused by using Benlate, I don't know what to use to treat clematis wilt. I have been battling the disease on two vines and Benlate is the only treatment recommended by clematis books. Are there any nonchemical treatments or chemical substitutes?

N. P., Baltimore, Maryland

A: DuPont's Benlate DF, a newer formulation of a standard Benlate fungicide, was pulled from the market two years ago because it allegedly caused stunting and mutation of ornamental plants grown by commercial growers. (See page 24.) The active ingredient in Benlate is benomyl and Benlate DF has been the only benomyl-based fungicide available for use on ornamentals.

Clematis wilt is the most common serious problem for clematis growers. A fungus enters the clematis at a place where it has been damaged, often near its base, girdling the stem and spreading up through the vine. Buds and shoot tips begin to droop and, within a few days, the entire plant above the point of entry will have blackened and died. Authorities believe that *Ascochyta clematindina* is its most frequent cause. *A. clematindina* is known to be the cause of leaf spot and stem rot in clematis, but in the past, some authorities argued that wilt was a separate disease.

To help prevent fungus attack, avoid crowding or matting of vines and plants. Be sure to prune back overgrown, tangled, matted, and dead vines each year. Provide good soil drainage and air circulation, which is especially important in warm humid climates. Remove dead

leaves and debris from the plant's base. Some experts feel that insufficient water makes clematises more susceptible to the disease and recommend a good soaking of the soil at the plant's base one to three times a week.

Once you notice symptoms, you should immediately cut off and destroy any infected leaves or stems. More drastic measures include cutting a vine clear to the ground or, because the fungus can remain in the soil, moving the plant to a new location.

You should begin a preventive regimen if your clematis has shown symptoms in the past or your area is particularly humid. Early in the growing season, spray with a copper or dithiocarbamate fungicide at least once every two weeks.

Q: What can you tell me about Buffalo grass? I have heard that some new cultivars are highly recommended for homeowners.

L. R., San Antonio, Texas

A: Buffalo grass (*Buchloe dactyloides*) is native to American midwestern plains states. The grass was an important food source for the vast buffalo herds that once inhabited that area. Researchers have bred two new kinds of grass called "Prairie" and "609." "Prairie" is blue-green with fine, dense, and soft blades, while "609" is a deeper blue-green with an even denser growth habit.

Buffalo grass has the advantage of being tolerant of heat, drought, heavy foot traffic, and most turf diseases, and it is finer in texture than other native grasses of the plains. Until recently it has not been popular for home landscaping. It is a warm season grass that goes dormant and turns golden brown in fall. It goes to seed at a relatively low height and has to be mowed frequently. However, the new grasses are vegetatively propagated to produce only females that will not set seed. Growers of these new cultivars say the grasses grow thick and lush but slowly enough that if maintained at a height of three to four inches, they only need to be mowed about twice during the growing season. Once established they need watering only every 21 to 45 days, depending on local environmental conditions. Buffalo grass can get by without any fertilizer at all. If fertilized for extra green color, growers advise using about one-quarter the amount of fertilizer used on St. Augustine or Bermuda grasses.

Don Buma, executive director of

Botanica, the Wichita Gardens, has been growing both of the new cultivars there and says he is very pleased with their performance. He called the grasses "reasonably aggressive and most definitely drought and heat resistant." No disease problems have occurred so far and last year, Buma said, they only needed mowing about once a month. "Prairie" or "609" would be ideal grasses to grow in an area that one literally did not want to have to maintain," he said. Two drawbacks he noted were that they take longer to green up in the spring than some other grasses, and are currently more expensive than many other types of grasses due to the production process that excludes male grasses to eliminate seed heads on the female grasses.

"Prairie" and "609" buffalo grass are available only in sod or plugs from Crenshaw & Doguet Turfgrass, 609 Castle Ridge Road, Suite 220, Austin, TX 78746, (512) 328-0884.

Q: Last year after my lilacs finished blooming, the leaves developed a whitish dusty covering. What is this and will it hurt the tree? What can I do to prevent it?

C. D., New Preston, Connecticut

A: The problem is powdery mildew. It is the most common fungal disease of lilacs. Powdery mildew occurs mostly in late summer in the eastern United States. While unsightly, it usually does not cause severe damage since it only affects the epidermal, or outermost, cell layers of the leaves. To control the fungus, dust or spray foliage about every 10 days with a sulphur fungicide when symptoms begin to appear. Discontinue treatment when symptoms disappear.

Q: What should I do with several tender azalea plants that I received for Christmas? Since they are not hardy here, can I continue to grow them indoors?

J. J., Terre Haute, Indiana

A: Let them summer outdoors. Make sure the soil in their pots is acidic, well-drained, and rich in humus. If not, transplant them into a pot with an acid potting mixture containing peat moss or composted oak leaf mold. Then after the last frost this spring, sink the pots into the ground in an area with light shade. Keep them well-watered and pinch back any leggy or weak-looking overgrown stems. Feed monthly with an acid-based fertilizer in early spring and summer. Before the first hard frost, bring the

Hydroponics Supplies

The American Horticultural Society's Gardeners' Information Service has a new bulletin available on sources of information and materials for hydroponic gardening. Send \$1 plus a stamped, self-addressed envelope to: AHS Gardeners' Information Service, 7931 East Boulevard Drive, Alexandria, VA 22308-1300.

azaleas into a room with temperatures between 40 and 60 degrees and keep them moist but don't feed them. Then next year in late January or early February, move the plants to a still cool but sunny window and begin fertilizing as new growth appears. Water more frequently and mist the foliage at least once every two days. Misting the foliage will also help deter spider mite infestations.

Q: Last year some of my tulips developed gray spots with brown edges all over the leaves. The flowers of these plants had withered, discolored blooms that never opened. What is causing this problem and how can I prevent it from spreading?

P. P., Oregon, Ohio

A: Your problem is botrytis blight (*Botrytis tulipae*), a fungal disease that is most common on lighter colored tulips and during very wet springs. Major areas of the leaves become discolored and entire stems may rot. If the bulb itself is affected, the blight can dwarf the entire plant and blast the flower head. The disease will spread to nearby plants through water and wind.

To control botrytis in your tulips, immediately dig up and destroy any plants that show disease symptoms. Plants should not be composted. Be careful not to leave any infected plant parts, such as leaves or bulb scale, in the area. When removing infected plants, immediately place them in a container to avoid spreading the fungal spores to nearby plants.

Do not plant fresh bulbs in an area where blighted plants have been growing unless the soil has been replaced, steam pasteurized, or drenched with an appropriate chemical. Careful inspection of each new tulip bulb is critical when planting in a new area. In fact, it's important to carefully inspect bulbs at a garden center or nursery before buying them. Discard any bulb that shows any blackened spots on the scales. Remove the outermost scale to see if there are any signs of disease underneath. To avoid disease problems, rotate tulips every three years to a new location and avoid excessive nitrogen fertilization.

—Maureen Heffernan
AHS Education Coordinator

Need gardening advice? Trying to locate a hard-to-find plant? Call the American Horticultural Society's Gardeners' Information Service (GIS). Master Gardeners and AHS Horticultural Interns are available every Monday through Friday (except holidays) from 11 a.m. to 3 p.m. EST to answer gardening questions and offer advice on where to obtain plants, seeds, and garden supplies. Call GIS toll-free at (800) 777-7931.



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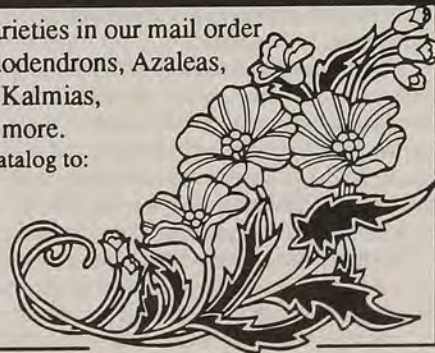
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AHS Bulletin Board

Keynoters Chosen for Children's Symposium

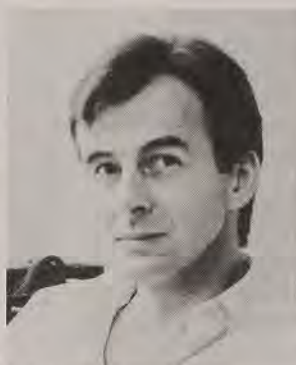
Internationally known experts on topics ranging from design to ethnobotany to intensive gardening techniques will be among the keynote speakers at the National Symposium on "Children, Plants, and Gardens" being sponsored by the American Horticultural Society in Washington, D.C., August 12-14.

The symposium, geared toward educators of children in pre-kindergarten through eighth grade, will feature lectures, concurrent workshops, and tours of area gardens for children, including newly designed gardens at AHS's River Farm headquarters and the Washington Youth Garden at the U.S. National Arboretum.

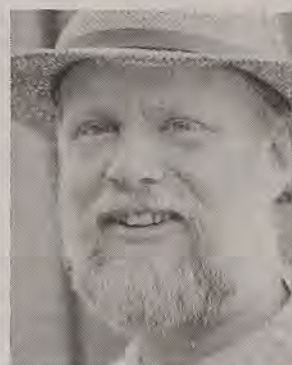
Keynote lecturers will include Mark Francis, professor of landscape architecture in the Department of Environmental Design at the University of California-Davis; Roger Hart, psychologist at the City University of New York (CUNY); John Jevons, director of the Mini-Farming Program for Ecology Action and author of *How to Grow More Vegetables Than You Ever Thought Possible on Less Land Than You Can Imagine*; Anne Lusk, promoter of community greenways and outdoor science classrooms; Mark Plotkin, vice president for Plant Conservation of Conservation International; and Jane Taylor, curator of the Michigan 4-H Children's Garden on the Michigan State University campus.



Mark Francis.



Roger Hart.



John Jevons.

Mark Francis, a researcher and designer of open spaces, has won a National Award for Exemplary Design Research from the National Endowment for the Arts. He is coauthor of four books, including *The Meaning of Gardens*, which won the highest book award given by the American Society of Landscape Architects. Francis holds that children need both unstructured time and natural environments to stimulate their imaginations and allow them the freedom to be creative. He has called the suburban environment, with its fenced yards and sequence of art lessons and formal sports programs, "one of the best examples of childhood denied."

Roger Hart, who is with the Children's

Environments Research Group at the Center for Human Environments at CUNY's Graduate School and University Center, uses social science research "unmuddled by romantic notions of childhood" to show that children need the direct experience of gardening, rather than merely formal environmental education, in order to develop affection for nature and a desire to become stewards of the earth. Says Hart: "Beyond the cognitive benefits of learning about plants and natural systems, there are more important affective benefits, with implications for a child's sense of self and, even more important, for a sense of self in relation to other living things."

Designers Help AHS "Plant the Future"

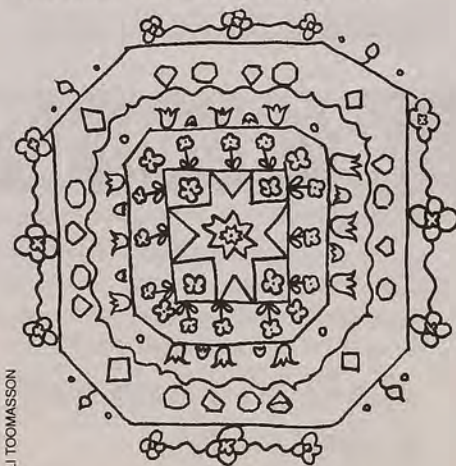
A dozen gardens for children—whimsical, interactive, educational, or contemplative—will be created at River Farm this spring in time for a special Father's Day open house weekend and a tour during the National Symposium on "Children, Plants, and Gardens."

Designers submitted plans to the American Horticultural Society in mid-January. Construction will begin in April and completion is due June 1.

Gardens proposed include a "Little House on the Prairie" surrounded by meadow natives; a colonial "weather" garden with a sundial, stile, tunnel, and gazing ball; a discovery pond, to be built by children, and encompassing a waterfall, bridge, moored float, and observation tanks.

Dinosaurs will have a starring role in two of the gardens. One will include a dinosaur footprint and introduce children to "living fossil" plants. In another, a large

dinosaur will overlook a sandbox, and a turf maze will lead to a teepee tree.



Fifth graders at Waynewood Elementary School created "Persian carpet" gardens.

Two other gardens were essentially designed by children. One includes features suggested by children—a meadow with moving grasses and butterflies, a stepping stone path and rock bridge, and a grove where children can sit on a bed of soft pine straw in the cool shade of pine trees; another will consist of "Persian carpets" drawn and planted by children.

Features of yet another garden will include a ballerina "scarecrow," an interactive water feature, animal topiaries, a vegetable garden with unusual and heirloom plants, and a color wheel of annuals and perennials.

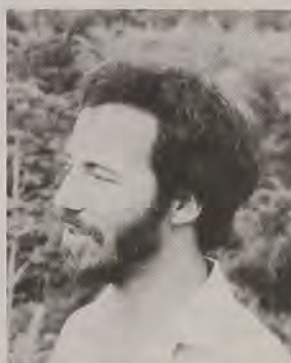
All the designers involved are donating their work. More details on the designs and the planned open house—during which there will be speakers and family entertainment and designers will be on hand to explain how to adapt their plans—will appear in the May News Edition.

John Jeavons will talk about "Growing With Living Soils." He is considered the world's leading researcher and developer of small-scale food production techniques using biointensive methods, in use in more than 100 countries. His *How to Grow Vegetables . . .* book has gone into four editions in five languages plus Braille and has sold more than 250,000 copies. He has also written *The Seed Finder*, *The Backyard Homestead*, and *Mini-Farm & Garden Log Book*. He was a systems analyst for the U.S. Agency for International Development and Stanford University before devoting himself to the development of biointensive techniques 17 years ago.

Anne Lusk is a former model turned "ski bum" who was hired to spearhead the creation of a 5.3-mile recreation path in Stowe, Vermont. Her success was recognized by President Bush, who named her one of his 1,000 Points of Light, and she is now involved in an effort to create an urban East Coast Greenway that will link cities between Maine and Florida. Lusk champions the idea that every school in America should have a greenway to serve not only as a path to the school building but as an outdoor classroom for



Anne Lusk.



Mark Plotkin.



Jane Taylor.

science, art, and physical education.

Mark Plotkin, who holds a doctorate in biological conservation from Tufts University, began his field work studying the ecology of reptiles, but then began ethnobotanical research among Indian tribes of Suriname. Since 1986 his work has also taken him to Brazil, Colombia, Guyana, and Venezuela. He has published and lectured extensively on sustainable harvesting of rain forest products. He will speak on "Science Education Through Ethnobotany."

Jane Taylor will describe the philosophy behind the 4-H Children's Garden, featured in the November News Edition. The garden, which is still being developed, was designed with input from children and comprises themes intended to spark a child's creativity and provides a place for hands-on learning. "Gardens nurture the sense of wonder in a child's

imagination and provide a place for enrichment," says Taylor. ♦

EcoFest '93

On Saturday and Sunday, April 3 and 4, AHS members and their families and friends in the Washington area are invited to join us at River Farm for EcoFest '93—our environmental festival exploring sustainable practices for our homes, yards, and gardens.

The exposition will feature short presentations by renowned environmentalists and horticulturists, hands-on demonstrations, displays by over 40 environmental and conservation groups, and numerous "shops" offering eco-products—everything from water-saving showerheads and drip-irrigation supplies to bat boxes and native plants.

EcoFest will sprawl over River Farm's 27 acres in an array of colorful pavilions dedicated to different aspects of sustainable living. There will also be activities for children, wildlife displays, live entertainment, and a food court specializing in ethnic foods from around the globe.

Admission and parking are free. Hours are from 11 a.m. to 4 p.m. on Saturday and from 1 to 4 p.m. on Sunday. For more information, call (703) 768-5700.

Compost Park Grant

The American Horticultural Society has received a \$24,000 grant from the Stanley Smith Horticultural Trust in San Francisco, California, for the completion of its National Home Composting Park.

A portion of the Smith grant will fund the construction of a formal visitor's entrance and information area, a pergola, and additional fences, trellises, and structures. The trust funds will also be used to install a water-efficient irrigation system, erect a series of educational signs, and complete the park's plantings. All of the plants in the park are ornamental or heirloom edibles or useful for wildlife and are central to the park's theme of sustainable horticulture and the intelligent use and reuse of natural resources.

Additional funding for signage in the park is being made available by the Toro Company, and funding for a park brochure and map has been made available by the Garden Writers Foundation, following the fall 1992 visit by 180 members of the Garden Writers Association of America.

Initial funding was provided by the Garden Club of Alexandria, private donations, and the generous contribution

of over \$38,000 in materials and equipment by 68 corporate supporters.

A full set of plans, lists of donors, products on display, press clippings, and highlights is available for \$1.25 by writing to Park Plans, American Horticultural Society, 7931 East Boulevard Drive, Alexandria, VA 22308-1300.

AHS Wants You!

The American Horticultural Society is recruiting volunteers for many new activities in 1993. Volunteers may work one or two days a week, outdoors or in. We need several able bodies to help out with the weeding, planting, and composting in the National Home Composting Park and in the demonstration gardens. If a cushy office job is more to your liking, we need volunteers to perform data entry, compile lists, do direct mailings, and take inventory in our gift shop. Volunteers receive many benefits, including free membership and invitations to art exhibits and other events.

Interested? Please call us at (703) 768-5700 and ask for a volunteer form.

National Symposium on "Children, Plants, and Gardens"

Please send full registration information:

Name: _____

Address: _____

City/State/Zip: _____

Daytime Phone: _____

Mail to: National Symposium,
AHS, 7931 East Boulevard Drive,
Alexandria, VA 22308-1300.

Gardeners' Dateline

Mid-Atlantic

♦ **Mar. 13-14. Hospital for Sick Children Flower and Garden Show.** Georgetown Visitation Preparatory School, Washington, D.C. Information: Patricia Grenier, (301) 299-4566.

♦ **Mar. 17-21. Washington Flower and Garden Show.** Washington Convention Center, Washington, D.C. Information: TJS Productions, 7668B Fullerton Road, Springfield, VA 22153, (703) 569-7141.

♦ **Mar. 18. Tidewater Horticultural Symposium.** "Developing the Character of the Southern Garden." Norfolk, Virginia. Information: Mrs. Joseph Fiveash Jr., (804) 425-1140 or Mrs. Wilcox Ruffin Jr., (804) 423-2788.

♦ **Mar. 23-26. The John Clayton Exhibition.** Display of the work of the 18th-century botanist. Sonner Hall, James Madison University, Harrisonburg, Virginia. Information: Julie Stickley, (703) 433-0163.

♦ **Mar. 24, May 1. Thomas Jefferson's Academical Gardens: Pavilions and Gardens.** Symposium and tour. University of Virginia, Charlottesville, Virginia. Information: (800) 346-3882.

♦ **Apr. 3. Oatlands Plantation Season Opening.** Leesburg, Virginia. Information: Melissa York, (703) 777-3174.

♦ **Apr. 17-25. Historic Garden Week in Virginia.** Garden tours throughout the state. Information: Suzanne Munson, (804) 644-7776.

♦ **Apr. 24. Herbs Galore.** Seminars, sales, workshops, and walking tours. Maymont Foundation, Richmond, Virginia. Information: Patricia Denny, (703) 358-7166.

♦ **Apr. 24. Howard County Garden Festival.** Howard Community College, Columbia, Maryland. Information: Georgia Eacker, (410) 531-6324.

♦ **Apr. 24, 25, May 1, 2, 5, 8, 12. Maryland House and Garden Pilgrimage.** Garden tours throughout the state. Information: Maryland House and Garden Pilgrimage, 1105-A Providence Road, Towson, MD 21204, (410) 821-6933.

AHS Spring Events

On March 12 and 13 the Red Hill Garden Club of Alexandria will present **Tables by Design**, featuring festive and theme tables. The show, which benefits AHS, will be held at the Virginia Theological Seminary, 3737 Seminary Road, Alexandria, Virginia. Cost is \$5. For more information call Katherine Kopp at (703) 370-3497.

From March 31 to May 10, River Farm will display "Twenty Years of Protecting Our Living Heritage," an exhibit by artist Carol Happ celebrating the 20th anniversary of the Endangered Species Act. Happ will lecture at 11 a.m. on April 24 in the River Farm ballroom. There is no charge but reservations are required. Call (703) 768-5700.

A reception for AHS members at the Cincinnati Flower and Garden Show will be held at 9:30 a.m. Friday, April 23. "Victory Garden" host Roger Swain will be on hand to greet members. Show tickets are \$6.50 in advance and \$9.50 at the gate. The reception is free but reservations are required. Call (513) 579-0259. Former AHS Board Member Frances Jones Poetker is honorary chairman of the flower show.

On April 23 from 10 a.m. to 3 p.m. and April 24 from 10 a.m. to 2 p.m., River Farm will host the annual **Spring Plant Sale**, sponsored jointly by the Alexandria Council of Garden Clubs and AHS.

♦ **May 1. The 65th Annual Georgetown Garden Tour.** To benefit Georgetown Children's House. Washington, D. C. Information: (202) 333-4953 or (202) 333-6896.

North Central

♦ **Mar. 19-Apr. 18. Spring Flower Show.** Krohn Conservatory, Eden Park, Cincinnati, Ohio. Information: Jan Seidel, (513) 352-4080 or (513) 352-4090.

♦ **Mar. 25-28. Fourth Annual Ann Arbor Flower and Garden Show.** "A Walk on the Wild Side." University of Michigan Matthaei Botanical Gardens,

Ann Arbor, Michigan. Information: Margaret Vergith, (313) 998-7061.

♦ **April 21-25. Cincinnati Flower and Garden Show.** Ault Park, Cincinnati, Ohio. Information: (800) 832-1700.

♦ **Apr. 24. The Great Cover-up.** Perennials exhibition. State Fair Park Arboretum, Lincoln, Nebraska. Information: Marla J. Rohrke, (402) 472-2679.

Northeast

♦ **Mar. 1-3. Massachusetts Turfgrass Conference.** Springfield, Massachusetts. Information: Mary Owen, (508) 831-1225.

♦ **Mar. 6. Annual Garden Symposium.** Bartlett Arboretum, Stamford, Connecticut. Information: (203) 322-6971.

♦ **Mar. 6-14. New England Spring Flower Show.** "Through the Garden Gate." Bayside Exposition Center, Boston, Massachusetts. Information: Terry Cronin, (617) 536-9280.

♦ **Mar. 7-14. Philadelphia Flower Show.** "Preserving the Past, Presenting the Future." Philadelphia Civic Center, Philadelphia, Pennsylvania. Information: (215) 625-8250.

♦ **Mar. 12-14. Sixth Annual Capital District Garden and Flower Show.** Knickerbocker Arena, Albany, New York. Information: (518) 356-6410, ext. 418.

♦ **Mar. 13-14. Maple Sugar Celebration.** Wave Hill, Bronx, New York. Information: (718) 549-3200.

♦ **Mar. 13-21. New York Flower Show.** "Gardens for Our Future." Pier 92, New York City. Information: Dana Robbin, Horticultural Society of New York, 128 West 58th Street, New York, NY 10019, (212) 757-0915.

♦ **Mar. 26-28. ALCA Student Field Days.** Student competition sponsored by the Associated Landscape Contractors of America. State University of New York, College of Agricultural Technology, Cobleskill, New York. Information: (703) 620-6363, Fax (703) 620-6365.

♦ **Mar. 30. Garden Architecture and Ornamentation.** Lecture. Tower Hill Botanic Garden, Boylston, Massachusetts. Information: Debi Hogan, (508) 869-6111.

♦ **Apr. 3-18. Easter Conservatory Display.** Longwood Gardens, Kennett Square, Pennsylvania. Information: (215) 388-6741.

Northwest

♦ **Mar. 6. Second Annual Herbal Renaissance.** University of Washington Center for Urban Horticulture, Seattle, Washington. Information: Dave Stockdale, (206) 685-8033.

♦ **Mar. 6. Women in Horticulture Conference.** Bellevue, Washington. Sponsored by the Association for Women in Horticulture. Information: Terri Arnold, (206) 935-7951 or Deb Powers, (206) 524-1672.

South Central

♦ **Mar. 25. City Gardens Today.** Symposium. Longue Vue Gardens, New Orleans, Louisiana. Information: (504) 488-5488.

♦ **Apr. 3-4. The 14th Annual Spring Garden Show.** The Botanical Garden at City Park, New Orleans, Louisiana. Information: Pamela B. Hodson, (504) 486-3736.

Southeast

♦ **Mar. 1-May 31. Second Annual**



From April 23 to 25, the Banning Residence Museum of Wilmington, California, hosts Floriade III, one of southern California's premier floral and interior design exhibitions. Floral and interior design experts of international renown gather to present lectures, demonstrations, and displays. The three-day event also includes an open-air floral and gift bazaar. A National Historic site, Banning Residence Museum was built in 1864 by General Phineas Banning, a visionary pioneer who helped transform Los Angeles from a tiny port town of 1,600 into the megalopolis it is today. For more information contact Beverly Werber, (818) 996-1614 or Zoe Bergquist, (310) 548-7777.

Spring Flower Festival. Cypress Gardens, Florida. Information: (813) 324-2111, Fax (813) 324-7946.

♦ **Mar. 5-7. Floriade 1993.** "Colors of the Desert." Margaret T. Hance Park, Phoenix, Arizona. Information: Doug Weber, (602) 234-0840.

♦ **Mar. 16-17. Ninth Annual Davidson Horticultural Symposium.** Information: Davidson Horticultural Symposium, P.O. Box 1145, Davidson, NC 28036, (704) 892-8285 or (704) 892-1580.

♦ **Mar. 20. Embraceable Landscapes.** Lecture. Atlanta Botanical Garden, Atlanta, Georgia. Information: (404) 876-5858.

♦ **Mar. 20. Arborfest.** Festival. North Carolina State University Arboretum, Raleigh, North Carolina. Information: Tom Foley, (919) 515-3132.

♦ **Mar. 27. Perennials Conference.** Cheekwood, Tennessee Botanical Garden and Museum of Art, Nashville, Tennessee. Information: (615) 353-2146.

♦ **Mar. 27-28. Private Gardens Tour.** Mobile, Alabama. Information: (205) 342-0555.

♦ **Mar. 27-28, Apr. 3-4, 10-11. Annual Azalea Festival.** Callaway Gardens, Pine Mountain, Georgia. Information: Kathy Tilley, (706) 663-5060.

♦ **Apr. 1-2. American Daffodil Society National Show.** Vanderbilt Plaza, Nashville, Tennessee. Information: Mrs. Richard Frank Jr., (615) 383-7058.

♦ **Apr. 2-4. New Bern Historic Homes and Gardens Tour.** New Bern, North Carolina. Information: (919) 683-1560.

♦ **Apr. 2-4. Deep South Orchid Society Annual Show.** Savannah, Georgia. Information: Ron Melander, (912) 236-3177.

♦ **Apr. 10. Biblical Plants of the World.** Pinecote Pavilion, Crosby Arboretum, Picayune, Mississippi. Information: (601) 799-2311.

♦ **Apr. 25. Annual Garden Day and Plant Sale.** Atlanta History Center, Atlanta, Georgia. Information: (404) 814-4000.

Southwest

♦ **Mar. 6-Apr. 11. Dallas Blooms.** Floral display. Dallas Arboretum and Botanical Garden, Dallas, Texas. Information: (214) 327-8263, Fax (214) 324-9801.

♦ **Mar. 12-Apr. 9. Permaculture Drylands Workshops.** Pearce, Arizona. Information: Permaculture Drylands Education and Research Institute, P.O. Box 133, Pearce, AZ 85625, (602) 824-3465.

♦ **Apr. 1-May 2. Wildflower Fields on Tour.** Wildseed Farms, Eagle Lake, Texas. Information: Wildseed, Inc., P.O. Box 308, Eagle Lake, TX 77434, (409) 234-7353.

West Coast

♦ **Mar. 6-20. Tulipmania.** Pier 39, San Francisco, California. Information: Denise Dirickson, (415) 705-5512.

♦ **Mar. 14. Fern Propagation.** Workshop. University of California Botanical Garden, Berkeley, California. Information: (510) 642-3343.

♦ **Mar. 19-21. The 48th Annual Santa Barbara International Orchid Show.** "Orchids in Paradise." Santa Barbara, California. Information: Margaret Cavaletto, (805) 967-6331.

♦ **Mar. 19-Apr. 18. Spring Festival of Flowers.** Descanso Gardens, La Canada Flintridge, California. Information: (818) 952-4400.

♦ **Mar. 26. Traditional European Design in California Gardens.** Lecture. Santa Barbara Botanic Garden, Santa Barbara, California. Information: (805) 682-4726.

♦ **Apr. 10-11. Iris Show.** Los Angeles State and County Arboretum, Arcadia, California. Information: (818) 821-3222.

♦ **Apr. 21-25. San Francisco Landscape Garden Show.** "California Heritage." Herbst and Festival Pavilions, Fort Mason Center, San Francisco, California. Information: Janet Taber-Coppola, (415) 750-5108.

♦ **Apr. 25. Orchid Cactus Show and Sale.** South Coast Botanic Garden, Palos Verdes Peninsula, California. Information: (310) 544-6815.

International

♦ **Mar. 12-22. Florissimo 93.** International exhibition of exotic flowers and plants. Dijon, France. Information: Florissimo 93, BP 108, 21003, Dijon CEDEX, France, Phone 8077-3900 or Fax 8074-8650.

♦ **Apr. 21. Secrets of Herbal Cookery.** Symposium. Civic Garden Center, Toronto, Canada. Information: Mary Bosley, (416) 962-2928.

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Du Pont Researchers Call Benlate Safe

After several months of research, Du Pont now claims its fungicide Benlate DF is not responsible for ornamental crop damage attributed to it. At a November press conference in West Palm Beach, Florida, the nation's largest chemical manufacturer also announced that it will no longer voluntarily compensate growers for losses.

Du Pont researchers released the statement after completing intensive research that they believe vindicates Benlate DF. Field tests of 250,000 plants included 35 species or varieties of woody ornamentals, foliage plants, and field crops. "Consistently throughout the research, we could find or establish no cause-and-effect relationship between our product and the crop damages," said agricultural products vice president William F. Kirk.

As a direct result of those tests, Du Pont has stopped paying Benlate DF claims. Since March 1991, when the first claims of crop loss due to Benlate DF were made, Du Pont has voluntarily paid nearly \$490 million to commercial growers. Now individual claimants, most of them from Florida, will have to settle their cases in court.

Some users of Benlate DF who thought their contamination problems were over are finding otherwise. Hugh Gramling, principal of Gramling Nursery, Inc., a nursery in Plant City, Florida, specializing in hardy landscape plants, used Benlate DF only once, in March of 1991. Gramling sprayed his 17 acres with 28 ounces of Benlate DF, approximately one-fifth of the eight-ounces-per-acre dilution recommended on the container. "Damage was widespread and it was total," says Gramling. What is perhaps most surprising about Gramling's losses is that his plants were growing in containers two feet above the topsoil that was treated. Gramling filed a claim for a year's loss of business, and Du Pont compensated him.

By January 1992, Gramling had followed the recommended procedures for decontamination, added two and a half acres of irrigation, and restocked his nursery with a third of his original volume. In March he was seeing the same stunted, strangely malformed junipers and hollies as the year before. To confirm recontamination, he employed the "cucumber protocol," that is, growing cucumbers to test for toxicity, a method advocated by the University of Florida's Institute of Food and Agricultural Sciences (UF/IFAS). "Ninety percent of the cucumbers were stunted and deformed, and the longest vine we could produce was eight to 10 inches," Gramling says. UF/IFAS is currently conducting experiments at several sites in Florida to determine if residual Benlate DF is behind such recropping problems.

Although an independent scientific advisory panel that included members of the National Academy of Sciences upheld Du Pont's conclusions, critics contend that Du Pont selectively disseminated its data.

Donald Poucher, a spokesman for UF/IFAS, with whom Du Pont had offered to share its research, called on the chemical company to make "a full and total disclosure of its research results, including experimental methodology." Meanwhile, Florida State Agriculture Commissioner Bob Crawford filed a motion in Hardee County Circuit Court to compel Du Pont to release 150,000 documents relating to Benlate. Crawford invoked the state's "sunshine in litigation" law, designed to shield the public from harm that may arise when legally protected information is withheld.

Many growers feel that Du Pont's announcement was motivated by increasing claims from nursery industry workers of illness caused by Benlate DF exposure. Responding to health claims, the Environmental Protection Agency has asked Du Pont for data on benomyl, the active ingredient in Benlate DF. The National Institute for Occupational Safety and Health and the Centers for Disease

Control are also investigating maladies reputedly involving Benlate DF.

Benlate WP (wetable powder), labeled for agricultural crops, has been used reliably since 1970 and is still available. Benlate DF (dry formulation) was introduced for ornamental plants and quickly became the most popular fungicide among commercial growers before its recall in March 1991.

New Certification for Horticulturists

Horticulturists can now receive a certification of professional standards comparable to those required in the fields of medicine, law, and engineering. The certified professional horticulturist (CPH) must meet designated academic criteria and have appropriate practical experience supported by references. And like doctors who take the Hippocratic Oath, qualifying horticulturists will be required to subscribe to a Code of Ethics.

Administered by the American Society of Agronomy and the American Society for Horticultural Science (ASHS), the certification identifies qualified professionals for educational, scientific, and service activities in both public and private sectors. Eligible applicants must have a bachelor's of science degree and five years of experience, a master's of science degree and three years of experience, or a doctorate and one year of experience.

J. Benton Storey, ASHS president-elect and chair of the six-member board that will approve the certifications, proposed the program as a way of establishing performance standards for nonacademic horticulturists and to identify qualified professionals to potential employers.

Since the program was announced in October, ASHS has received nearly 100 requests for applications each month. For further information write ASHS, 113 South West Street, Suite 400, Alexandria, VA 22314.



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