

December 1986

American Horticulturist



Help Save America's Endangered Wildflowers



Mark W. Skinner

Hummingbirds are the primary pollinators of *Lilium bolanderi*, which is just one of the spectacular native plants featured in the American Horticultural Society's *1987 Endangered Wildflowers Calendar*.

Many of America's most treasured wildflowers are threatened with extinction. In fact, experts estimate that 10 percent of the species and varieties native to the United States are in jeopardy. Over 50 taxa have already disappeared.

Help save our endangered wildflowers by purchasing the American Horticultural Society's *1987 Endangered Wildflowers Calendar*. Funds raised from sales will be used to support conservation projects. To order your calendar, turn to page 37.

Contents



James E. Cross left a position as an investment advisor with a Wall Street investment firm to pursue a career in horticulture. Today, he is the owner of a highly successful container plant nursery on Long Island. To learn more about Cross' mid-life career change, and how other men and women pursue careers in horticulture, turn to "Careers in Horticulture," on page 25. Photograph by Richard M. Adams.

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On the Cover: The brilliant blossoms of dwarf poinciana are just one of the attractions of a fascinating Japanese garden featured in this issue of *American Horticulturist*. This lovely garden is located in subtropical Florida, a surprising—and horticulturally challenging—location for an authentic Japanese garden. To learn more about it, turn to "Morikami: A Japanese Garden in the Subtropics," on page 18. Photograph by Dan Nelson.

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New Projects

Winter, the time for thinking about and planning projects, is upon us. Two exciting new projects that were developed this year may provide our readers with the raw materials for some energetic pondering. We at AHS are very excited about both of these projects and we would like to encourage Society members not only to ponder but to participate actively in them.

The Commission on the Bicentennial of the United States Constitution has launched a project entitled "Plant a Living Legacy," in which citizens all over the United States will be encouraged to commemorate the signing of the U.S. Constitution by planting a new garden, restoring an existing garden or park, or planting trees and flowers along public streets and roadways.

The "Living Legacy" project was developed by a special committee, composed of such groups as the American Association of Nurserymen, the American Society for Landscape Architects, the American Forestry Association, the National Council for Rehabilitation and Therapy through Horticulture and the American Horticultural Society. AHS viewpoints have been well represented, thanks to the efforts of two staff members of your Society: Sharon Barnes, Public Relations Director, and Barbara Ellis, Publications Director.

To be recognized as "Living Legacies," projects must be planned with a commitment to long-term maintenance, and they must be on publicly-owned land or on property that may be opened to the public. Each local project developed in the next year will be dedicated on September 17, 1987, the 200th anniversary of the signing of the Constitution in Philadelphia.

The "Plant a Living Legacy Project" provides a challenging opportunity for gardeners to get involved in the celebration of the Bicentennial of the Constitution. It is hoped that "Living Legacy" plantings across the country will serve to remind future generations of Americans of the importance of the living document that is our Constitution.

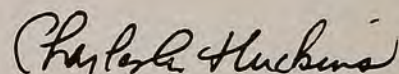
For more information on how you might become involved in this exciting project,

see the November issue of *American Horticulturist* News Edition, or write to "Living Legacy Project," Commission on the Bicentennial of the United States Constitution, 734 Jackson Place, NW, Washington, D.C. 20503.

The USDA has embarked on an ambitious program to update the USDA Hardiness Zone Map, first published in 1952. Although the USDA zone map has been widely accepted, gardeners have been aware of its limitations since the time it was adopted. The updated and expanded version of the hardiness map—to be known as the Plant Performance Guide—will include detailed information useful to gardeners, landscapers and nurserymen. The guide will take a variety of cultural factors into consideration, as well as changes in gardening and landscaping methods. The new map will encompass the entire region from Panama to the North Pole.

The USDA is analyzing weather records, and will make this information available as part of the guide. In addition, a list of approximately 2,000 species and cultivars has been entered into the Germplasm Resources Information Network (GRIN), a computerized seed/plant catalogue housed within the Agricultural Research Service of the USDA. Society members, as well as members of other horticultural organizations, have been asked to help compile data on these plants for the final guide. This enormous undertaking is being coordinated by Society Board Member and former President Dr. Henry M. Cathey, Director of the U.S. National Arboretum.

For more information about this project, see the November 1986 issue of *American Horticulturist* News Edition, and write or call Plant Performance Guide, U.S. National Arboretum, 3501 New York Avenue, NE, Washington, D.C. 20002, (202) 475-4829.



—Charles A. Huckins
Executive Director

AHS 42nd Annual Meeting

MAY 13-16, 1987
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Gardening in the city—penthouses, townhouses, community gardens and parks—will be the focus of the 42nd Annual Meeting of the American Horticultural Society. Enjoy special tours of the New York Botanical Garden, the Brooklyn Botanic Garden, Wave Hill Gardens, the gardens of the Cloisters Museum and the PepsiCo Sculpture Gardens. Take an indepth look at the work of Olmsted with a special emphasis on New York's Central Park. Learn about the exciting work in the development of community gardens. There's something to interest any gardener or plant lover at heart. Plan to meet us in New York for "Parks, Penthouses and Windowsills: Gardening in the City!"

Please send me advance information on the 42nd Annual Meeting of the AHS, to be held in New York City.

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ABOVE LEFT: Participants in the upcoming Annual Meeting in New York City will enjoy an elegant reception in the breathtaking Enid A. Haupt Conservatory at the New York Botanical Garden. Photograph by Allen Rokach, courtesy of the New York Botanical Garden. ABOVE RIGHT: Sidewalks in Manhattan's colorful flower district are lined with flowers and plants. Photograph by Barbara W. Ellis.

MAIL TO: Elizabeth Smith, AHS, P.O. Box 0105, Mount Vernon, Virginia 22121.

Ground Covers



Hostas, *Alchemilla mollis* and *Brunnera macrophylla* make striking ground covers along a grass path.

One of the best small gardens I know is in the center of a tiny Cotswold village in southwestern England. Less than an acre in size, the garden seems much larger, in part because of the contrasting styles of its various areas. Nearest the house, the character is almost formal, with a square lawn, a geometric herb and rose garden, straight gravel walks and a rectangular conservatory. In contrast to all

this geometry, the rear half of the garden is a winding woodland, so densely planted with shrubs, small trees and ground covers that the house and neighboring back yards are completely hidden.

In this "woodland," *Brunnera macrophylla*, *Alchemilla mollis* and *Nepeta mussinii* are planted in long sweeps, punctuated with clumps of various species and cultivars of *Epimedium* and *Hosta*, some

of which are variegated. Sizable clumps of *Bergenia cordifolia* make corners more emphatic with their cabbage-like leaves. Along the edges of the narrow paths, more specimens of *Nepeta mussinii* crowd *Pulmonaria saccharata* and various hardy geraniums, including *Geranium endressii* and *G. endressii* 'Wargrave's Pink'. Even common garden rhubarb plays its part in providing foliage contrast.

In England, none of these ground covers are uncommon; a British garden without *Alchemilla mollis* or some form of *Nepeta* is not only incomplete but virtually non-existent. Yet the combinations of these ground covers, which provide background texture and splashes of perennial color, raise the Cotswold garden above the commonplace.

Here in the United States, it is surprising how limited our repertoire of ground covers is. There are some individual gardeners who have broken away from the ordinary and planted hardy geraniums and sedums as ground covers, but by and large, the same ground covers are used over and over again. I was recently told at a horticultural gathering that the two most popular plants in the United States are *Vinca minor* and *Pachysandra*. *Hedera helix* (and its cultivars) could probably be added to the list.

There is much to be said for our popular threesome. For one thing, all are evergreen. Both *Vinca* and *Hedera* can grow in conditions ranging from full sun to full shade. And though *Pachysandra* thrives in partial to deep shade, like the others, it will eventually form a reasonably dense, weed-resistant cover. *Vinca minor* 'Bowles' has deeper blue flowers than the species, spreads outward from the crown rather than rooting along the stem, and continues to bloom sporadically throughout the growing season.

In many American landscapes—particularly around older, more traditional homes—these three ground covers are common themes. Predictably, one or all unite the landscape or lawn with the house, foundation shrubs and any subsidiary buildings, such as a garage or guest house.

As part of a recent project, I was asked to give a bit of life to just such a planting. To tear out hundreds of square feet of established ground covers was out of the question. Not only would such an undertaking be costly in terms of labor and new plants, but the evergreen cover was as much a part of the garden's character as were the centuries-old sugar maples.

Inspired by the Cotswold garden, I decided to use the existing ground covers as a foliage background for seasonal displays of spring bulbs—not the usual sorts of Cottage and Darwin tulips or 'King Alfred' daffodils, but a succession of species tulips. Also included would be plants with handsome, long-lasting foliage, such as *Anemone sylvestris*, an 18-inch plant with white flowers in May and June; a few specimens

of *Aquilegia*, all with the same blooming time; and a large number of three-foot-tall pink-and-white *Anemone* × *hybrida*, which blooms from late August well into September and sports handsome lobed leaves all summer. All of these plants grow in either full sun or partial shade.

Without wreaking too much havoc, we cleared a foot-wide wandering drift through sections of ground cover so that the effect of winter bareness would be minimal. We then enriched the soil and put in herbaceous plants. In the partially shaded *Vinca* beds, which are in bloom from April into May, we poked in hundreds of specimens of *Tulipa turkestanica*, an eight-inch-tall species with about half a dozen white, star-shaped flowers per stem. We also planted *T. tarda*, a six-inch plant that bears clusters of bright yellow flowers edged with white.

A bed of *Pachysandra* was planted with *Tulipa praestans* 'Fusilier', whose clusters of eight-inch flowers are brilliant red in April. For May bloom, we planted *T. batalinii*, which bears six-inch yellow flowers, as well as the graceful *T. marjolettii*, with 20-inch, ivory to white flowers.

Planting technique was simple, if somewhat arduous, for the bulbs numbered in the thousands. We poked the ground with a stick, then placed a pinch of bone meal in each small hole. We planted the tulips in broad sweeps, strewn by the handful so that they would appear as if nature had arranged them all. The only trick was not to lose track of those that had slipped beneath the foliage.

In the dappled shade, another formal area of *Pachysandra* entered a woodland. Again, we removed narrow sweeps of ground covers. This time, we planted various ferns, as well as *Tiarella cordifolia* (whose small white spires appear in irregular patches along the edges in spring), *Polygonatum odoratum* 'Variegatum', *Trollius* (for splashes of yellow and gold in May and June) and *Helleborus orientalis*, along with a small selection of species tulips. The foliage of each of these new "ground covers" (*Trollius* excluded) is now an attractive feature throughout most of the growing season. At the same time, the established ground cover serves as a constant background for a changing sequence of bloom, while still retaining its unifying role in the landscape. ♣

—Margaret Hensel

Margaret Hensel is a landscape designer and writer living in western Massachusetts.

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A Most Unusual Plant

What is the world's most unusual plant? Among the candidates for such a title are plants that look like stones, or that smell like carrion, or that wait a century to bloom. Of course, there is no consensus, but I would say that the parade of strange plants is led by those that behave like animals.

An appetite for the bizarre is not part of every horticultural personality, but for those with a yen to grow something outrageous, purely for the fun of it, there are several routes to take. One is to study a good-sized catalogue, staying clear of the front pages and concentrating on offerings not illustrated. Another is to visit a greenhouse, preferably a rambling conservatory. Yet another is to read an article like this one.

It was on an isolated, unglamorous page of a seed catalogue some years ago that I came across the description of a plant whose leaves move in warm weather, when the temperature is above 70° F. "How strange!" I thought. "A plant that fidgets?"

The telegraph plant (*Desmodium motorium*) is a nervous green thing that perhaps should have been an animal instead of a plant. Other acrobats of the vegetable kingdom, such as the popular sensitive plant (*Mimosa pudica*) or the less-well-known carambola (*Averrhoa carambola*), must be touched or prodded in some way to get them to bend, fold, droop or whatever. Not so in the case of the telegraph plant. As long as temperatures remain mild (the sun need not be shining), it performs its act without the slightest cue.

And what an act! The telegraph plant sends "flag signals" all day with a pair of leaves that wave from the base of a larger, stationary leaf. The animated leaflets twist and twirl in orbits, pivoting on coiling stems that resemble tiny muscles. The motions are irregular and unpredictable. At night all the leaves droop, making the plant look wilted. These weird semaphore "messages" have never been decoded. Incredulous visitors have asked me why the plants act in such a strange manner. My stock answer is, "They think they're animals."

The only species of *Desmodium* grow-



If there were a contest for the world's most unusual plant, *Desmodium motorium* (also listed as *D. gyrans*) would certainly be a candidate. ABOVE: The small, paired leaflets, borne on the leaf stalk just below the leaf, move when the plants are exposed to temperatures above 70°F. BELOW: These delicate looking, attractive plants make excellent house plants.

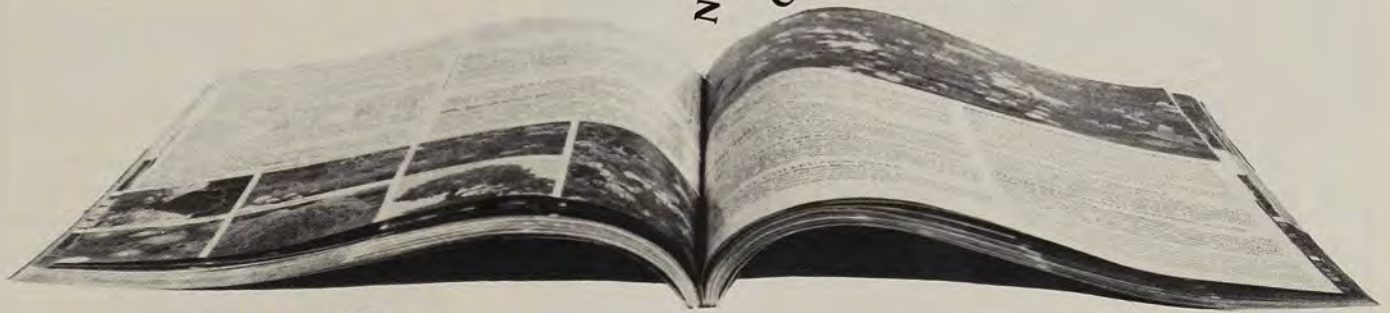
ing wild in our country is *D. canadense*, the tick trefoil, whose purple spikes produce lenticular seeds coated with a Velcro-like fuzz that clings to clothing, hair or almost anything, just like ticks. Once children discover this quality, they are quick to play practical jokes with these "vegetable ticks."

By contrast, the seeds of *D. motorium*, a native of India, are smooth and look as if they have been dipped in varnish. Their resemblance to tiny kidney beans reveals their tie to the pea family (Leguminosae). You are not likely to get more than about eight of them in a packet.

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THE INDOOR GARDENER

motorium, I recommend using the following "fail-safe" sowing method. First, spread a one-inch layer of potting soil or seed-starter mix on the bottom of a fiber flat. Then add a one-inch layer of milled sphagnum moss. (You could use all milled sphagnum moss, but using just a top layer of this relatively expensive medium makes it spread further.) The milled sphagnum moss should be moistened. To do this, put some in a plastic bag, add water and squeeze the bag, keeping the top closed. Pat the seed-starting medium down gently. Lay the seeds on the surface, where you want them to sprout. (I usually put one about an inch from each corner and one in the center, then use up the remaining spaces symmetrically.) With a blunt stick or the eraser-end of a pencil, push each seed one-quarter inch down into the moss and cover up the hole by pushing the surrounding moss over it. Label the flat and give it a good sprinkling. Then set it on a heating cable, in a bright, warm place, but out of direct sun.

Seeds of the telegraph plant may be sown any time of the year. I prefer spring, with its lengthening days and warming weather. The seeds take eight to 21 days to germinate, occasionally longer. During the sprout-watch, sprinkle the surface when it begins to appear dry. Although inserting a seed flat into a plastic bag can help to preserve moisture, I have found that this method shocks the tender seedlings by suddenly exposing them to "outside air," thus increasing the danger of damping off. Although you must keep a close watch and keep the plants moist if the seed flat is left uncovered, the seedlings will have a healthier start in life. And, I believe, you will acquire a greener thumb in the process.

When three leaves have appeared, transplant the "baby telegrapher" to a three-inch fiber or clay pot filled with a well-drained potting soil. Then put it in a bright, airy, humid place, in temperatures between 58° and 80° F. Indoors, a "humid place" is either where lots of other plants are growing, or where the air receives added moisture—for example, from misting, pans full of water, or regular clouds of vapor from steaming bathrooms or kitchens. In warm weather, keep telegraph plants outdoors with other potted pets that enjoy several hours of sunlight each day.

Don't expect to see any "action" until about the sixth true leaf has formed, which takes at least 36 days from the time of sowing. Only then do the motile leaflets

begin to form at the juncture of the main leaf and the leaf stalk. It is these smaller, paired leaves that "fidget."

If the fledglings are slow to swing into action, don't get discouraged. When I grew my first batch of telegraph plants, I almost threw them out, suspecting their alleged power of motion to be a hoax. But the wispy seedlings were graceful and reminded me of little bamboos, so I kept them. When they rewarded me with their first wiggles, I grinned from ear to ear and said, "I see it, but I don't believe it!"

A bi-weekly feeding will keep the plants twitching and stretching; by summer's end, the lanky stems will have grown several feet. My favorite plant food is fish emulsion. I ignore the label instructions and mix it so that the water looks like weak tea—roughly two squirts of emulsion per half-gallon of water. Whatever fertilizer you use, be sure to dilute it. Too generous a supply of food or too large a pot can kill *D. motorium*. I have never had to keep a telegraph plant in a pot larger than six inches. An especially vigorous two-year-old plant might benefit from an eight-inch clay or wood pot if the soil is extra-porous and well drained.

A greenhouse is not necessary to house these creatures through the winter. They will be happy in a south or west window of your house as long as the temperature does not dip below 50° F. However, the plants may get so tall you will have to either cut off their tops or cut a hole in your ceiling.

Telegraph plants are tender perennials; given suitable summer and winter quarters, with as much care as you would give *Coleus*, they will live for several years and may even show their purple spiked blooms for you. In their second spring, you will probably want to cut them back. Tip-cuttings about five inches long will root. Sink the cuttings halfway in a moist sterile medium, and place them in a warm, shaded place. Mist several times daily, or keep under an umbrella of clear or translucent plastic. Pot the cuttings as soon as they resume growth.

A young telegraph plant, presented with a brief set of instructions, is an ideal gift for anyone with more than a passing interest in plants. Who could pass up a graceful, easy-to-grow plant that behaves like an animal? ♀

—Anthony DeBlasi

Anthony DeBlasi is a free-lance writer and photographer living in West Newfield, Maine.



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Pesticides from Plants

Although pest control is considered a modern and sophisticated science, its history dates back to the beginnings of agriculture. Ever since humans first started to cultivate plants, they have had to do battle with insects, diseases and weeds.

Classical writings on agriculture allude to various methods of pest control, many of which were based on superstition. For instance, burying a toad near millet was supposed to protect the plant from disease. However, other, more practical uses of plant and animal products were also outlined, and many of these persisted in Europe—largely unchanged—until the mid-1600's. Only then did researchers begin experimental work to test techniques for controlling pests and diseases of crops and ornamentals.

Colonists brought these established practices with them to America, where they learned new methods from the native Indians. Throughout the colonial period, plants served as an important source of pesticides. Extracts of tobacco were sprayed or dusted on crops, and liquid extracted from hellebores was applied to corn seeds to make them unpalatable to insects and birds. Tobacco itself was protected from insects with a solution of saffras.

While advanced societies have relied more and more on artificial chemicals, primitive societies—especially in the tropics—have continued to use plant-derived pesticides. Exploration of these primitive areas has led to the discovery of many new plant products and to an increased interest in biological control as a safer form of agricultural management. Scientists are once again focusing their attention on finding plants that are suitable as a source of pesticides. However, this area of research still lags behind others. In a 1983 survey of 54 Agricultural Experiment stations in the United States and Puerto Rico, only 14 reported involvement in active research on plant-derived pesticides.

A recently compiled list of plants that are reported to be used in various parts of the world in the control of household and agricultural pests includes six species of

Plant-Derived Pesticides

| Common Name (of plant and/or pesticide) | Scientific Name (of plant) | Family | Origin | Source (of active principle) |
|---|---|----------------|--------------------|------------------------------------|
| Insecticides | | | | |
| Affinin† | <i>Heliopsis longipes</i> | Compositae | New World | roots |
| Anacyclin† | <i>Anacyclus pyrethrum</i> | Compositae | Old World | roots |
| Custard apple | <i>Annona</i> sp. | Annonaceae | New World | seeds |
| Echinacein† | <i>Echinacea angustifolia</i> & <i>E. pallida</i> | Compositae | New World | roots |
| Gossypol | <i>Gossypium</i> species | Malvaceae | New World | seeds |
| Heliopsin† | <i>Heliopsis helianthoides</i> s. <i>scabra</i> | Compositae | New World | roots |
| False Hellebore | <i>Veratrum album</i> | Liliaceae | Old World | rhizomes |
| Herculin† & Neoherculin† | <i>Zanthoxylum clava-herculis</i> | Rutaceae | New World | bark |
| Mamey | <i>Mammea americana</i> | Guttiferae | New World | fruits & seeds |
| Mexican cockroach plant | <i>Haplophyton camicidum</i> | Apocynaceae | New World | leaves |
| Nicotine* | <i>Nicotiana tabacum</i> | Solanaceae | New World | leaves |
| Pellitorin† | <i>Anacyclus pyrethrum</i> | Compositae | Old World | roots |
| Pyrethrin* | <i>Chrysanthemum cinerariifolium</i> | Compositae | Old World | flowers |
| Quassia | <i>Quassia amara</i> | Simaroubaceae | Old World | wood & bark |
| Rotenone* | <i>Derris</i> & <i>Lonchocarpus</i> spp. | Leguminosae | Old & New World | roots |
| Ryania | <i>Ryania speciosa</i> | Flacourtiaceae | New World | roots, leaves & stems |
| Sabadilla | <i>Schoenocaulon officinale</i> | Liliaceae | New World | seeds |
| Sanshool† | <i>Zanthoxylum piperitum</i> | Rutaceae | Old World | fruits & bark |
| Scabrin† | <i>Heliopsis helianthoides</i> s. <i>scabra</i> | Compositae | New World | roots |
| Spilanthol† | <i>Spilanthus oleracea</i> | Compositae | Old World | flowers |
| Thundergod Vine | <i>Tripterygium wilfordii</i> | Celastraceae | Old World | bark of roots |
| Yam Bean | <i>Pachyrhizus erosus</i> | Leguminosae | New World | seeds |
| Insect Repellents | | | | |
| Azadirachtin* (Neem tree) | <i>Azadirachta indica</i> | Meliaceae | Old World | seeds |
| Bay Laurel | <i>Laurus nobilis</i> | Lauraceae | Old World | leaves |
| Citronella* | <i>Cymbopogon nardus</i> | Gramineae | Old World | leaves |
| Cucumber | <i>Cucumis sativus</i> | Cucurbitaceae | Old World | fruits |
| Zanthophylline | <i>Zanthoxylum monophyllum</i> | Rutaceae | New World | branches & stems |
| Herbicides | | | | |
| Juglone* | <i>Juglans nigra</i> (and related species) | Juglandaceae | New World | roots & husks |

*pesticide at or near stage of commercial production

†pesticide belonging to the chemical group unsaturated isobutylamides

algae, fungi and lichens; seven species of ferns and fern allies; 11 species of gymnosperms; and 659 species of flowering plants. This list indicates that although many different kinds of plants have been used to control pests, by far the most common source of plant-derived pesticides are the angiosperms, or flowering plants.

Of the 120 families of flowering plants containing species reported to control pests, five are notable: the Leguminosae, or pea family (78 species); the Compositae, or daisy family (65 species); the Euphorbiaceae, or spurge family (39 species); the Labiatae, or mint family (33 species); and the Solanaceae, or nightshade family (23 species). Since members of these families are known to contain numerous poisonous and aromatic chemicals, their pesticide properties are not surprising.

Much pesticide research has focused on the five families. (Three insecticide products of commercial importance have already been isolated from this group.) In studying the pesticide-related properties of plants from these and other families, researchers have categorized each plant's "control" potential—that is, as an insecticide, an insect repellent or a herbicide.

Insecticides

As early as the 1600's, an extract of tobacco was used in Europe as a spray to protect other plants from insects. Both the liquid extract and a dust form remained popular throughout the 19th century. Tobacco fumigants were also used to kill insects in greenhouses. In the 1900's, nicotine sulfate was isolated and marketed as an insecticide.

Nicotine is synthesized in the roots of *Nicotiana*, a member of the Solanaceae. It is then transported to other parts of the plant, including the leaves. It is most concentrated in *N. tabacum*, the source of smoking tobacco, but also occurs in many other species. Nicotine kills a variety of insects quickly by acting as a stomach poison. Some insects are obviously immune, since they can feed on tobacco plants. Usually, nicotine does not harm the plants on which it is sprayed.

The popularity of nicotine-derived insecticides has waned in recent years for several reasons. For one thing, it is expensive to produce and has been replaced by synthetics that are less costly. Also, the parts of *Nicotiana* plants that were once considered useful only for insecticide ex-

traction are now used in the tobacco industry. Finally, nicotine is toxic not only to insects, but also to humans and other mammals.

Among the daisy family (Compositae) members that have been used to kill insects is *Chrysanthemum cinerariifolium*, commonly called pyrethrum. A powder made from the flowers served as an insecticide in the Middle and Near East in ancient times. This species was introduced to Europe in the early 1800's, and later to the United States, Japan and other countries. By the 1900's, Japan had become the leading producer of pyrethrin, the flower extract used as an insecticide. However, after World War II, production shifted to Kenya and Ecuador.

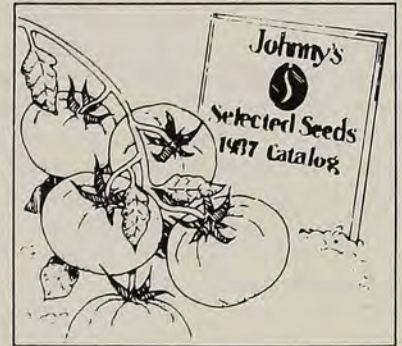
Pyrethrin is concentrated in the disk florets and achenes. The processing is very labor-intensive, since flower heads must be picked by hand, dried and ground up before the pyrethrin can be extracted. This slow process has prompted scientists to isolate and synthesize this chemical.

Pyrethrin is often combined with a synergist to enhance its effectiveness. It acts quickly to paralyze or kill insects such as houseflies, mosquitoes, roaches and beetles. The spray form is used primarily as a contact insecticide on plants in the house and elsewhere. For long-term use, pyrethrin can be mixed with a powder medium and spread in dark storage areas; any insects that come in contact with the powder will be killed, while others will be repelled. Since pyrethrin is broken down by sunlight, it does not accumulate in the environment. It shows no significant toxicity in mammals, and is therefore one of the safest insecticides available.

Several plants of the pea family, or Leguminosae, have been used for centuries as fish poisons. They have been found to be effective in killing insects as well. *Derris*, *Lonchocarpus* and several related genera all produce a group of compounds called rotenones. Rotenone is found mainly in the roots, which can be ground up and applied as dust.

The first recorded use of rotenone (once referred to as "derris dust") as an insecticide was for the control of caterpillars in the late 1800's. In this century, rotenone quickly became the most popular "natural" insecticide, and pesticide users began to consume millions of pounds of roots. Scientists eventually synthesized the compound, thereby making production less expensive.


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SEASONABLE REMINDERS

Rotenone acts in a somewhat complicated manner, by inhibiting the mitochondrial electron transport chain in the cells of insects. This inhibition causes lowered oxygen consumption, paralysis and eventually, death. Rotenone spray is commonly applied to house plants and garden ornamentals to control such pests as aphids and red spiders. Although it is effective against a number of insects as well as fish, it is virtually harmless to mammals, and ranks with pyrethrin as a safe insecticide. Like pyrethrin, rotenone is degraded by light and leaves no toxic residue.

Insect Repellents

Of the many plants reputed to repel insects, there is one that has been proven to contain a potent chemical repellent: *Azadirachta indica*, the neem tree. Although native to India, this member of the Meliaceae is grown in many tropical areas as a shade tree. Throughout the centuries, neem trees have provided oil for lubrication and soap-making, as well as wood (which is resistant to termites) for stoves and construction. The leaves were also used

at one time to keep insects away from books and clothing.

Although all parts of the neem tree repel insects, this property is concentrated in the seeds. In 1975, the primary active ingredient, azadirachtin, was isolated and its chemical structure determined. This compound repels about 60 different insect species, including houseflies, various beetles, aphids, mealybugs and several crop pests.

Azadirachtin acts as a feeding deterrent by disrupting the insect's normal responses. It is thought that proteins in the insect respond to chemicals in food by signaling the insect to eat. If an anti-feedant, such as the one that is present in the neem tree, is applied to insects, this reaction is apparently blocked, and the insect does not recognize the plant as edible. Azadirachtin can be applied to the soil, where it enters the roots and travels throughout the plant, or it can be applied directly on plants or other surfaces. It is effective at low concentrations and persists for a long time.

Azadirachtin does not harm the plants to which it is applied, nor is it toxic to mammals and birds. It seems to affect only plant-eating insects, so it can be used safely

in conjunction with predatory insects in an integrated pest management program. Unfortunately, the supply of azadirachtin is small; only minute amounts of the chemical can be extracted from seeds. Scientists are working to synthesize the compound so that it can be used more widely. If they succeed, this natural repellent will be of great value as a pesticide.

Oil of citronella, derived from the leaves of the Old World grass, *Cymbopogon nardus*, was the most widely used mosquito repellent in the early 1900's. It is still available in the form of candles, which can be burned in outdoor areas near the home. It, too, may have a place in integrated pest management as an effective, temporary control for mosquitoes.

According to old wives' tales, cucumbers (*Cucumis sativus*) and bay leaves (*Laurus nobilis*) are effective as insect repellents. Recent research has shown that there may be some truth to the tales. Chemicals isolated from these two species do indeed repel cockroaches. When further refined, they may be useful as safe repellents in controlling these unwelcome pests in the home.



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Herbicides

Unwanted weeds can be just as troublesome as insect pests and plant diseases. So far, only one important herbicide has been isolated from plants: juglone. Juglone is present in walnut trees (*Juglans* spp.) and other members of the Juglandaceae, or walnut family. Centuries ago, the Greeks and Romans used walnuts to kill fungi. In other areas, fresh walnut husks were thrown into rivers to stun fish and force them to rise to the surface, where they could be collected easily. Farmers probably noticed the allelopathic effect of walnut trees long before it was mentioned in print in the late 1800's. Scientific experiments in the 1920's demonstrated the toxicity of walnut extracts to tomatoes and alfalfa plants.

The primary active ingredient, juglone, is most abundant in the roots and husks of the trees; there is none in the edible kernels. This chemical is toxic in very small amounts to a number of important economic plants, including alfalfa, tomatoes, potatoes, apples, blueberries and azaleas. It does not affect other plants such as grasses, which live beneath walnut trees.

Recently, scientists have discovered that juglone interrupts the normal respiratory processes in certain plants. Unable to produce chemical energy, the plants die. Apparently, the resistant plants undergo a different respiratory process. Screening for respiratory type may provide a quick way to separate the sensitive from the resistant plants, and thus may be the key to identifying weeds, as well as crops, that are susceptible to the chemical's toxic effects.

Juglone has potential value, then, as a selective natural herbicide. Modern research has also confirmed that juglone has a sedative effect on some fish and small mammals, and can be effective in killing fungi, bacteria and yeasts.

Outlook

The plant-derived pesticides discussed above are examples of the few that have reached—or are approaching—the stage of production and practical application. There are many more that need further chemical investigation, and still others that have not been studied at all. In many parts of the world, projects have been established to

screen plants for pesticide activity. Although most of these plants grow in the tropics, scientists are also studying plants in the temperate regions.

To characterize the pesticide potential of a plant, researchers must test all of its parts against a variety of insects. Much of the current research is focused on the chemical structure of natural pesticides, which scientists hope eventually to synthesize. This approach will allow pesticide users to take advantage of the plants' unique chemical properties without causing over-collection of wild populations.

Human life has always been closely linked to the world of plants. Even in this age of computers, plants have much to offer in the way of new foods, new medicines and—thanks to continuing research—safer pesticides. ♣

—Eileen K. Schofield

Eileen K. Schofield has a master's degree in botany and has published numerous technical and popular articles. She is also author of *Plants of the Galapagos Islands*, a field guide for tourists. Currently, she is an Associate Editor at the Agricultural Experiment Station, Kansas State University, in Manhattan, Kansas.

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Vireya Rhododendrons

TEXT AND PHOTOGRAPHY
BY TOVAH MARTIN

My first encounter with tropical rhododendrons took place accidentally about seven years ago. Dr. L. C. Case, a rhododendron and magnolia connoisseur of international renown, was standing beside me in our greenhouses. At one point he uttered approvingly, "I see that your vireya rhododendron is in bloom." I was taken aback. "Rhododendron?" I replied, dumfounded. It was midwinter and barren outside. Surely he was mistaken!

His finger was pointed in the direction of a shrubby plant with long, brittle leaves and an asymmetrical form. For many years, it had refused to produce flowers. Lacking proper identification and bereft of any obvious physical endowments, the plant had been pushed to the side of a bench. Now, a sizable umbel of sulfur-yellow trumpets could be seen emerging from a rosette of leaves. Dr. Case and I admired the impressive flower truss, then probed the plant's branches for a label. We found a worn tag with the barely legible words "*R. laetum* ×" scratched in faded pencil. Suddenly, the cryptic abbreviation took on meaning, and I could see the familial resemblance.

The blossoms of a tropical or vireya (pronounced vih-RAY-ah) rhododendron vaguely resemble those of a hardy rhododendron, but their beauty is more delicate than that of their rough-and-tumble Asian relatives. The floral form is also more primitive; the umbel is loose, and each flower dangles precariously from a rather lengthy stem. Vireyas are obviously rhododendrons, but each specimen exhibits a kind of tropical beauty. Best of all, vireya rhododendrons blossom in both winter and summer.

Most vireya rhododendrons hail from the Malaysian Peninsula and its adjacent islands. A combination of the area's

treacherous climate, prevalent diseases and inhospitable native inhabitants slowed the discovery and collection of vireyas, which were late to arrive on the European botanical scene. The first vireya described, *Rhododendron malayanum*, was discovered in 1823 by Dr. William Jack of the East India Company. However, specimens were not collected until 1843, when the famous British nursery firm of James Veitch & Sons sent Thomas Lobb on a botanical mission to Malaysia. Among the botanical specimens Lobb collected on the mission were seven species and varieties of *Rhododendron*: *R. malayanum*, *R. javanicum*, *R. jasminiflorum*, *R. brookeanum*, *R. multicolor*, *R. javanicum* var. *teysmanii* and *R. lobbii* (later named *R. longiflorum*).

The collection was an immediate success in England, and Veitch lost no time before embarking on a massive hybridizing campaign. By 1897, he had created no fewer than 200 hybrids.

During the Victorian Age, vireyas were often grown in ornate, plant-filled rooms known as conservatories, where they thrived in the chilly environment. (Greenhouse heating systems had yet to be perfected.) Conservatories were typically designed to imitate an outdoor garden, complete with tastefully arranged statuary, fountains and paths lined with displays of tropical plants. Vireyas balanced the park-like scenes with their shrubby foliage topped with color.

Although their popularity increased steadily during the 19th century, vireyas continued to be grown solely as greenhouse plants by members of the upper class. Unfortunately, their restricted cultivation eventually led to their downfall. In the early 20th century, the economic instability resulting from World War I caused many large estates, along with their beautifully designed conservatories, to fall into dis-

repair. By the end of World War II, vireya rhododendrons had virtually vanished from cultivation.

Vireyas fell prey not only to economic pressures but also to competition from other plants. Early 20th-century gardeners were inundated with novelties, and the once-popular tender Malaysian rhododendrons were soon completely overshadowed by the hardier Asian rhododendrons, newly introduced from China and the Himalayas. Vireyas were virtually forgotten until the 1950's, when the National Arboretum in Washington, D.C., expressed an interest in acquiring a collection from a few ardent British plantsmen who had retained stock. (Thanks to the efforts of these collectors, a dozen of Veitch's original 200 hybrids remain in cultivation today.) The turning point came in 1961, however, when Dr. Hermann Sleumer of the National Herbarium of the Netherlands undertook an expedition to New Guinea sponsored by the American Rhododendron Society. The vireya specimens collected during the expedition received an enthusiastic welcome when they arrived on American soil. Southern California growers were especially eager to test vireyas as landscape subjects.

The plants were rapidly propagated and distributed to arboreta throughout the country. Strybing Arboretum in San Francisco was particularly intrigued by the tropical rhododendrons, and began a massive distribution program among members of the American Rhododendron Society to test the plants in different environments on the West Coast. By 1969, vireyas were in the hands of many private gardeners.

The blossoms of the tropical vireya rhododendrons resemble those of their hardy northern cousins. 'Calavas' is just one of the many attractive vireya cultivars available.



The vireyas at Strybing were wintered indoors until 1972, when the arboretum decided to plant the bulk of its vireya stock outdoors. Because of the risk involved, the plants were carefully sited on a frost-free hillside. Unfortunately, in December of that year, San Francisco suffered a bout of unusually cold weather. Temperatures plummeted to 23° F and remained below freezing for days. The stock that had been left outdoors was completely decimated.

Interest in growing vireyas at Strybing was still strong, and the collection was eagerly rebuilt by reobtaining the specimens that had been distributed privately. All went well until 1976, when the vireya collection was again lost, this time because of a drought and a strike of city employees, among other unfortunate events. Those vireyas that survived the disasters were lost in a theft. Finally, Strybing Arboretum surrendered to fate. There was little interest in attempting another trial with vireyas.

Although vireyas had failed as landscape plants, they kindled the interest of indoor growers. The first task for commercial growers was to modernize the tarnished conservatory image connected with the plants. Soon, magazines carried articles about vireya rhododendrons, which were portrayed as winter-blooming house plants that would produce umbels of bright blossoms in an east or west window, or under fluorescent lights. The tempting color pho-

tographs that accompanied the articles captured the audience's attention. Suddenly, everyone was interested in obtaining vireyas as house plants.

Nuccio's Nursery in Altadena, California, known for its unparalleled collection of camellias, was the first American mail-order firm to offer vireyas through its catalogue. A handful of innovative rhododendron specialists followed suit, adding a few vireyas to their lists. Eventually, large rosters of species and hybrid vireyas appeared, often accompanied by photos featuring close-ups of the huge flowers in delicious colors.

As vireyas have become more widely available to the public, they have also excited the interest of large public gardens. For example, Longwood Gardens has expressed an interest in collecting and testing vireyas for eventual use in its display gardens. Arnold Arboretum of Harvard University is beginning to amass a collection for an indoor display. And the Hunnewell Pinetum, a famous private estate in Wellesley, Massachusetts, has built up an extremely impressive collection for exhibition in its traditional Victorian conservatory.

The recent popularity of vireyas in the United States is due, in part, to the fact that the thermostat in the average home is now kept on the cool side. Like cymbidiums and camellias, vireyas prefer cool

temperatures. They can reportedly withstand temperatures as low as 30° F, provided they are given overhead protection. (Plants should not be exposed to frost.) Vireyas are especially suitable for unheated porches and sunrooms. In the winter, optimal nighttime temperatures range from 40° to 55° F, although vireyas will tolerate warmer conditions. During the spring and summer, the plants benefit from a sojourn outdoors. West Coast gardeners have learned that vireyas grow better in raised beds than in pots sunk in the ground.

Like many species of orchids, most vireyas are epiphytic, although some can be found growing in the loose humus of the jungle floor. The plants lend themselves naturally to pot culture. A container-grown vireya will usually out-perform its field-cultivated counterpart in the production of blossoms. In fact, restricting the root system of a vireya in a tight container seems to encourage flowers. Some growers pot vireyas loosely in a medium of pure, long-fibered sphagnum moss, while others recommend a mix of equal parts sphagnum, peat and sand. An orchid-type mix consisting of 40 percent leaf mold, 40 percent redwood bark chips and 20 percent sandy loam may also be used.

Vireya rhododendrons have rather specific nutrient requirements. Their leaves can endure the drought, heat and sun of summer without any burning, bleaching or shriveling. However, the foliage rapidly registers the effects of mineral deficiencies. According to Carl A. Deul, an avid vireya specialist and director of Rancho Pacifica Gardens in Northridge, California, vireyas prefer a constant low injection of fertilizer (with a nitrogen content of less than 80 parts per million) to less frequent, heavier doses of food. However, they will tolerate normal fertilization in summer. Vireya Specialists, a mail-order supplier in Los Angeles, recommends using fish emulsion (¼ or ½ strength) when fertilizing. To combat chlorosis, a frequent problem with tropical rhododendrons, plants should be bolstered regularly with chelated micronutrients.

Most members of the Ericaceae, including vireya rhododendrons, prefer an acid soil. Evidence of vireyas' pH preferences can be quite striking, as in the case of the vireyas at the Hunnewell Estate. Apparently, the gardeners there were beginning to notice yellowing in the foliage of their plants. An agent at the Agricultural Experiment Station recommended experimenting with a more acidic potting medium. The results were astonishing: within a fortnight, the foliage began to turn green and lush.



ABOVE LEFT: The lush blooms of vireya rhododendron 'Shasta' would make an attractive addition to any indoor garden. ABOVE RIGHT: *Rhododendron taylori* is just one of the species of tropical rhododendron that are available.



Vireyas' tolerance of extremely dry conditions makes them especially suitable as house plants. (Vireyas have been known to thrive and blossom during the scorching, arid summer of the Australian desert.) In the home, they can be grown in a bright east or south window. In addition, many vireya specialists recommend growing the Malaysian rhododendrons under fluorescent lights. The more compact prostrate selections are generally suitable for light gardening. Prostrate vireyas also make excellent hanging basket plants. The foliage will never dangle limply over the edges of the pots, and the stems form a rather graceful, low arch. A few recommended species and cultivars for basket culture include *Rhododendron ravum*, *R. macgregoriae*, *R. 'Valentine'* (*R. lochae* × *R. gracilentum*), *R. lochae*, *R. 'Pink Delight'*, *R. jasmiflorum* and *R. 'Red Prince'* × *R. lochae*.

Vireya rhododendrons require pinching to encourage branching. Harold Greer of Greer Gardens in Eugene, Oregon, recommends early pruning—"pinching out any single apical buds as they begin to elongate." Pinching is crucial if the plants are grown under fluorescent lights or in hanging baskets. If not disciplined, a vireya can eventually become unattractive and gangly.

Currently, there is a great deal of ex-

perimentation with different methods of cultivating vireyas. Growers have yet to formulate a foolproof system for cooling and watering the plants to stimulate maximum bud formation. Furthermore, they do not always agree on growing techniques. However, their findings are fascinating and provide a balanced view of the current state of the art of vireya cultivation.

Vireyas are susceptible to the same insect infestations that plague other members of the rhododendron family. Gardeners should watch for aphids, thrips, red spider mites and mealybugs. However, caution should be used when combating insect infestations with chemicals. For instance, Cygon reportedly causes foliar damage.

The ranks of vireya rhododendrons have increased steadily since Dr. Sleumer made his expedition in 1961. There are at least 300 species and hybrids in cultivation today. The key to the vireyas' future seems to be in hybridizing, and growers are producing hybrids with amazing speed.

Some catalogues list an awesome array of hybrids, all of which bear huge umbels of delicate tubular flowers. Some of the blossoms are large, and their "trumpets" wide open; other, more dainty blossoms are dangly and bell-shaped. The colors are

not shocking, but cheerfully bright. They tend toward the pastels—yellows, oranges, salmons, pinks and muted reds, with many shades in between. Fragrance is a characteristic of many vireya hybrids; the aroma is reminiscent of carnations.

Many vireya hybrids are the result of complex breeding. While hybridists continue to seek the "perfect" vireya, others, such as Harold Greer, feel that the vireyas' future still lies in the Malaysian jungles: "As more exploration is done in the wild, better forms of the species may be found that are more vigorous, free-flowering and compact in habit. I doubt that they will ever become common house plants, but I would say they eventually will be widely grown by connoisseurs."

Vireyas will probably never be as omnipresent as spider plants in the windowsills of the nation. However, the exotic flower umbels of the tender vireya rhododendrons are a lovely sight to behold on a windowsill. Somehow, those few loose trusses are infinitely more pleasing in mid-winter than all of the rhododendron blooms of summer put together. And that, I suppose, is what house plants are all about. ♣

Tovah Martin is a frequent contributor to *American Horticulturist*. She is the begonia specialist at Logee's Greenhouses in Danielson, Connecticut.

MORIKAMI

A Japanese Garden in South Florida

BY RUBY WEINBERG

A Japanese garden in the subtropics? Absurd! At least, that was my first reaction when I heard about The Morikami Gardens, located on the southeast coast of Florida in Delray Beach.

Many traditional Japanese landscape designs have been created in places far from the mother country. But the climate and geography of southeast Florida are so different from those of most of the Japanese archipelago that I wondered how such a scheme could possibly be successful.

Most of the year, Delray Beach is hot and humid; it has a true subtropical climate. Only subtle differences mark a change in season. Rainfall is heavy in spring and summer, a bit scanty in fall and winter. (Within the last 10 years, southeast Florida has had occasional frost and even a snowfall, but this kind of weather is extremely rare.) Because of the 12-month growing season, plants grow rapidly and are often lush and flamboyant.

On the other hand, the climate of Tokyo, Japan, is similar to that of Norfolk, Virginia, which has its share of frost and light snow in the winter. Thus seasonal contrast is an essential element in Japanese landscape design. In addition, Japanese landscapes are meticulously manicured and controlled, and slow-growing and naturally compact plants are preferred.

As for geography, southeast Florida is as flat as a board, while 70 percent of Japan is mountainous. Many Japanese gardens are small-scale simulations of mountain scenes, and water is often incorporated into the design.

Remarkably, Morikami's planners learned to cope with these differences. In fact, the designers who planned and planted The Morikami (pronounced more-ih-KAHM-ee) Gardens have created a surprisingly charming and authentic repro-

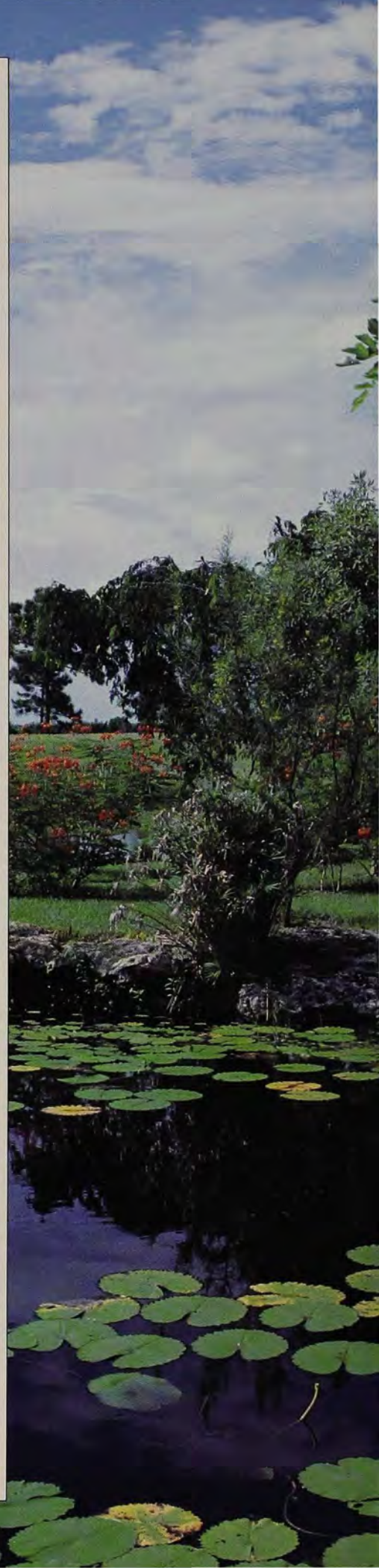
duction of a Japanese landscape design.

The Morikami Gardens, along with The Morikami Museum, are located in a semi-rural area about five miles from the Atlantic, on the northwest side of a 150-acre preserve called Morikami Park. The region, now devoted to plant nurseries, was once farmland. Eighty years ago, the swampy scrubland was cleared by a group of 100 Japanese immigrants who called themselves the Yamato Colony and aspired to transform the land into farms suitable for the production of vegetables and pineapples. Unfortunately, blight and typhoid took their toll, and the colony eventually dispersed. One of the few immigrants who remained was George Sukeji Morikami. He continued to farm on land that eventually became extremely valuable as real estate prices soared in south Florida. By the end of his life, Morikami's holdings were worth more than a million dollars.

Before his death, Morikami deeded 150 acres of his property to Palm Beach County. The entire acreage was set aside as Morikami Park. The deed specified the construction of a museum that would communicate Japanese cultural traditions to the people of George Morikami's adopted country. Before the farmer's death, in 1976, The Morikami Museum had already become a reality. The Morikami Gardens, located within Morikami Park, were opened to the public in June of 1977.

Waterlilies and the reflections of clouds dot the surface of the pond that surrounds The Morikami Gardens. Zig-zag bridges, like the one on the right, are typical of traditional Japanese gardens, but Morikami is far from typical; because it is located in South Florida, this Japanese garden is planted with a wide variety of plants adapted to a subtropical climate.

David William Ginsburg





To the Japanese, the qualities of a particular building are greatly enhanced by cultivating the land around it and creating a kind of indoor-outdoor continuum. With this idea in mind, the Palm Beach County Parks and Recreation Department planted the gardens of Morikami while the museum was being built.

Tokyo-born Seishiro Tomioka was hired to plan the museum site and to design the gardens. Tomioka was well qualified to do the job. In Japan, he had mastered Japanese garden principles, and in the United States, he had studied the growing conditions of south Florida as County Superintendent of Park Planting and Design. In creating The Morikami Gardens, his basic problem was how to transform the swampy scrubland into a place of peaceful contemplation.

Tomioka decided to use water—often a focal point in Japanese gardens—to separate the existing brush and woodland of the park from the museum and garden area. Luckily, southeast Florida has a high water table and abundant rainfall. Using an idea somewhat reminiscent of ancient Japanese castles and their fortifications, Tomioka had a canal or moat dug around the area to be developed. Soil removed from the canal was used to build a slightly elevated island, which became the site of the gardens and museum. The museum building was then situated in the approximate center of the garden. In the meantime, the canal was given an irregular jagged shape, and many peninsulas were formed on the garden side. This unusual waterway was cleverly planned so that only a small portion of the water is visible from any one part of the garden. The name “canal” or

“moat” was dropped, and the waterway became known as “The Pond.”

The combination of the dentate shoreline and the position of the building embodies an important Japanese concept known as *miegakure* (hide-and-seek). Tomioka designed The Morikami Gardens so that the visitor would be able to see only one segment of the placid pond waters and only one section of the museum’s exterior, the plantings, and the distant lawn and woodland at one time. Such a design serves to entice the observer to seek the mysterious unknown beyond each crook and bend of the path.

Visitors enter Morikami Park from Carter Road. On the walk from the main parking lot to the entrance of the island garden, a white pebbled path bordered by a sweeping lawn of sturdy Saint Augustine grass leads visitors along a waterway, where *miegakure* is already at work. Visible across the pond is the roof line of a Japanese building (the museum), but the whole scene is partially concealed by the shrubbery of the garden itself.

At last, the path reaches the entrance bridge. In Japanese gardens, bridges are ornamental as well as practical. This particular bridge spans the garden-island with a graceful arch, its sides banked with *Asparagus densiflorus* ‘Sprengeri’ (asparagus fern). It is called “Moon Bridge” and is similar to the kind of semi-circular bridges often used in Japan. Once across Moon Bridge, visitors follow a steppingstone path. On the right side of the path, forming a canopy, are five specimens of *Bucida buceras* (black olive), shade trees from the Caribbean. Although all the trees were planted at the same time, they have been

carefully pruned to varying heights so they appear to be seedlings that have developed naturally.

The path leads to the front entrance of the museum, a one-story building with white stuccoed walls and a wood-shingled roof curving upward at the corners. Like many Japanese homes, it is surrounded entirely by a verandah, and the architecture adds to the house-and-garden feeling.

Before entering the museum, the visitor must don paper slippers to protect the delicate floor. (Traditional mats of rice straw would be short-lived in Florida’s humid climate, so mats of sturdier materials have been substituted.) Inside are tiny rooms filled with Japanese furniture and artifacts, as well as a library. In the center of the building lies a courtyard garden constructed of stone, raked gravel and a minimum of plants.

The public is invited to participate in a variety of special programs throughout the year at the museum, including bonsai demonstrations, art shows and Japanese festivals. At the time of my first visit, a tree was festooned with small white papers—fortunes that had been distributed, read, then placed on the tree like Christmas ornaments.

Near the bottom of the verandah steps is a distinctive arrangement: a large boulder planted with *Cycas revoluta* (sago palm), *Jasminum multiflorum* (fragrant jasmine) and *Encephalartos*, a young cycad with spiny gray leaves. The grouping is especially beautiful in autumn, when the jasmine is a starry mass of white flowers. The textural contrast of rock and plants suggests a still-life painting composed of diverse yet complementary parts.

Originating from the main path of the garden are smaller paths made of steppingstones, some of which lead to garden benches. Visitors can also stroll on the grass. On the east lawn near the pond, nine horizontal boulders are arranged like the swell of ocean waves. After a shower, rainwater collects in their surface cavities, and small birds can often be seen taking a refreshing bath in the water.

Following the path clockwise around the museum, visitors come upon a planting of



Left: Ruby Wenberg Right: Barbara W. Ellis

FAR LEFT: Clumps of striking bird-of-paradise, *Strelitzia reginae* add a colorful, tropical flavor to the garden. LEFT: Outside the bonsai exhibit, *Carissa* and *Nandina* frame a traditional Japanese water basin. RIGHT: In the center of the museum is a small, traditional courtyard garden with raked gravel (used to represent water), rocks and a minimum of plants.



red and white azaleas. (When I visited in March, the azaleas were in full bloom; during my October visit, the same plants still had a few flowers.) It is difficult to grow azaleas in south Florida, however. Morikami's horticulturist, Dan Nelson, hopes to locate azaleas and rhododendrons that would adapt well to south Florida's growing conditions. In particular, he would like to find selections that would bloom only in the spring and thus would perpetuate the seasonal aspect of Japanese garden culture.

Framing the museum along its north and east sides are specimens of *Murraya paniculata* (formerly *M. exotica*), wax myrtle. These plants are pruned constantly to head height. In south Florida, wax myrtle is usually grown as a tall hedge. Its small white flowers bloom most of the year.

Further along the path is the Bonsai Memorial Garden, which features a collection of masterful miniatures of many species of trees, some of which are on loan. They are exhibited in a bamboo structure that is open in the center. At the entrance is a bamboo gate and a clipped holly hedge with bamboo plants in the background. Here, a *tsukubai* (water basin) is set in a pebbled area. A bamboo flume pipes water into the basin. (The Japanese traditionally

wash their hands and rinse their mouths before entering a house or tearoom.) Since the basin is only a foot high, one must stoop to use the water. Such a demonstration of humility is characteristic of Japanese culture.

Bonsai is the art of dwarfing trees and shrubs by growing them in containers. In Japan, bonsai specimens are often proudly displayed in both home and garden. Morikami's collection consists of both cultivated and endemic Floridian plants, including the native *Conocarpus erectus* (buttonwood), a tree from the Florida Keys and the Everglades that was once used for making charcoal by early Floridians. Morikami's buttonwood specimen is estimated to be 50 to 75 years old. However, it was collected from the wild, and has not been in cultivation long. The largest bonsai in the collection is a planting of seedling *Casuarina*, or Australian pines. Named after the cassowary bird of Australia because of its long, feathery branches, this introduced species has run rampant in Florida. Trained and bedded on a coral base, Morikami's planting has the classical windswept appearance of pines on a mountainside. Another bonsai specimen in the collection, *Taxodium distichum* (bald cypress), loses its leaves gradually in the fall.

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Departing from the bonsai exhibit, visitors are treated to another lovely view from a pebbled beach that juts out like a peninsula into the pond. The beach affords a superb wide-angled view of the water. Specimens of *Typha latifolia* (common cattail) dance above the surface, while pink- and blue-flowered water lilies open in the sunshine. *Cyperus papyrus* (papyrus), the ancient Egyptian plant used for making paper, stands in the shallows on reedy stems. In other wet spots grow tall wands of *Cortaderia selloana* (pampas grass) and strap-leaved *Acorus* (sweet flag), which has a lemony fragrance. In early spring, the flowers of bamboo make their appearance. None of these species are hardy in Japan, although less frost-tender forms of bamboo are widely grown throughout the Orient.

Near the path, on the west side of the museum, is a garden bench flanked by a bed of *Strelitzia reginae* (bird-of-paradise). When I visited The Morikami Gardens in the fall, the bird-of-paradise was in full bloom. According to Dan Nelson, the plants are not hardy in Japan, but the Japanese admire the exquisite orange-and-blue flowers and sometimes grow them, for cutting, in greenhouses.

At this point in the walk, visitors are treated to a waterfall, formed by two

streams rushing down a hill into the pond below. Unfortunately, the many ornamentals planted on the hill cannot be appreciated because of the distance. However, the torrent can be enjoyed for its music and motion.

Continuing along the walk, the visitor arrives at a stream that is crossed by a zigzag bridge, a small, refined version of the common makeshift bridge made of eight wooden planks. In Japanese design, a zigzag bridge is said to "discourage pursuit of demons who can only travel in straight lines." In March, the purple blooms of Japanese iris can be seen reflected in the water. Koi, Japanese colored carp, swim in the stream. Whiskered catfish compete for the food thrown in for the koi. (Florida's catfish, which are uninvited guests, have the amazing ability to enter any lake or pond by walking overland from the nearest canal.)

Shading the iris is *Pongamia pinnata* (poonga-oil tree), pruned Japanese-style; only a few branches are left hanging over the water. Like most of the plants in the garden, the poonga-oil tree is not used in Japan. It is subtropical and thrives only in hot, humid climates. In Malaysia, the plant's native home, fishermen crush the flat, oily seeds of the plant and cast them into the water to deplete the oxygen supply, thereby

bringing dying fish to the surface. Fortunately, the trees at Morikami never seem to bear seed pods.

Beyond the zigzag bridge, between the path and the water, are several beautiful trees, including another poonga-oil. This wide-spreading and dense-leaved specimen is pruned to three trunks, and the bark glistens with beige-and-white lenticels. In the background are coral boulders marked with fossil imprints.

Near this area is a four-foot-tall specimen of *Lonchocarpus punctatus*, commonly called lance pod or pride-of-Bermuda. The long racemes of mauve flowers resemble those of a lilac and are exceedingly fragrant. This rare shrub is tropical rather than subtropical, and flowers have been destroyed by cold snaps.

Back near the front of the museum stands a tall stone antique lantern called Ishi Doro. This temple lamp from Tokyo dates back to 1681. On its 300th anniversary, Ishi Doro was presented to The Morikami Gardens. Originally, garden lanterns were used for lighting candles, but now they are mostly decorative garden features.

At this point, the visitor has completely encircled the museum. Actually, the paths that encircle the museum building could be traversed in five or 10 minutes—if the visitor does not allow himself to be de-



tained. But a full appreciation of the gardens and museum requires ample time and an unhurried frame of mind. My first visit occupied fully an hour and a half.

In an alcove near the front door of the museum is yet another interesting arrangement: a small lantern and boulder backed by a close-spaced colony of *Juniperus chinensis* var. *chinensis* 'Torulosa' (tortured or Hollywood juniper). The junipers are pruned high, like pines in a forest reaching for sunlight. Throughout the gardens, thoughtful groupings such as this one reflect the Japanese desire to emulate nature.

In Japan, pines are favored over other trees because they symbolize longevity and happiness. In Morikami Park, *Pinus elliotii* (southern slash pine) grows everywhere. The pine forest provides a splendid backdrop for the more intimate garden plantings. Southern slash pines can be seen at a distance from many places on the island garden. In the gardens themselves are plantings of the slower-growing *Pinus thunbergiana* (Japanese black pine). These rugged conifers grow into irregular, weather-beaten configurations.

Unfortunately, midwinter in south Florida is not cold enough for traditional Japanese cherry blossoms. However, gardeners at Morikami have made good use of a few Japanese indigenous plants that do not require a cold dormant period, such as black pine, nandina, bamboo and podocarpus. In addition, they have used many different deciduous trees and shrubs to provide seasonal contrast. Clumps of *Acer rubrum* (red maple), a south Florida native, are planted in a grove on the far side of the pond. The trees' red autumn leaves and winter branch structure add a distinctive seasonal touch. *Taxodium distichum* (bald cypress) heralds the coming of winter. By mid-November, its bony white silhouette stands out in stark contrast to the broad-leaved evergreens around it.

Fruit also enlivens the winter scene. Songbirds are attracted to several fruit-bearing species found at Morikami, including *Ilex cassine* (dahoon holly), with its profuse bunches of small red berries. Blue herons, mallards, ospreys and other transient water birds enjoy the pond's fish and vegetation.

During my autumn visits, many of the

LEFT: Palms and other tropical species surround a waterfall located across the pond.
ABOVE RIGHT: A bonsai planting of *Casuarina cunninghamiana* (commonly called Australian pine), trained on a coral base, has the windswept look of plants on a mountainside.



Martin Weinberg

trees were fruiting heavily. However, I was surprised by the absence of chrysanthemums, an ancient Japanese symbol for autumn. Unfortunately, in south Florida, chrysanthemums must be grown in air-conditioned greenhouses in the summer. Subtropical flora fills the gap nicely, however, since it undergoes seasonal changes. In the fall, *Hedychium coronarium* (white ginger) and bird-of-paradise are both in full and splendid bloom. Although many plants provide a smattering of blossoms all year, *Camellia japonica* is prominent in winter; trumpet trees (*Tabebuia argentea* and *T. pallida*) usher in early spring; *Lagerstroemia speciosa* (Queen's crape myrtle) begins to bloom in mid-spring; and a few perennials, such as daylilies, are summer focal points.

Morikami's designers have avoided the most common Floridian plants, such as the coconut palm, bougainvillea and hibiscus. Instead, the emphasis is on those plants with distinctive shapes, textures, seed pods or flowers. As Dan Nelson notes, the gardens are "an attempt to adapt Florida landscape material to a Japanese design." Existing plants are continually re-evaluated for their suitability in a Japanese design. For example, in less than a decade, all overly exuberant acacias have been removed. Given the lush growth conditions of south Florida, a tree like *Grevillea robusta*, commonly called silk oak, would become coarse and unmanageable if not regularly pruned.

Fortunately, many of the plants at Morikami are amenable to being tightly trimmed

into typical Japanese shapes. For example, *Carissa grandiflora* (natal plum) has been trimmed into a mound called *tamazukuri* (round- or ball-shaped) and is particularly effective when displayed against a boulder. Some of the trees are also pruned to accentuate their skeletal forms. Morikami's specimen of *Coccoloba uvifera* (sea grape), the common bushy tree that crowds tropical American shorelines, has been shaped to emphasize its round leaves and clusters of fruit.

Unfortunately, none of the ornamental plants in the gardens are labeled, except in the bonsai enclosure. However, visitors can purchase a booklet in the museum that can help in locating and identifying individual plants.

As Morikami's budget grows, many changes and additions are expected to be made. Possibilities for the future include a larger museum as well as a Japanese restaurant. No doubt the gardens themselves will be expanded.

A visit to The Morikami Gardens is an inspiration for anyone who would like to develop a Japanese garden in an unlikely setting. After three visits, I left the gardens not only with renewed admiration for Japanese landscapes, but also with a high regard for Morikami's designers and horticulturists, who created the seemingly impossible in south Florida. Without a doubt, George Morikami himself would have been very pleased. ☉

Ruby Weinberg is a gardener and writer living in Califon, New Jersey.



CAREEERS

IN HORTICULTURE

BY RICHARD M. ADAMS, II

In Part I of his three-part series on careers in horticulture (see *American Horticulturist*, October 1986), Richard M. Adams introduced us to several people who shaped their careers around an intense interest in plants. For all of the people portrayed in those profiles, an overriding determination to perfect their own horticultural skills—whether as a professional or hobbyist—was apparent.

In Part II of the series, Adams presents profiles of professionals with a wide range of backgrounds and interests. Through stories ranging from that of an independent freelance writer to that of a horticultural therapist who uses plants to touch the lives of the physically and mentally handicapped, Adams shows that this wide range of backgrounds and interests has been reflected in some very interesting careers. All of these careers seem to be productive, both for the person working on a particular aspect of horticulture, and for the public that reaps the benefits of this work.

In the third part of the series (*American Horticulturist*, February 1987), Adams will explain various options that are open to an individual who is considering obtaining an education in horticulture. Adams will cover everything from formal to informal education in the field, and will explain undergraduate and graduate degree programs. He will wrap up the series with some interesting descriptions of a few horticultural courses he attended while preparing this article.

James E. Cross

Owner, Environmentals, Cutchogue, Long Island, New York.

A thoughtful look at his interests led this man to a mid-life career change—from a Wall Street investment advisor to the owner of a highly successful container-plant nursery.

Getting a new nursery business off the ground is difficult. One nursery that has done well since its relatively recent start in 1967 is Jim Cross's Environmentals, a wholesale container-plant nursery on Long Island.

Environmentals was started as the result of an unusual career change. Owner Jim Cross attended Ohio University and Stanford on the G.I. Bill, where he studied business and finance. After graduating, he took a position as an investment advisor with a Wall Street firm. Several years later, Cross began to feel dissatisfied with his work. About that time, some younger men left their firms to set up their own investment company, and Cross joined them the next year as a partner. However, the excitement of the new firm still didn't satisfy him completely. While the other partners enjoyed following the stock market and making money for their clients, Cross found the work laborious.

Cross began doing some serious introspection, making a list of other careers he might enjoy. While working in the investment field, he had gotten involved in landscaping his yard with unusual rhododendrons, heathers and other shrubs. Gradually, he had begun to encroach upon his neighbors' yards on either side. As he looked seriously at possible careers, "nursery business" kept getting higher on the list.

Cross began researching soil maps and looking with real estate agents at farms on

eastern Long Island. He bought land in 1966 and started Environmentals the next year. The firm now employs seven people (including Cross) and supplies markets principally in New York City and Westchester County, and on Long Island. Many customers from other states visit the nursery to purchase stock.

Entering the driveway of Environmentals, the visitor is greeted by gracefully landscaped demonstration gardens of dwarf conifers and other dainty trees and shrubs. The production area looks like a military barracks, with rows of Quonset-style, polyethylene greenhouses, each sheltering dozens of containers of beautifully grown, weed-free, pest-free stock.

Cross insists that the main ingredient for success is common sense, and that the prospective entrepreneur shouldn't be intimidated by the "buzz words" of business. It's obvious, though, that Cross has a sound understanding of business concepts. To begin with, he has a well-defined market. "We grow plants for the impulse sale at retail garden centers," he explains. "Production time is what costs the most, so we grow our specimens just large enough to catch the eye." Still, about a third of Environmentals' material is sold to landscapers who cannot find more rare species in the size, quality and quantity they need.

According to Cross, the initial investment in land and the long start-up time are the biggest obstacles to starting a nursery, but help is sometimes available from the Farm Credit Association. "With so many farms coming close to bankruptcy, this cooperative looks favorably on nurseries they think will be profitable," he notes.

Many businesses never get off the ground because of a lack of cash (what financiers call "working capital"). "You should estimate how much working capital you'll need in the first three to four years it takes

LEFT: James E. Cross made a mid-life career change from investment counselor to nurseryman. Today, as owner of Environmentals on Long Island, New York, he has seven employees and produces a wide variety of trees and shrubs, which he sells primarily to retail garden centers.

to become profitable, then *double* that amount to be safe," advises Cross. Once established, some businesses go under from "overmanagement." According to Cross, "The owners lose touch with the business because they get too enamored with the trappings of management." To avoid this pitfall—and, more importantly, because he enjoys the work—Cross spends more time planting cuttings or driving a tractor than he does sitting at a desk. "I believe in 'unspecialization' of personnel, including myself," he says. "Everyone here can do everything."

Although much of the production work at Environmentals could be monotonous, Cross and his staff don't perform one particular task for more than a few hours. Thousands of cuttings must be taken each year, for example, but Cross says, "We only take cuttings in the fall, and then only for the first hour and a half of the day. We plant the cuttings only until lunchtime, then in the afternoon we do something else."

Environmentals grows a large variety of plants, including a number of heather and heath species. Many garden centers would find it difficult to inventory and order this many plants properly. "We work on a semi-consignment basis with these plants," says Cross. "The garden center gives us the space, and we keep it stocked with an appropriate selection." This method allows him to "transplant" some of his firm's expertise along with the plants.

Because of Jim Cross's common-sense approach to business and his plant fancier's appreciation for choice plants, Environmentals has become a successful and respected nursery business.

Pamela Harper

Freelance Writer and Photographer, Seaford, Virginia.

Independent-mindedness and a desire to combine career and family led this accomplished gardener to a successful freelancing career.

Freelancing allows you to set your own schedule, work independently and operate out of your home. However, only about half a dozen garden writers in the United States are able to earn a living solely from their freelance work, or so estimates Pamela Harper, who is one of those few.

From one room of her suburban Virginia home, Mrs. Harper runs the Harper Horticultural Slide Library, a collection of

about 80,000 color slides stored in metal boxes in two broom-closet-sized cabinets. The slides of plants include pictures of species and cultivars of trees, shrubs, perennials, annuals and bulbs. There are also views showing how plants look in their natural settings or in gardens. In addition, the collection includes slides of fountains, walkways and other garden features, along with scenic views of famous botanical gardens and estates.

Mrs. Harper sells photographs to magazine and book publishers, gives lectures and teaches courses at botanical gardens, and writes illustrated articles for magazines. "Sometimes I feel like a one-man band," she says. Her first book, *The Story of a Garden*, was published in 1972. Her second, *Perennials—How to Select, Grow and Enjoy* (co-authored with Frederick McGourty), was published in 1985 and includes over 240 color photos. Mrs. Harper also works as a book manuscript consultant, and furnishes garden clubs and other groups with slide shows accompanied by descriptive narratives for their own use.

It's easy to tell which house on the block belongs to the Harpers; it's the one that looks like a botanical garden. Two densely planted acres of shrubs and perennials account for some of the writer's gardening experience, which is what gives her writing so much authority. The garden also provides subjects for photographs and serves as a test bed for plant selection and cultural techniques.

Mrs. Harper comes from a long line of gardeners in England and has been interested in plants since she was a toddler. Before she and her husband, an engineer, came to the United States in 1968, she owned a small nursery specializing in hardy heathers.

Mrs. Harper's first gardening article in the United States appeared in *Flower and Garden* magazine. When she submitted another article years later, the editor said, "It's fine, but we need photographs, too." That response got her started in horticultural photography. Since then, she has had articles and photos published in well over a hundred different books and magazines in the United States and England.

One reason Mrs. Harper has done well in freelance work is that she likes to work independently. "I am not a good manager," she admits, "because I always think I can do the job better myself." Becoming a freelancer, she cautions, takes years of

work; editors and other clients find out about your work largely by word of mouth and exposure. "People write to me who have just graduated with a degree in horticulture and journalism, and ask, 'How can I do what you do?' I write back that I can't tell them how to proceed; I can only say how it's been for me. It's different for everyone. I usually advise them, now that they have their education, to get some experience, because that's what you write from. A degree is not needed for freelance work, nor will it help sell your work. It *will* help you to get a regular paid job, and that is probably the best route for the new graduate as a means of earning a living, in the meantime testing your own potential by writing as a hobby. That is how I began."

"If you write well, know your subject, are persistent and are prepared to work fourteen hours a day, seven days a week," Mrs. Harper says, "you may have a future as a freelance writer."

Barry R. Yinger

Curator of Asian Collections, United States National Arboretum, Washington, D.C.

Like many advanced amateur horticulturists, this botanic garden curator travels abroad, collects exotic plant species, and plants them in his own section of the Arboretum. However, as a professional, he is paid for his efforts.

Many students are lucky if they know what they want to major in midway through college. Barry Yinger knew even before he enrolled that he wanted to study ornamental horticulture and Oriental languages, a joint major available through the University of Maryland's multidisciplinary program. Today, Barry is Curator of Asian Collections at the U.S. National Arboretum, and his knowledge of Korean, Japanese, and Mandarin Chinese comes in handy on plant-collecting trips to the Orient. Even his business card is in English on one side and Korean on the other.

Growing up on a farm, Barry got interested in plants when he was just a toddler and would trek in from the fields clutching plants he had picked. He had his first garden at age eight. In high school, he was good at debating and was advised to pursue a pre-law program in college. However, he found the legal field boring, and eventually dropped out of the program.

While working odd jobs in landscaping and at garden centers, Barry became in-

terested in Asian plants, and decided to go back to college to study horticulture and Oriental languages. While in college, he spent a semester in Japan. Later, after graduating, he made several collecting trips to the Orient.

Barry decided to pursue his interest in plant-collecting through participation in the respected Longwood Program in Ornamental Horticulture at the University of Delaware, a two-year fellowship program leading to a master's degree in botanical garden management. After graduating from the Longwood Program, he spent two years in Korea helping to develop the Chollipo Arboretum. "The site—in a seacoast fishing village—was beautiful," he says, "but the goals of the garden were never well defined, which created some headaches."

Since 1983, Barry has been Curator of Asian Collections at the U.S. National Arboretum, where he has had almost complete freedom in developing the "Asian Valley," a 30-acre collection of Oriental trees and shrubs. He travels to the Orient about once a year to collect seeds, cuttings and plants, which he then grows in a greenhouse at the Arboretum. When the specimens are ready to be planted outside, Barry decides where they will go and then plants them with the help of his part-time assistant. "There is nothing I'd rather be doing," he reflects.

As he approaches the age of 40, Barry is beginning to think more about his long-term financial security. "Curatorial skills do not command a high salary," he admits, "and any student considering a career in horticulture should be willing to work for the love of plants rather than the love of money." In the meantime, though, Barry has what many people want the most: a highly satisfying career.

Janet M. Poor

Owner/Manager, Janet Meakin Poor Landscape Design, Winnetka, Illinois.

Combining an interest in unusual plants with a talent for landscape design has given this landscape designer a three-year backlog of clients.

Landscape design became a second career for Janet Poor 16 years ago. Today, she is a sought-after landscape designer, the editor of a book, and a board member of both the American Horticultural Society and the Chicago Horticultural Society. Her success comes, in part, from being able to do two things well: choose unusual plants,



Richard M. Adams, II

In his horticultural career, Barry Yinger combined an interest in plants with a fascination for Oriental languages.

and design attractive landscapes.

"I always loved gardening and the outdoors," says Mrs. Poor, who is married and the mother of two grown children. A former teacher, she began taking plant materials and design courses at the Morton Arboretum in nearby Lisle, Illinois. She took additional courses at the University of Illinois and the University of Wisconsin.

Before completing the courses, Mrs. Poor began designing gardens for friends, and her work brought more and more referrals. Clients were impressed with the unusual plants she used, how good they looked together, and how well they grew. Today, Mrs. Poor has clients who are willing to wait three years for her to design their gardens.

Mrs. Poor begins a landscaping job by consulting with her clients and asking about their lifestyle and goals. Do they want to design their entire yard, refurbish a garden or create a new garden? What functions will the design serve? Do the clients want a place to have cookouts, play volleyball or entertain grandchildren? Do they want a vegetable garden or an orchard? Do they prefer perennials, annuals or woody plants? Do they want a formal or an informal look? Are they avid gardeners, or do they want a low-maintenance garden? Do they want terraces, decks, fountains, a pool? How much do they want to invest in the design? This initial discussion may take anywhere from a couple of hours to several months, depending on the job's size and the client's decisiveness.

After determining what the client wants, Mrs. Poor tries to capture in her own mind what the finished product will look like. Then she presents her ideas orally to the client. If the client likes her ideas, she commits them to paper, sketching different views of the design. When the client approves the sketches, she develops a formal site plan blueprint and a budget.

Mrs. Poor works either as a consultant or as a general contractor. As a consultant, she supplies a blueprint of the design; the client then finds and installs the plants. As a general contractor, she provides the design, the plants, and the planting crew, as well as masons and other workmen who are required.

According to Mrs. Poor, one of the advantages of being a one-woman firm is being her own boss. In a sense, though, each client is a boss. "Some clients take longer to make up their minds than others," she says. "To enjoy being a landscape designer, you have to be willing to give, to be of service, without worrying about the clock and how many hours you put in."

Not all jobs run smoothly, either. Soil conditions vary and may not be favorable to certain plants (rhododendrons, for example, don't do well in poorly drained soil), so Mrs. Poor has to be able to suggest suitable substitutes. "Most landscape designers guarantee their installations for a year, so if something dies, I have to explain why and replace it," she says.

Many landscape architects today emphasize the importance of intuitive thought—specifically, the ability to combine colors, textures and forms in a pleasing design. Mrs. Poor places equal value on pragmatism—for instance, a knowledge of plants and the conditions they require. "There are a lot of talented designers out there who don't know much about plants, and a lot of horticulturists who don't emphasize the design," she notes.

In addition to practicing landscape design, Mrs. Poor is working to unite designers, horticulturists and botanists in an effort to introduce more unusual, worthwhile species into cultivation. As editor of the Garden Club of America book, *Plants that Merit Attention*, she describes different woody plants that could be used more often in the landscape. "Educating gardeners helps create a demand for new and unusual plants," says Mrs. Poor. "For example, a client may see a picture of a deciduous larch (*Larix decidua*), a feathery conifer that's easy to grow but not often

seen. The client asks the landscape architect to plant *Larix decidua*. The landscape architect asks the nurseryman for *Larix decidua*. The nurseryman asks the horticulturist how to propagate and grow *Larix decidua*. And the horticulturist asks the botanist where to find *Larix decidua*. Everyone works together, and all benefit. Our book will hopefully stimulate more of this kind of cooperation.”

Rena J. Huber, R.N., H.T.R.

Horticultural Therapist, Chicago Botanic Garden, Glencoe, Illinois.

This horticultural therapist uses plants to light up the lives of the physically and mentally handicapped.

Horticultural therapist Rena Huber is one of the few people at the Chicago Botanic Garden who use plants as a means rather than an end. She is concerned not so much with growing quality plants or designing attractive landscapes as she is with using plants to provide hospital patients and senior citizens with the physical and mental benefits of plant care activities.

The Chicago Botanic Garden provides several hospitals and patient-care facilities in the area with horticultural therapy services and training. Rena and the two horticultural therapy interns at the Garden oversee a model therapy garden called the Learning Garden for the Disabled. They also conduct horticultural therapy sessions in the field so they can reach even more people.

On a typical day, Rena and the interns travel to Children's Memorial Hospital in Chicago to conduct a one-hour program in an on-site garden they helped design. After briefing the hospital staff on the day's activities, they help tape plastic bags over the arms of those children with intravenous units, to protect them from the soil and water. Then the eight to 10 children in the program choose from a posted list of "things to do," such as watering, cultivating, checking for insects with a hand lens, cutting back herbs or removing spent blossoms. A "curiosity corner" is set up with interesting plants for the children to touch, smell or dissect. After each session is evaluated, plans are made for the following week's program, which is taught by the hospital staff Rena has trained in horticultural therapy.

After lunch, Rena and the interns drive to Chicago's Malcolm X College, where—on a rooftop container garden—they con-



Photograph courtesy of the Chicago Botanic Garden

As a horticultural therapist, Rena Huber uses the benefits of working with plants as a medium for helping the physically and mentally handicapped.

duct another hour-long session in which senior citizens help day-care children grow vegetables. This session, like the last, is critiqued for the benefit of the staff and the interns.

Rena Huber's qualifications for her job include a degree in horticulture and a Registered Nurse's (R.N.) certificate. She is also a Registered Horticultural Therapist (H.T.R.) with the National Council for Therapy and Rehabilitation through Horticulture (NCTRH).

The NCTRH has three levels of registration, based on points earned through various combinations of study and work experience: 1) Horticultural Therapist Technician—two points, based on a bachelor's degree in a related field or an associate's degree in horticultural therapy, for example; 2) Horticultural Therapist Registered—four points, based, for example, on a B.S. in horticultural therapy, or a combination of a degree in a related field, plus a 900- to 1,000-hour internship, plus one year of paid employment; 3) Master Horticultural Therapist—six points, based on a master's degree in horticultural therapy or a related field, four years of work experience, plus workshops, continuing education courses, published articles or seminars presented.

Positions in horticultural therapy are difficult to find today, and salaries are comparatively low. However, jobs are available nationwide if a person is willing to relocate. Like other health-related professionals, horticultural therapists are often overworked, and burnout is common. Still, the rewards of providing stimulating activities for up to 50 people a week keep the highly qualified and enthusiastic horticultural therapists like Rena Huber going.

Gregory Wuthnow

Grounds Superintendent, Mt. Cuba Center, Greenville, Delaware.

A promotion from gardener to superintendent forced this horticulturist to change his priorities from growing plants to cultivating the talents of his staff.

A big step on the horticultural career ladder is to go from planting, pruning and other gardening tasks to supervising other people who do this work. Gregory Wuthnow recently took just this step.

Before his promotion, Greg was one of about a dozen gardeners at Mt. Cuba, a large estate in Greenville, Delaware. Among the estate's 80 cultivated acres is a series of gardens ranging in style from natural-

istic to formal. These include a pond garden, a woodland path, a hilltop meadow, a rock garden, a cutting garden and an extensive arboretum. Formerly, as one of four gardeners who took care of specific areas, Greg was in charge of the five-acre pond garden. Its four manmade ponds are linked by streamlets of recirculated water and surrounded by lawns and naturalistic plantings. A path around the ponds features native shrubs such as rhododendrons, leucothoes and fothergillas interplanted with native perennials, including lilies, lady's-slipper orchids and ferns.

As the pond gardener, Greg typically spent the day mowing the lawns and trimming their edges, pruning shrubs, removing dead branches and other debris from the flower beds, planting new shrubs, and doing whatever was necessary to keep the garden picturesque. During the busy summer growing season, two assistants were hired to help him.

Greg's interest in horticulture began when he was a child. After earning an associate's degree in horticulture at the University of Delaware, he found it difficult to find a job because he lacked practical experience. He heard about the Mt. Cuba job through a local gardeners' club, and was hired in 1973. When the Superintendent retired, Greg was selected as a replacement.

As the estate manager, Greg not only oversees the "section gardeners" but also a regular crew of seven who specialize in pruning, spraying, planting and some landscape designing. Some of the crew's work, such as mowing the extensive lawns or maintaining the gardening equipment and machinery, is scheduled in advance. Other work, like snow removal or repairing storm-damaged plants and structures, comes unexpectedly.

The landscaping of the estate is an ongoing process, and Greg meets frequently with the estate's owner to discuss design projects. Once, for example, it was decided that new rhododendrons would be planted. About 50 large specimens—many taller than the burliest of the gardeners—arrived on a tractor-trailer and had to be unloaded in the parking lot. It took the crew two weeks to prepare the planting sites, move the specimens and get them planted with a back hoe—all the while, keeping up with the estate's daily chores. Managing the ongoing tasks (lawn mowing, for instance), emergencies (such as fallen trees and branches) and periodic projects (rhododendron plantings, for example) requires

Greg to have a good sense of priorities. He is no longer able to become so deeply involved in a single project (as he could be when he was a section head) that he forgets about other projects or the people that are doing them.

Since the estate is so large, Greg often drives around in a station wagon to check on the progress of the work teams. As a people-oriented manager, he tries to build a sense of responsibility among the employees by giving them positive feedback as well as pointing out things he thinks could be done differently.

As a member of the staff, Greg believes the greatest satisfaction comes not only from creating picturesque gardens, but also from having responsibility, taking pride in his work and developing a sense of loyalty to the estate's owners. As Superintendent, he tries to instill these same feelings in his staff. The gardening crew's exceptional team effort won the estate the Professional Grounds Maintenance award in 1985.

Although his new assignment as Superintendent takes him away from the horticultural work he loves, Greg still keeps in touch by working along with his staff whenever possible. He knows full well that it is his years of practical experience, coupled with his associate's degree, that help make him a good all-around manager.

Dorothy Temple

Former Chief Floral Director, The White House, Washington, D.C.

The sweet smell of flowers and the satisfaction of seeing her plans take shape have been part of this florist's life, as have the tedium of answering the telephone, waiting on customers and standing up all day.

As a child, Dottie Temple used to collect old carnation flowers from a nearby grower, take them home and arrange them into bouquets. The talent she developed in floral design eventually led her to the White House, where she served Presidents Nixon, Ford, Carter and Reagan.

Mrs. Temple's first invitation to the White House came when, as Chairman of the American Academy of Florists, she was asked to do the floral designing for President Nixon's second inauguration. Later, she was asked to design for Christmas and for state dinners. When President Ford took office, Mrs. Temple was invited back frequently to decorate for lunches and dinners for Mrs. Ford and her social staff. She even decorated for Susan Ford's high school

prom, which was held in the East Room.

After President Carter came to the White House, Mrs. Temple was called on even more often to do the floral designing for dinners, receptions and holiday entertaining. In 1981, after President Reagan was elected, Nancy Reagan asked her to take over as head of the White House Flower Shop and its staff of four.

Mrs. Temple recalls that as Chief Floral Director, she received many letters of thanks from foreign heads of state, complimenting her on her floral designs. One of her favorite White House stories concerns Prince Charles's first visit to the Reagan White House: "Prince Charles was due for a morning visit to the Oval Office. His limousine entered the wrong gate and was approaching the South Portico, which had been stripped of all plants, to be replaced later in preparation for his visit to a gala that evening. The social secretary ran to me in horror. We grabbed a flat of pink geraniums and rushed to the entrance, and both got down on our hands and knees—she on one side of the walk, and I on the other—and proceeded to 'plant' the geraniums. Needless to say, we never finished on time. As the Prince stepped out of his car, there we were, in our gray flannel suits and high heels, planting geraniums. I often wonder what he thought!"

As Chief Floral Director to the White House, Mrs. Temple did what she enjoys most—planning and executing floral displays. But it wasn't always that way for her as a commercial florist. "Some of the daily activities can be humdrum and boring, like telephone answering, cleaning, accounting, flower buying and so on. But then the fun part takes over: sketching and planning for major events and holidays, and—the best part of all—seeing those plans take shape," she says.

"To run your own florist's business," Mrs. Temple continues, "it's important to have experience in all parts of the business: buying, markup, hiring help, serving customers. Good financial backing is also important."

In the current job market, Mrs. Temple feels that "there is *always* room for good designers." Education is more important as a means for developing and expressing design talent than it is as a formal job requirement. Thus, a high school diploma, a vocational certificate in floral design, an associate's degree in floriculture, or a bachelor of fine arts degree might be appropriate for different people.

Although professional floral design is hard work, the professional florist also reaps certain rewards that are less accessible to the amateur designer, such as the opportunity to meet interesting people in related fields, including art, architecture, interior design, fashion and party planning. In addition, as recognized authorities in their field, professional florists like Mrs. Temple are invited to speak, judge, consult, lead tours abroad and serve as board members of various organizations. (Mrs. Temple is currently serving on the board of the American Horticultural Society.)

In spite of all the hard work, Mrs. Temple says, "I still can't think of anything I'd rather do—giving me the opportunity to use a product of nature to enhance our home surroundings and to bring comfort, pleasure and happiness to so many people every day."

Theodore W. Stamen

Cooperative Extension Urban Horticulture Advisor, Riverside County, California.

This horticulturist makes use of several different kinds of organizational, leadership and communication skills in his work as a Cooperative Extension Agent.

While many horticulturists wear khakis or jeans to work, a jacket and tie is the uniform of Ted Stamen, Urban Horticulture Advisor for the Riverside County, California, Cooperative Extension Service. As much an executive as he is a gardener, Ted seldom has a chance to get dirt under his fingernails, since he works more with people than with plants.

County Cooperative Extension Agents interpret and disseminate the research findings of land grant universities such as the University of California. One of Ted's primary activities is to organize seminars and educational programs for amateur gardeners and professional nurserymen. For example, Ted helped pioneer the Master Gardener Program in California. Each year, about 30 volunteers, selected from all over Riverside County, attend evening classes in all phases of gardening, from botany to vegetable gardening to pesticide application. In return for the 50 hours of instruction they receive, the volunteers agree to donate 50 hours of their time to Extension programs each year. Some of them volunteer at the University's botanical garden, while others set up educational booths at shopping centers or answer telephone inquiries from people wanting to know



Theodore W. Stamen is the Urban Horticulture Advisor for the Cooperative Extension Service in Riverside County, California.

Photograph courtesy of Ted Stamen

what's wrong with their plants. "With 175,000 people in the county, one urban horticulture advisor can't be accessible to everyone," explains Ted, "but we now have eighty-five active Master Gardeners who greatly increase our interface with the public." (The Master Gardener Program is available through local Extension offices across the country.)

The Extension Service also sponsors programs for professional horticulturists. Recently, Ted organized a seminar on trees, for example. A prominent tree pathologist discussed pests and diseases, and an attorney talked about the legal implications of faulty tree maintenance, such as who is at fault if a branch falls on a passer-by. "We booked an auditorium for five hundred people, but over a thousand wanted to attend," says Ted of the program.

One reason for the success of both programs in Riverside County may be the new policy of charging participants a modest fee, something which Ted was convinced would ensure programs of high quality. "With the state budget continually being cut back, the fee allows us to offer a first-class program, which is what people want the most," he explains.

In addition to disseminating information, Ted is involved in applied research at the University of California Agricultural Experiment Station. He received a research grant from the International Society of Arboriculture to study vertical mulching (using columns of porous material in the soil) to relieve soil compaction. He is also conducting a computerized marketing survey of the gardening public to help identify who gardens, what gardeners' needs are and where they get their technical gardening information. Such studies help Extension

Agents decide how best to serve industry and the public.

Ted also writes magazine articles for the nursery and landscape industries about tree care, tree maintenance, correct planting techniques and other topics. In addition, he speaks to about 25 trade groups a year.

Ted not only organizes, conducts research, speaks and writes, he also receives a lot of mail and telephone calls. He stresses that "to be successful in Cooperative Extension, you need to want to help others and have good organizational skills, leadership ability and communication skills, and a good academic plant science background." (Ted holds a bachelor's degree in ornamental horticulture from the University of Florida at Gainesville and a master's in the same subject from the University of Massachusetts.) "One can have a good academic background but may not be able to communicate effectively with others," he notes.

An energetic individual who, at age 51, says he has found what he likes to do best, Ted is good at organizing his time and managing people. In this case, he is not actually in charge of the people he manages. "In California, Extension Agents are academic employees of the University; our pay scale is good, and we get six months' sabbatical leave every seven years," he says. "You also have the opportunity to work with and assist an industry of very fine people." 🍎

Richard M. Adams, II has a Ph.D. in horticulture from Cornell University. The first part of this series on horticultural careers appeared in the October 1986 issue of *American Horticulturist*. Adams will complete the series in the February 1987 issue with an article on educational opportunities.



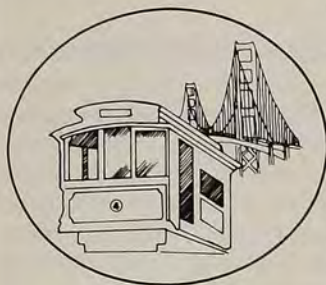
The American Horticultural Society

Bay Area Gardens of California

March 26-April 4, 1987

A Tour Designed in Collaboration with Serendipity Tours

Early spring invites us to explore California's landscape and garden design with emphasis on the work of three distinguished designers of the San Francisco Bay Area, Thomas Church, Dan Kiley, and Lawrence Halprin. During our ten day visit we will stay at the charming Julianna Hotel in the heart of the city. From here we will radiate north and south to visit celebrated public gardens and parks, private estates, the famous redwoods, vineyards, a small specialty vegetable and flower farm, and a landscaped horse breeding farm. The leaders for this trip will be Eleanor M. McPeck, garden designer, landscape historian and co-author of *Beatrix Farrand's American Landscape: Gardens and Campus* and Sue Hossfeld, Bay area resident, world traveler, and knowledgeable horticulturalist.



Spain in Private Splendor

April 12-26, 1987

A land of great beauty and history, the very name Spain provokes one's imagination. Our visit will encompass the four corners of this magical country—Barcelona, Galicia, Grenada, Sevilla and, of course, time in Madrid. Since many of the country's most interesting gardens are privately owned, we have enlisted two of Spain's leading horticulturalists to help design this exceptional tour. Private is the best word to describe what we are offering: from Arab castles, ducal palaces and monasteries to bullfights, country houses and city gardens, so much of what we will see will be opened to us exclusively. This trip will delight all those interested in such a fine blending of culture and horticulture.



Capability Brown's England

May 18-June 1, 1987

The name Capability Brown is synonymous with the magnificent open parks and woodlands of England. His influence is also felt in some of the great houses and surrounding gardens which he was responsible for architecturally and aesthetically. Our two weeks which will include Press Day at the Chelsea Flower Show, will include visits to some of these Treasure Houses, with private tours conducted by the owners or head gardeners, as well as tours of some smaller and more private estates, little known to the general public.



Emerald Gardens of Ireland

June 4-18, 1987

A Tour Designed in Collaboration with Serendipity Tours

The Emerald Isle is not as well known for gardens as her English neighbor, but Irish gardens have a wild and wonderful glory all their own. This trip is a romantic journey to some of the lost domains of Irish landscape as well as to the flourishing estates of today. The changing mood and character of the landscape will surprise us as much as our discovery of the variety and richness of the gardens we plan to visit. We begin in the Southwest with its dramatic views of sea and mountain. The second half of our trip finds us visiting gardens in Dublin and County Wicklow, "The Garden of Ireland".



These trips are sponsored by the American Horticultural Society.

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The Torchwood Family

According to the beautiful story celebrated in the Christmas tradition, gold, frankincense and myrrh were brought by three Oriental kings to Jesus Christ in the manger at Bethlehem. Such were the gifts considered fit for a King.

Frankincense has always been a rare and treasured substance. Used in early times by the Egyptians in religious rites, it also constituted part of the Jewish incense of the sanctuary and is frequently mentioned in the Pentateuch. The first-century historian Pliny "the Elder" mentions frankincense as an antidote for hemlock poisoning. In China and elsewhere in the Far East, it was used as both an internal and external medicine. Myrrh was highly esteemed by ancient Eastern and Mediterranean societies as an ingredient in costly incense, perfumes and cosmetics. It was also used in medicines and in embalming.

Burning of incense was a common practice in many ancient rituals. It is believed that the use of myrrh at the Festival of Adonis (the Greek god of vegetation and rebirth) may have given rise to the fable regarding his birth. (According to legend, Adonis was born from a myrrh tree when the bark split, or when the tree was gored by a boar.)

Both frankincense and myrrh are derived from plants of the torchwood or incense-tree family, Burseraceae. This family of trees and shrubs is most common in tropical and subtropical Africa and Malaysia, as well as in tropical America. Plants can be found growing in vast savanna areas, along coastal belts, in rain forests and in hot, dry bush veldt.

All plants of the torchwood family have many resin ducts, especially in the bark. If bruised, the bark releases tear-shaped drops of aromatic gum. This gum has been used for many centuries in the production of treasured fragrances.

Although resin ducts are omnipresent in the Burseraceae, the flower, fruit and foliage characteristics serve as the basis for classifying the various species of the family. The flowers are produced in complex branching clusters called panicles, which are crowded at the twig ends. Staminate



Marjorie Stodgell

and pistillate flowers are borne on separate plants, and are small and creamy or greenish. The fruit from which the nut is obtained is usually a drupe—a stone fruit with the seed enclosed in a stony cover that is, in turn, enclosed in a fleshy layer (as in a peach, almond or olive). The deciduous leaves of Burseraceae members are pinnately divided, that is, composed of leaflets arranged on each side of a stalk. The leaves are spirally arranged, and are usually crowded at the tips of twigs.

Frankincense can be collected from any of several plants of the genus *Boswellia*, especially *B. carterii*, a tree native to Somalia and the Hadramawt region of the southern Arabian peninsula. When incisions are made in the trunk of the tree, frankincense exudes a milk-like juice that becomes hardened when exposed to the air; heat causes the bark to release a balsamic odor. Today, frankincense is used in the preparation of incense and fumigants, and as a fixative in perfumes.

Myrrh is the product of various small, thorny, flowering trees of the genus *Com-*

miphora. An agreeably aromatic gum is obtained from *C. myrrha* and *C. abyssinica*. The fluid exuded from resin ducts when the bark is cut hardens into globules called "tears" when it is exposed to the air. Myrrh tastes bitter, and its name in Arabic reflects that characteristic.

True myrrh, *C. abyssinica*, is produced in small quantities in Somaliland. It is used chiefly as an ingredient in dentifrices, perfumes and stimulating tonics, and as a protective agent in pharmaceuticals. It is also included in official recipes of incense used in Hebrew tabernacles. The "balm of Gilead" of Arabia is the gum from *C. opobalsamum*. It is still used in some Mohammedan households in the preparation of a fragrant unguent known as the "balm of Mecca."

Also included in the torchwood family are plants that yield edible nuts or that serve as a source of timber for construction. Among these are species in the genus *Canarium*. These large trees of the tropics are common from Malaysia to the Philippines, and are also found growing in Africa and northern Australia. They attain great heights and exhibit an unusual structure; plank-like buttresses support the lower part of the trunk, from which aerial roots often hang.

Canarium species are important because they produce large quantities of edible fruits and nuts. They are also valued as a source of fragrant resins and of lumber. The only *Canarium* fruits to reach world markets are the pili nut (*C. ovatum*) and the Chinese olives (*C. album* and *C. pinela*).

Canarium ovatum, commonly known as pili nut or Philippine nut, and *C. luzonicum*, also commonly called pili nut or Java almond, are among the most important nut-bearing trees of the 75 kinds in the torchwood family. The kernels of their seeds are large enough to extract and eat as nuts. They are a prime source of fats and proteins in the diet of residents of the Far Pacific. Many people claim that the delicious flavor of the nuts is superior to that of almonds.

The Chinese white olive is another interesting member of the torchwood family.

C. album of Indochina produces a fleshy, egg-shaped fruit that is eaten like an olive. The kernel of this fruit contains an edible oil, but the hard stone makes crushing impractical.

C. vulgare and *C. indicum* are commonly called Java almonds. The nuts are eaten raw or baked, and are also used as a tasty addition to cassava puddings. Local demand absorbs the supply. In eastern Malaysia, where the coconut is scarce, fresh oil from these nuts is used for cooking.

Oil used as an illuminant is expressed from the nuts of *C. javanicum*. Commonly called the Ceylon almond, this species is native to the island from which it takes its name (now known as Sri Lanka).

In Africa, the chief food-producing species of *Canarium* is *C. schweinfurthii*. The slightly greenish outer pulp of the fruit is edible, while the nut is cooked with other foods. The wood is used in the construction of buildings and for carpentry.

The valuable resins that have been harvested regularly from *Canarium* species are chiefly Malabar elemi and Manila elemi, extracted from *C. strictum* (black dammar tree) and *C. luzonicum* (pili nut), respectively. The word "elemi" refers to a gum that is useful in medicine and in making varnish.

The species *Boswellia serrata*, Indian olabanum, is closely related to frankincense. It is cultivated in central India for its timber as well as for its fragrant resin. The wood is used for constructing buildings and for making paper, and the flowers and seed nuts are edible.

In Central America and Mexico, another species, *Bursera gummifera* (gommier tree), is the source of Mexican elemi, known locally as *cachibou* or *chibou*. The approximately 40 species of the genus *Bursera* are native to both the Old and New Worlds. *B. microphylla* is the elephant tree or torote of southwestern Arizona, southeastern California and northwestern Mexico. *B. simaruba*, West Indian birch or gumbo-limbo, is native to south Florida, the West Indies, Mexico and Central America.

As we learn more about the many practical and symbolic uses of torchwood family members through the centuries, the holiday season—with its beautiful traditions and stories about frankincense and myrrh—takes on new meaning. ♪ —Jane Steffey

Jane Steffey is an editorial advisor and a frequent contributor to *American Horticulturist*.

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Q: That's some comparison! But tell me, what's really so important about a "balanced spectrum?"

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- Annona* ah-NO-nah
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- Averrhoa carambola*
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ber-GIN-ee-ah core-dih-FOE-lee-ah
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boz-WELL-ee-ah car-TEAR-ee-eye
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BRUN-er-ah mack-row-FILL-ah
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cah-NAIR-ee-um AL-bum
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
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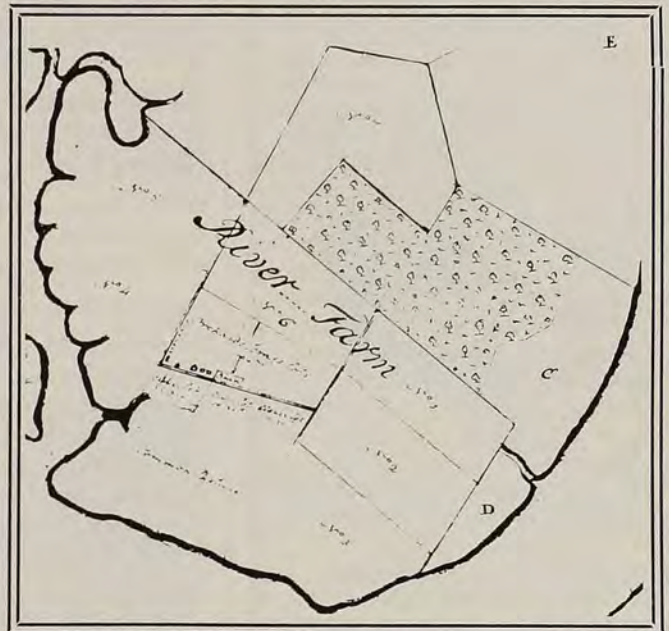
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Book Reviews

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Phyllis V. Shaudys. Storey Communications.
Pownal, Vermont. 1986. 275 pages; softcover,
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This is a book that contains suggestions for using and enjoying herbs the year round. The author has combined information from her previous book, entitled *Gourmet Gardening*, with related articles, recipes, crafts and tips from her quarterly newsletter, *Potpourri from Herbal Acres*, as well as new material into an idea-filled book that will appeal to advanced and beginning gardeners alike.

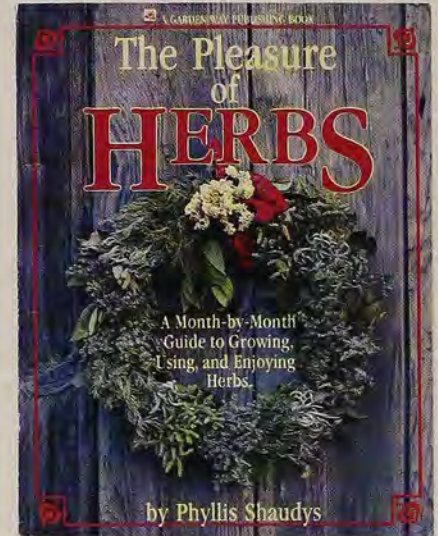
The Pleasure of Herbs contains gardening tips on the cultivation of various herbs as well as recipes for potpourris and a multitude of gourmet dishes from "Oregano Cheddar Bread" to "Chicken Simon & Garfunkel," which is prepared with what else but parsley, sage, rosemary and thyme! Numerous charts provide a wealth of information, including cultural requirements of specific species of herbs, the characteristics and uses of specific types of herbs in cultivation (the various mints, for example), and the care and handling of herbs for harvest. Directions for making herbal wreaths, herb jellies, and a number of other projects are also included.

As its title suggests, the book is organized into 12 chapters—one for each month of the year—and the projects and recipes are organized on a seasonal basis. The April chapter, for example, includes tips on spring care of herbs, a discussion of propagation methods, recipes for herbed or spiced beef, basic recipes for potpourri and a chart explaining potpourri fixatives. The appendix includes an encyclopedia of herbs, a section on growing herbs for profit, sources, reading lists and an index.

English Garden Design: History and Styles Since 1650.

Tom Turner. Antique Collectors' Club. Woodbridge, Suffolk, England. 1986. 238 pages; hardcover,
\$39.50. AHS member price, \$32.60.

This book presents an interesting new look at the design and history of English gar-



dens. Although most treatments of this subject merely divide English gardens into either a formal or informal style, author Tom Turner has analyzed the roles European garden movements have played in the development of the English garden. In this book, he describes 11 styles of gardens found in England. The book contains discussions of the various European gardening movements and their English counterparts, as well as brief explanations of the historical events that fueled the development of garden styles in England. The 11 English garden styles discussed are Enclosed, French, Dutch, Forest, Serpentine, Irregular, Transition, Italian, Mixed, Arts and Crafts and Abstract. A wealth of line drawings, landscape plans and illustrations, as well as black-and-white and color photographs, illustrate the text.

Rocky Mountain Alpines: Choice Rock Garden Plants of the Rocky Mountains in the Wild and in the Garden.

Alpines '86 Publications Committee. Timber Press.
Portland, Oregon. 1986. 333 pages; hardcover,
\$35.00. AHS member price, \$29.75.

This book is a "must" for any dedicated rock gardener. Sponsored by the American Rock Garden Society and its Rocky Mountain Chapter as well as the Denver Botanical Garden, it is a collection of articles on Rocky Mountain alpine plants by some of the world's foremost experts.

The book is divided into three parts, the

first of which is devoted to articles on the geography and climate of the Rocky Mountains, the geologic history of the region, the history of botanical discoveries, and rock gardening in the region. A second part is entitled "Wild Rock Gardens of the Rockies," and includes articles on natural areas in the northern, middle and southern Rockies, as well as the Colorado Plateau and western drylands, that are famous for their flora. Articles in this section include "Pikes Peak: America's Mountain," "The Yellowstone Region: Endemics and Other Interesting Plants," "A Rock Scrambler's Flora: Special Plants of the Colorado Rockies" and "Alpines of the Canadian Rockies."

Part Three of *Rocky Mountain Alpines* is devoted to Rocky Mountain plants in cultivation. This section features several articles on propagation and growing techniques, as well as discussions of how to grow these lovely plants in the Northeast, Midwest, Northwest and abroad.

In addition to black-and-white photographs and line drawings, this book contains numerous color plates that illustrate Rocky Mountain plants growing both in their native habitats and in gardens. An index and bibliography are also provided.

Houses of Glass: A Nineteenth-Century Building Type.

Georg Kohlmaier and Barna von Sartory. *The MIT Press Cambridge, Massachusetts*. 1986. 641 pages, hardcover, \$65.00. AHS member price, \$52.00.

This is a scholarly treatise on the architecture and history of greenhouses, conservatories, palm houses, orangeries and winter gardens, written in German by two residents of Berlin—Georg Kohlmaier, an architect, and Barna von Sartory, a sculptor—and translated into English. The authors discuss both the history of the greenhouse and the greenhouse as a building type, and also have included detailed descriptions of construction and design methods. The majority of the book, however, is devoted to an extensive catalog of over 100 greenhouses from Europe and North America. The history of each structure is included, as are technical descriptions and dimensions. The catalogue section is followed by over 200 pages of remarkable photographs and engravings of "houses of glass." A multitude of black-and-white illustrations—line drawings, photographs, etchings and site plans—are provided throughout the book.

The text of *Houses of Glass* is extensive, but also technical, so this is not a book to select for pleasure reading. (Unfortunately, the readability of the text has been greatly reduced because of the unusually small typeface that was selected.) However, this is an excellent book on the architecture and history of "houses of glass," and contains a wealth of information for the individual with more than a casual interest in these structures.

Pruning Simplified.

Lewis Hill Storey Communications. Pownal, Vermont. 1986. 208 pages, softcover, \$12.95. AHS member price, \$10.35.

Just as its title suggests, this book is a beginner-level look at how to prune a variety of woody plants. First published by Rhodale Press in 1979, *Pruning Simplified* is illustrated with simple line drawings, and includes general information on pruning methods, tools and equipment, as well as an explanation of some of the reasons for pruning, including pruning during transplanting, pruning to control size or shape, pruning for rejuvenation, or pruning for plant vigor. Chapters on pruning hedges, evergreens, ornamental trees and shrubs, fruit and nut trees, small fruits, vines and ground covers are also included.

Bromeliads: Beautiful, Impressive, and Easy to Grow.

Victoria Padilla. Crown Publishers. New York, New York. 1973. 134 pages, softcover, \$12.95. AHS member price, \$9.70.

Bromeliad fanciers will be pleased to know that Victoria Padilla's informative book on these fascinating plants is now available in paperback. An introductory chapter provides general characteristics of the plants and a brief history of their cultivation as well as nomenclature and general cultural information, while the majority of the book is devoted to descriptions of the various species in cultivation. The plants are organized by genus, and the author has provided botanical names (with pronunciations and synonyms under which the plant is sold), and descriptions of the plant and its natural habitat.

Bromeliads is illustrated with black-and-white photographs and eight pages of color plates. ● —Barbara W. Ellis

Barbara W. Ellis is Publications Director for the American Horticultural Society and Editor of *American Horticulturist*.

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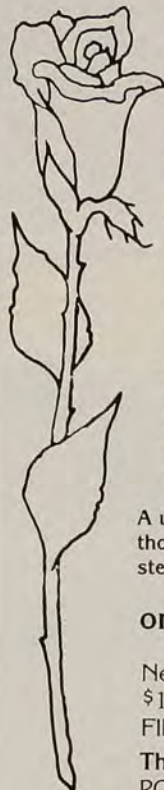
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