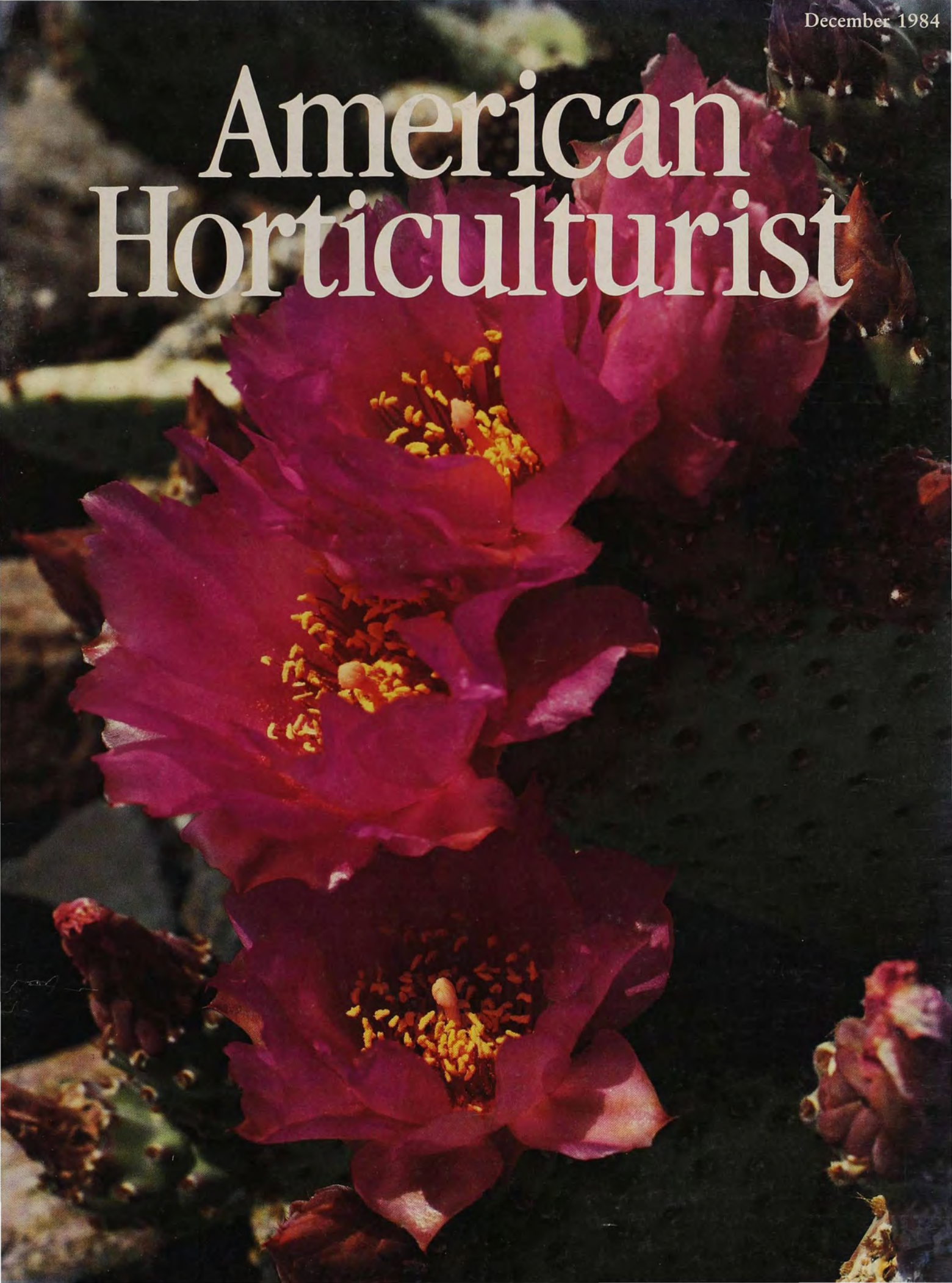
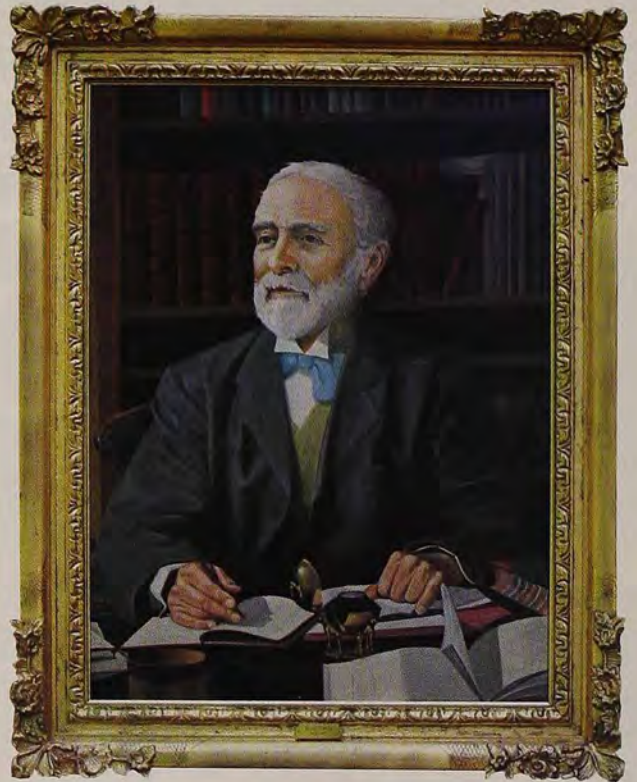


December 1984

# American Horticulturist





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Overlooking the Hudson River and the Palisades of New Jersey—and just minutes from midtown Manhattan—is a garden that is beautiful at any time of year. Join Peter Loewer for a tour of Wave Hill on page 24.

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**On the Cover:** Desert plants have a variety of ways of adapting to the harsh habitats where they are found. This beaver-tail cactus, *Opuntia basilaris*, photographed in Nevada at Valley of Fire State Park, is an excellent example of a species that must conserve water in order to survive the harsh drought and high temperatures of its native environment. To learn more about how plants conserve water, and what makes a good drought-tolerant plant for a desert garden, turn to Rich Adams' article, "Desert Natives: Adaptations to Drought," on page 14. Photograph by Pat O'Hara.

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# Help Save America's Threatened Wildflowers



Photograph by Alvin Staffan/Courtesy Ohio Department of Natural Resources

**M**any of America's most treasured wildflowers—including the beautiful lakeside daisy, *Hymenoxys acaulis* var. *glabra* (above)—are threatened with extinction. In fact, experts estimate that one-tenth 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 1985 Endangered Wildflowers Calendar. Funds raised from sales will be used to support conservation projects. To order your calendar, turn to page 9.

# Charles Huckins, Executive Director

Q. What comes to mind as the most exciting project the Society has initiated in your first year as Executive Director?

A. I'd say the Endangered Wildflowers Calendar is the most tangible new project. Response to the Calendar and to the Wildflower Rediscovery Project has been overwhelming, and I'm happy to see the Society make this big step forward into plant conservation efforts. And since we're concerned about getting the Society's message out to those who are not familiar with it, the publicity these programs have generated is gratifying. At last count, several thousand non-members had written to us for information about the Endangered Wildflower Project. Not only are we furthering the cause of plant conservation, we are familiarizing more people with other Society aims and projects.

Q. The Society's membership has grown quite a bit in the last several years. What kinds of changes can members expect to see in membership programs?

A. We're continuing to promote membership aggressively, and I'm always looking for members in good standing to help us do more of that. One of the greatest changes we've made in terms of membership is the revamping of our membership categories. In recent months, we've created new membership categories with additional benefits for membership levels above the basic dues rates. This should give members more of a sense of AHS as a *society*—a group of people across the nation who share the same interests and who can help us achieve some of our goals—promoting local and regional horticultural activities, improving horticultural education, preserving endangered and threatened plants . . . I'm also happy to report that we've changed our renewal program to avoid the difficulties advance notices cause some of our members. Although our renewal rate has always been very good, we're hoping to keep more members on board through the improved renewal system, and that's an important part of our long-term growth.

Q. AHS is upgrading its computer facil-

*"Response to the Calendar and to the Wildflower Rediscovery Project has been overwhelming, and I'm happy to see the Society make this big step forward into plant conservation efforts."*

ity. How does that tie in to the long-term growth you're referring to?

A. The Society has been providing computer services to other horticultural organizations for some years, keeping membership and plant records for them. To my knowledge, the service is unique, and has helped plant societies and botanical gardens with their administrative and scientific needs. Now that we are able to upgrade our computer capabilities, we can serve more organizations, and provide them with better, more responsive service. Our improved computer resources will also be essential to the long-term success of our Gardener's Information Service. It's critical that we keep constantly updated information on horticultural resources and events throughout the country, and the computer is the only way to do this efficiently.

Q. Now that you've had the opportunity to attend an AHS Spring Symposium and an Annual Meeting, what's your view of these national-level events?

A. I was extremely pleased with both of this year's meetings. The San Antonio Annual Meeting, with its focus on native plants and their usefulness in cultivated settings, represents the Society's interest in promoting horticultural trends of importance to the nation and of value to the gardener—and of course it enabled us to highlight the unique horticultural resources of the San Antonio area. I see the meetings as an opportunity to showcase horticulture in different parts of the country, while members learn how they might apply hor-

tical know-how from, say, the tropical parts of this country to their own locales. For example, with the Spring Symposium in Miami, there was much to learn about the care of what non-Floridians know as indoor plants. We're trying to hit topics on the cutting edge of horticulture in our meeting programs and bring our members in touch with the experts on these topics. The Spring Symposium in Los Angeles will focus on the use of drought-resistant plants, among other important subjects, and I think that's an important item to have on the Society's national agenda, given the increasing concern everywhere about the availability and quality of our water resources.

Q. We don't really have space to cover all of the Society's activities in this interview. I'd like to conclude by asking you where you see the Society going in the near future.

A. For all of our good efforts to serve the general needs and interests of horticulturists throughout the country (and, indeed, we are well represented by our members in all 50 states and territories), I believe that we could help make everyone better informed about the great value and variety of horticultural resources, particularly places of horticultural information and learning, and sources of horticultural goods and services, that exist throughout this vast and varied land of ours. Currently, the staff and trustees of the Society are developing a sponsoring membership program that will help bring these resources together. With this new program, more communication between horticultural organizations will be possible, and this will certainly benefit the home gardener as well as the professional. We're excited about offering this program to botanical gardens and arboreta, landscape and nursery firms, garden clubs and plant societies, and other horticultural organizations throughout the United States, so that we might begin serving them better. This way, we will be able to benefit not only them but the American public as well.

# The Ginseng Family

According to Chinese legend, ginseng was cultivated in heaven by the gods and brought to earth to help ease the suffering of mankind. At one time, only the emperor had the privilege of collecting this root, renowned for its fantastic powers of allaying fatigue, increasing mental capacities, prolonging life and dissolving tumors. For thousands of years the root of this herb was referred to in Oriental medicine as the "elixir of life" and the "herb that cures all." It has been credited with healing innumerable ailments, and, in some quarters, is considered both a rejuvenating antidote to impotence and a sexual stimulant.

The earliest complete Western description of Chinese ginseng can be found in an eleventh-century herbal. P. Jartoux, an eighteenth-century Jesuit missionary in China, was perhaps the first westerner to witness the gathering and use of ginseng in Manchuria. He was also the first to furnish a detailed description of the plant, which he published in transactions of the Royal Society of London in 1714. This communication created tremendous interest in the Western world and aroused speculation that the valuable root might be found elsewhere, particularly in areas of the world with a climate similar to that of Manchuria, such as Canada. Father Joseph Francis Lafitau, a Jesuit missionary who worked with the Iroquois Indians in Canada, was also fascinated by the reports about ginseng. Lafitau observed the Indians' use of a remarkably similar root in the treatment of stomach disorders and as an aphrodisiac. After searching for several months, he discovered American ginseng near Montreal in 1716.

Linnaeus gave ginseng the name *Panax*, in reference to the plant's miraculous healing powers. *Panax* is derived from the Greek word *panakes*, meaning panacea. Best known of the species in this genus is *Panax pseudoginseng* (also called *P. ginseng* and *P. schinseng*). American ginseng is *P. quinquefolius*, a name assigned by Linnaeus in 1753.

The species of ginseng found in North America is only slightly different from the plant from the Far East. *P. quinquefolius*



Block's

ABOVE: Algerian ivy, *Hedera canariensis*.  
RIGHT: *Aralia spinosa*, commonly known as Hercules'-club or devil's-walking stick.

is native to shady slopes of ravines in hardwood forests from Quebec to Manitoba, and from Maine and Minnesota, southward to the mountains of Georgia, Arkansas and Louisiana.

*P. quinquefolius* is a fleshy-rooted perennial herb, 10 to 20 inches tall. Its stems bear a single whorl of palmately divided leaves with five leaflets. A solitary stalk bears an umbel of greenish-white flowers, followed in September by bright red fruit about the size and shape of wax beans, each containing two or three seeds. Birds,

mice and chipmunks are fond of the seed.

Another species, *P. trifolius*, groundnut or dwarf ginseng, is found from Nova Scotia to Wisconsin and south to Georgia. It differs from *P. quinquefolius* in that it is smaller, has three leaflets, and produces yellow berries. It is not desirable commercially.

Samples of American ginseng root were sent to China for examination soon after the plant's discovery. Once the Chinese confirmed that the quality was satisfactory, the French in Canada began collecting ginseng from the Indians for export. Demand for ginseng grew so quickly that it became an important article of commerce in Montreal. Soon, American colonists became enthusiastic about collecting the roots. Gathering and marketing, which began on a small scale, picked up momentum when the extent of ginseng's range in the colonies became known, and the collection and sale of American ginseng became a highly profitable venture. Ginseng was first exported to China from the colonies in the mid-eighteenth century, by way of the East India Company in England. A shipload of 55 tons of ginseng sailed from Boston to China in 1773. In 1782, John Jacob Astor made the first direct shipment of American ginseng to China.

The supply of wild ginseng was much depleted during the nineteenth century because of the constant and heavy demand for the root by Chinese the world over. In addition, the plant's woodland habitat was greatly diminished by lumbering operations and by settlement.

Great quantities of ginseng roots were dug in the wild, without consideration given to the age of the plants or for replacing them, and American ginseng nearly became extinct in the wild. Ultimately, cultivated plants grown in various parts of the country became available.

Under the Endangered Species Act of 1975, the status of ginseng was considered on a nationwide basis. Lawmakers decided that the overall situation was not grave enough to warrant federal listing of ginseng as a Threatened or Endangered Species. However, under the Convention of International Trade in Endangered Species



Pamela Harper



*Fatsia japonica*, commonly called Japanese fatsia or Formosa rice tree.

Betsy R. Crowder

(CITES), export of both wild and cultivated American ginseng is still regulated on an annual basis. Exporters must have a federal permit, as well as state documents that certify that the roots were legally harvested. Much of the American ginseng that is harvested is cultivated in shaded farms or wooded areas, then exported.

The U.S. Food and Drug Administration permits the import and marketing of Chinese ginseng roots and other ginseng products provided that no nutritional or therapeutic claims are made on the labels of the products. Ginseng tea, extracts, tablets and capsules imported from three countries—Korea, the USSR and China—are sold in some American drugstores and Oriental food stores as food, not as drugs.

Since 1950, the People's Republic of China has produced the root under government supervision. Chinese and Russian researchers report having isolated five ginseng chemicals that they believe act as stimulants, tranquilizers or painkillers. Russian studies also conclude that ginseng diminishes the harmful effects of radiation; Western scientists tend to refute such claims.

Ginseng and its relatives are members of the Araliaceae, the aralia or ginseng family, which consists of 84 genera of herbs, shrubs and trees that are distributed throughout the world in both temperate and tropical regions. The chief centers of distribution are India, Malaysia and tropical America. Various vegetative and floral characteristics—for example, simple or lobed leaves, and pinnately or palmately compound leaves—distinguish the most

important genera. The juvenile forms of leaves and growth often differ markedly from the adult forms. When grown as ornamental pot plants, many different species remain in similar juvenile stages and are difficult to identify. These features contribute to the horticultural interest and value of many species.

The plant stems of aralia family members are pithy, and frequently bear spines or prickles. Leaves are usually alternate, and are often large and variously compound. Hairs on the leaves are distinguishing features of some species. In species of climbing habit, aerial roots on the stems enable the plant to cling to supporting structures. Some leaves and roots are aromatic.

Small, greenish or whitish flowers are arranged in clusters. In some instances, the sexes are on separate plants. Generally, there are five to 10 petals; occasionally, there are four. The petals are free or partially fused. There are from five to many stamens. The fruit is a drupe.

Thirty species of herbs, shrubs and trees in the ginseng family are botanically classified in the genus *Aralia*. Several of these are nearly or fully hardy in USDA Zone 5, including such woody plants as Hercules'-club, Japanese angelica tree and Chinese angelica tree.

*Aralia spinosa*, Hercules'-club or devil's-walking stick, is a clump-forming North American shrub or tree that grows to 30 feet or more. It is thickly armed with stout spines. The two common names allude to the vicious spine-covered clubs or canes that can be fashioned from the stem or

trunk. The bark of *A. spinosa* has been used for medicinal purposes. Hercules'-club is hardly a species you would think of planting as an ornamental, but the great inflorescences of creamy-white flowers the plant produces in July give it an almost exotic beauty. It is even more ornamental in the fall, when berry-like fruits of crimson or reddish-purple hues cover the plant. The suckering habit of this species may be a detraction in the garden, but *A. spinosa* can make a majestic addition to a mass of lower-growing shrubs, or can serve as an effective barrier plant.

The angelica trees—*A. chinensis* from China and *A. elata* from Japan, Korea and Manchuria—are also prickly trees. They are very handsome, with large, hairy flower clusters and large foliage. Some of the more ornamental cultivars of the two angelica trees (there are several variegated ones, for example) are more commonly grown than the species.

*Aralia cordata* is a spineless, perennial herb that grows about nine feet tall. Commonly called udo, it is grown on many truck farms in Japan. Its brilliant white, crisp, fiberless shoots have a slight turpentine flavor, suggestive of pine. The young shoots are peeled, cut into shavings and soaked for an hour in ice water in preparation for use as a salad green. Udo is also cooked somewhat as is asparagus. It is ready for eating extremely early in the spring. This hardy herb is not commonly grown in the United States.

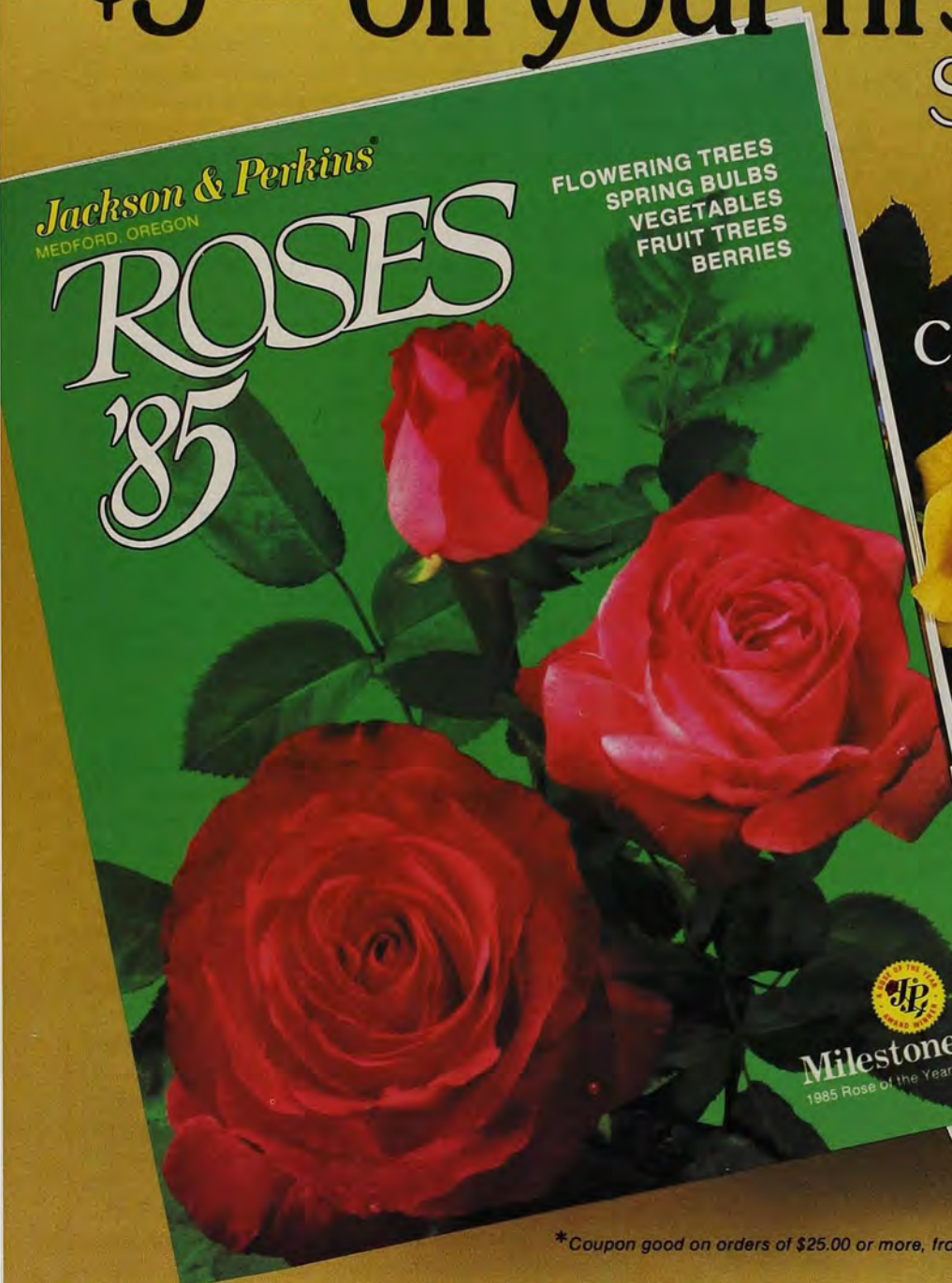
Herbaceous wild relatives of udo in the United States are wild sarsaparilla and the spikenards. *A. nudicaulis*, wild sarsaparilla, produces one long-stalked compound leaf and a naked flower stalk that arises from the underground stem. The flower stalk has three clusters of greenish flowers, which are followed by purplish-black berries. The creeping, aromatic rootstock is used in homemade root beer, and was once used medicinally as a stimulant and diuretic. Udo roots have also been used in this way. The name sarsaparilla comes from the Spanish *zarza*, meaning bramble, and *parrilla*, or little vine.

The two spikenards—*A. racemosa* and *A. californica*—differ in leaf size and in the number of flowers to a cluster. Berries of *A. racemosa* are used to make jelly; the plant's aromatic root is used medicinally or as an ingredient in homemade root beer. The name spikenard alludes to a fragrant ointment, mentioned in the Bible, that has become associated with this *Aralia* species in modern times.



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## STRANGE RELATIVES

Most of the plants florists call "aralia" belong to another genus of the ginseng family, *Polyscias*. *Polyscias* species are trees from Africa, India and the Pacific Islands, and range in height from eight to 25 feet. In the North, these plants are grown as greenhouse foliage plants, and usually reach three to six feet in height. In the tropics and subtropics, they are used outdoors as hedges and for other landscape uses. There are about 80 species; cultivated species and their numerous cultivars appear under such familiar names as Balfour aralia, fern-leaf aralia, ming aralia and geranium-leaf aralia. Generally, these plants are spineless, and are known for their fine foliage. The aromatic, compound leaves vary from species to species in size, shape and color; some are plain green, while others are variegated with white and cream mottling or margins. Flowers are rarely produced on cultivated plants. The name *Polyscias* is from the Greek words for "many" and "shade," in reference to the abundant foliage and the shade provided by the foliage.

False aralia, *Dizygotheca elegantissima*, is a straight-stemmed, willowy plant that is frequently used in interior landscaping and as a house plant. There are about 15 species in the genus, all of which are spineless shrubs or small trees. When used as an indoor tree, false aralia attains a height of three to six feet. It retains its juvenile characteristics—finely divided, red-brown leaflets that are wavy-edged and slightly lobed—under these conditions. The whorled leaves are borne at the ends of long stems.

*Brassaia* is a genus of about 40 species of trees or shrubs native to India, the Malay Peninsula, the Philippine Islands, north-east Australia and Hawaii. *B. actinophylla*—Australian umbrella tree, Queensland umbrella tree, or octopus tree—is a 40-foot evergreen. Its glossy, compound leaves may be two to four feet long; seven to 16 leaflets radiate umbrella-like from a central stalk. Flowers are small, red and crowded in clusters arranged in long, erect spikes that stand out above the foliage. The fruits that follow are purplish-red. *B. actinophylla* is the superb house plant known as schefflera. (The so-called dwarf schefflera, *Shefflera arboricola*, is in a different genus altogether, and is so new that it is not yet listed in some references.)

For generations the Japanese have been growing a sturdy plant we know as fatsia. It is *Fatsia japonica*, now a very popular plant in the West as well as in the East. In areas where winters are mild and temper-

atures rarely go below freezing, *Fatsia* can grow outdoors as a garden shrub; elsewhere, it is a much-admired and frequently used indoor plant. Its rich, one-foot-wide, glossy-green leaves are palmately lobed. The lobes are long and sharply pointed, cut beyond the middle of the leaf blade. Small, whitish flowers on long terminal stalks are followed by black berries. The name *Fatsia* is derived from the Japanese vernacular name for the plant.

*Fatsia japonica* 'Moseri'—a compact, vigorous cultivar—is one of the parents of an amazing offspring,  $\times$  *Fatsihedera lizei*, tree ivy. Also known as botanical-wonder,  $\times$  *Fatsihedera* is a hybrid between two genera. This semi-erect, vine-shrub is shrubby, like *Fatsia*. Its five-lobed leaves are much like ivy, only larger. Such intergeneric hybrids occur infrequently. The other parent is *Hedera helix* 'Hibernica', a variety of English ivy. This accidental cross occurred in the Lizé brothers' greenhouse in France shortly before World War I.

Tree ivy is a glossy-leaved, semi-climbing evergreen that can be tied to a support or can be allowed to grow as a bush. Its hardiness permits its use outdoors from Zone 7 southward. Flowers, when produced, are sterile.  $\times$  *F. lizei* 'Variegata' is a cultivar with white margined leaves.

*Tetrapanax* is a genus somewhat like *Panax*, the ginseng genus, with flower parts in groups of four (tetra). There is only one species, *T. papyrifera*. Commonly known as Chinese rice paper plant, it is a small, spineless evergreen tree native to southern China. In cultivation, it does not normally exceed 10 or 20 feet in height; as an indoor tree, it rarely grows higher than three to five feet. Fan-shaped leaves measure 12 inches across and are deeply lobed. Each lobe has strong veins and corrugations between veins. The trunk in the juvenile stage is covered with white, woolly hairs; leaves are white-felty when they first appear. Small, white flowers, which stand out beyond the foliage, are clustered in panicles almost three feet long. The white pith of the trunk and branches is extracted, cut in thin strips and pressed to make a very expensive rice paper. The paper is made into artificial flowers or used for surgical dressings and for cleaning lenses.

Ivy, the climbing evergreen that can be identified by even the least knowledgeable observer of the landscape, is also a member of the ginseng family. *Hedera* is the scientific name for ivy; the word ivy is derived from the Greek *iphyon*.

Ivies are evergreen woody plants that

have both juvenile and adult foliage forms. In the juvenile forms, leaves are palmately lobed. Flexuous stems produce aerial roots, which the vine uses to cling to any available support. The vine does not flower in its juvenile state. Ivies become shrub-like or tree-like at maturity. In the adult stage they have stiff, non-climbing, rootless stems, and the leaves are elliptic or ovate, not lobed. At this stage, ivy produces clusters of small, greenish flowers on bushy branches; rooted cuttings of this adult form produce an erect shrub, not a vine. The fruit of ivy is a small, poisonous, black berry.

Chief among the five species of *Hedera* are *H. canariensis*, Algerian or Canary Island ivy, which is much cultivated in the subtropics; *H. colchica*, Persian or Colchis ivy, which is native to regions south of the Caspian Sea, and has large, heart-shaped, dull green leaves that produce a resinous odor when crushed; and *Hedera helix*, English ivy, a woody vine native to Europe, North Africa and western Asia that is cultivated in temperate zones of the world.

Most cultivated ivies are *H. helix*. It is the most variable of all hederas, and many cultivars have arisen. Juvenile shoots mutate freely, giving rise to various foliage forms and growth habits. Such mutations are unstable and frequently revert to the original form with age. *H. helix* is now much more than a ground cover or wall drapery; ivy specialists and hobbyists have produced over 100 cultivars by propagating choice mutants.

English ivy is hardy, even in many parts of Zone 5. Moreover, ivy is an almost perfect foliage house plant. The wealth of varieties of foliage has attracted many admirers and collectors.

Not all "ivies" are ivy. A number of plants from other families carry ivy in their names, presumably because they are climbing or trailing plants. Some of these are Boston ivy, *Parthenocissus tricuspidata*; devil's ivy, *Epipremnum aureum*; Swedish ivy, *Plectranthus* species; and grape ivy, *Cissus* species.


An ages-old panacea, historic commercial ventures, and ornamentation of modern gardens are all seen in a review of the ginseng family. All of these plants contribute to the leafy greenness of our planet and to the cycle of life on it. ☉

—Jane Steffey


Jane Steffey retired last year as the Society's Horticultural Advisor. She is now an active AHS volunteer and serves as Editorial Advisor to *American Horticulturist*.

# CATALOGUE for GARDENERS

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# Book Reviews

## HERB GARDEN DESIGN.

*Faith H. Swanson and Virginia B. Rady.*  
*University Press of New England.*  
*Hanover, New Hampshire. 1984. 155*  
*pages; softcover, \$15.95; hardcover,*  
*\$30.00. AHS discount price, \$15.85*  
*(softcover), \$28.50 (hardcover) including*  
*postage and handling.*

This book is based on the premise that an herb garden should be both functional and aesthetically pleasing. More than 50 different garden designs—based on herb gardens located throughout the country—are presented. Their level of complexity varies from the very small and simple to the very large and complex. A plan is given for each garden design, including dimensions, details of construction and lists of plants. If you have ever wanted an herb garden of your own, one of these designs will certainly work for you. If you already have an herb garden, the many ideas illustrated

in this book should inspire you to change or improve your design. In addition to many specific designs, *Herb Garden Design* includes an introductory chapter describing many different garden structures, as well as a final chapter that details the actual planning and installation of a sample garden.

## SHRUBS IN THE LANDSCAPE.

*Joseph Hudak. McGraw-Hill Co. New*  
*York, New York. 1984. 292 pages;*  
*hardcover, \$34.95. AHS discount price,*  
*\$29.45 including postage and handling.*

The landscape architect who wrote this book is well known not only for the quality of his designs, but also for his extensive knowledge of landscape plants. About one-quarter of the book is devoted to basic cultivation and design principles, while the remainder is divided into three sections on needle evergreens, broadleaved evergreens and deciduous shrubs. A brief history of the use of each species in cultivation is followed by a description of growth habits and outstanding features. Where applicable, cultivar lists give further descriptive detail. An appendix with lists of plants for special applications is also very helpful. This would be a good basic reference work on shrubs were it not for the rather bad photographic reproductions included. The plates with their postage-stamp-sized illustrations might better have been eliminated altogether by the publisher and the price reduced accordingly.

## ROSES FOR AN EMPRESS.

*Josephine Bonaparte and Pierre-Joseph*  
*Redouté. Sidgwick and Jackson.*  
*London, England. 1983. 118 pages;*  
*hardcover, \$19.95. AHS discount price,*  
*\$17.45 including postage and handling.*

Empress Josephine was a lover of roses, and the flowers that bloomed in her garden at Malmaison were immortalized in the paintings of Pierre-Joseph Redouté. This is the story of Josephine Bonaparte, told through her own letters and those of her contemporaries, and illustrated with the color paintings of her roses by Redouté. This very attractive book is the perfect Christmas present for a rose lover or anyone interested in the history of gardening.

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**SCOTLAND'S GARDENS.**

G. Allen Little (editor). *Spurbooks*. Edinburgh, Scotland. 1981. 280 pages; hardcover, \$17.95. AHS discount price, \$15.85 including postage and handling.

This extensive guide is essential for anyone who visits Scottish gardens. I can vouch for its value, having recently returned from a garden tour of Great Britain, which included many choice locations in Scotland. The book contains a brief introduction to the history of gardening in Scotland, as well as stories of travelers who were responsible for the many plant introductions from all over the world. The descriptions of individual gardens are arranged geographically. While many of these are still privately owned, nearly all of them are open to the public at some time during the gardening season. The number and beauty of Scottish gardens may not be appreciated by many travelers; this book should quickly correct that oversight. Of particular interest is a chapter devoted to the problems of maintaining a large estate garden in modern times.

**BOTANY IN THE FIELD.**

Jane Scott. *Prentice-Hall, Inc.* Englewood Cliffs, New Jersey. 1984. 165 pages; softcover, \$8.95; hardcover, \$16.95. AHS discount price, \$8.90 (softcover), \$15.50 (hardcover) including postage and handling.

The title of this book is misleading. *Botany in the Field* is not a guide to the conventional study of plants in the field; rather, it is a guide to plant communities—the study of plant ecology in the field. A brief introduction regarding the effects of man

on the natural succession of plants is followed by four major chapters devoted to the interrelationships of plants in four basic communities: the various kinds of deciduous forest, as well as open lands, wetlands, and dry lands. This is a clear and well-written introduction to plant ecology intended to inform the amateur naturalist about what he sees around him and why. It would make an excellent text for an extension course in plant ecology, or simply interesting and informative reading for the inquiring nature lover.

**THE BOOK OF EDIBLE NUTS.**

Frederic Rosengarten, Jr. *Walker and Company*. New York, New York. 1984. 384 pages; hardcover, \$35.00. AHS discount price, \$29.50 including postage and handling.

*The Book of Edible Nuts* is an in-depth study of 42 different kinds of nuts. "Nuts," in this case, range from walnuts, Brazil nuts and cole nuts to sunflower seeds and water chestnuts. The history, folklore, commercial development and harvest of each crop are discussed at length. Also included is a selection of recipes that describe the basic preparations necessary to make the nuts edible. Written in the same style and with the same authority as the author's earlier *The Book of Spices*, this is an enjoyable book to expand your knowledge. In addition, it is a valuable reference work covering all aspects of nuts, with the exception of details of actual cultivation in the home garden. ☉ —Gilbert S. Daniels

Gilbert S. Daniels is the Immediate Past President of the American Horticultural Society.

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# Pronunciation Guide

The accent, or emphasis, falls on the syllable that appears in capital letters. The vowels that you see standing alone are pronounced as follows:  
 i—short sound; sounds like i in “hit”  
 o—long sound; sounds like o in “snow”  
 a—long sound; sounds like a in “hay”

*Abies mariesii* AY-beez mare-EES-ee-eye  
*Abronia villosa*  
 ab-**RON**-ee-ah vill-**OH**-sah  
*Acacia* ah-KAY-see-ah  
*Achimenes* ah-KIM-en-eez  
*Aeschynanthus hildebrandii*  
 ess-kin-**AN**-thus hill-de-**BRAN**-dee-eye  
*A. marmoratus* a. mar-mor-AY-tus  
*A. parvifolius* a. par-vi-FOL-ee-us  
*Agalmyla parasitica*  
 ag-al-MY-lah par-ah-SIT-i-kah  
*Alnus pendula* AL-nus PEN-dew-lah  
*Aloe* AL-oh-ee/AL-oh  
*Amaranthus caudatus*  
 am-ah-RAN-thus caw-DAY-tus  
*Aralia californica*  
 ah-RAIL-yah kal-i-FORN-i-kah  
*A. chinensis* a. chi-NEN-sis  
*A. cordata* a. cor-DAY-tah  
*A. elata* a. e-LAY-tah  
*A. nudicaulis* a. nu-di-KAUL-iss  
*A. racemosa* a. ray-si-MO-sah  
*A. spinosa* a. spin-OH-sah  
*Arctostaphylos* ark-toe-STA-fill-os  
*Aucuba japonica* var. *borealis*  
 aw-KOO-bah ja-PON-i-kah bor-ee-AL-iss  
*Bellonia aspera*  
 bell-OH-nee-ah AS-per-ah  
*Boea hygroskopica*  
 BO-ee-ah hy-gro-SCO-pee-kah  
*Brahea armata* bray-HEE-ah ar-MA-tah  
*Brassaia actinophylla*  
 bras-SAY-ee-ah ack-tin-oh-PHYL-lah  
*Calamagrostis arundinacea* var. *brachytricha*  
 ca-lah-mah-GROS-tis ah-run-din-AY-cee-ah  
 brack-ee-TRICK-ah  
*Canna* × *generalis*  
 KAN-ah jen-er-AL-iss  
*Ceanothus* see-ah-NO-thus  
*Cephalocereus senilis*  
 SEPH-al-o-CER-ee-us sen-ILL-is  
*Chilopsis linearis*  
 kill-OP-sis lin-ee-AY-ris  
*Chirita elphinstonia*  
 cheer-EE-tah el-fin-STO-nee-ah  
*C. micromusa* c. my-kro-MEW-sah  
*C. sinensis* c. sin-EN-sis  
*Chrysothemis pulchella*  
 cry-so-THEE-mis pul-CHELL-lah  
*Cissus* CIS-sus  
*Cleome hasslerana*  
 clee-OH-me has-sler-AY-nah



*Codonanthe carnosa*  
 coe-doe-NAN-thee car-NO-sah  
*C. crassifolia* c. cras-si-FOL-ee-ah  
 × *Codanantanthus*  
 ko-dah-nan-TAN-thus  
 × *Coltricantha* kol-tri-CAN-thah  
*Columnea erythrophaea*  
 co-LUM-nee-ah er-ee-thro-FAY-ee-ah  
*Cryptomeria* krip-toe-MEER-ee-ah  
*Cunninghamia* cun-ning-HAM-ee-ah  
*Cyclamen persicum*  
 SYKE-la-men/SICK-la-men PER-sic-cum  
*C. purpurascens* c. pur-pur-AS-enz  
*Diastema* die-ah-STEM-ah  
*Dizygotheca elegantissima*  
 diz-ee-GO-thee-kah el-e-gan-TISS-i-mah  
*Encelia* en-CEL-ee-ah  
*E. farinosa* e. far-in-OH-sah  
*Epipremnum aureum*  
 ep-i-PREM-num ARE-ee-um  
*Episcia hirsuta* e-PISS-ee-ah hir-SUE-tah  
*E. lilacina* e. lil-ah-SIGH-nah  
*Erianthus ravennae*  
 er-ee-AN-thus rah-VEN-nah-ee  
*Euphorbia* yew-FOR-bee-ah  
 × *Fatshedera lizei*  
 fats-HEAD-er-ah LITZ-ee-eye  
*Fatsia japonica* FATS-ee-ah ja-PON-i-kah  
*Fouquieria* foo-key-AIR-ree-ah  
*Fremontodendron californicum*  
 free-mont-toe-DEN-dron  
 kal-i-FORN-i-kum

*Gesneria citrina*  
 jess-NAIR-ee-ah si-TREE-nah  
*G. cuneifolia* g. cu-nee-FOL-ee-ah  
*Gloxinia* glox-IN-ee-ah  
*Haworthia* hah-WORTH-ee-ah  
*Hedera canariensis*  
 HEAD-er-ah canary-EN-sis  
*H. colchica* h. KOL-chi-kah  
*H. helix* h. HE-lix  
*Hypocyrta* hy-po-SIR-tah  
*Ilex crenata* var. *radicans*  
 EYE-lex kren-AY-tah RAD-i-kanz  
*I. sugerokii* i. sue-ger-OH-kee-eye  
*Ipomoea* × *multifida*  
 i-POH-me-ah mul-TIFF-i-dah  
*I. quamoclit* i. QUAM-oh-clit  
*Koellikeria* koh-el-li-KER-ee-ah  
*Kohleria* koh-LEER-ee-ah  
*Lindera benzoin* LIN-der-ah BEN-zo-in  
*L. umbellata* l. um-bell-AY-tah  
*Lithops* LITH-ops  
*Magnolia hypoleuca*  
 mag-NOL-ya hy-po-LEW-kah  
*M. obovata* m. oh-boh-VAY-tah  
*M. salicifolia* m. sa-li-si-FOL-ee-ah  
*Mesembryanthemum*  
 mezz-em-bry-AN-thee-mum  
*Mimulus* MIM-you-lus  
*Miscanthus* mis-CAN-thus  
*Nautilocalyx* nau-ti-low-CAY-licks  
*Nelumbo nucifera*  
 nel-UM-boh new-SIFF-er-ah

*Nematanthus wettsteinii*  
ne-ma-TAN-thus wet-STEIN-ee-eye

*Nerium oleander* NEAR-ee-um ol-ee-AN-der

*Niphaea* ni-FAY-ee-ah

*Nymphaea tetragona* var. *tetragona*  
nim-FAY-ee-ah te-tra-GO-nah  
te-tra-GO-nah

*Oenothera deltooides*  
ee-no-THEER-ah del-toe-EYE-deez

*Panax ginseng* PAN-ax GIN-seng

*P. pseudoginseng* p. su-do-GIN-seng

*P. quinquefolius* p. quin-que-FOL-ee-us

*P. trifolius* p. try-FOL-ee-us

*Parkinsonia aculeata*  
park-in-SO-nee-ah ah-cul-EE-ah-ta

*Parthenocissus quinquefolia*  
par-then-o-sis-us quin-qui-FOL-ee-ah

*P. tricuspidata*  
p. tri-cus-pid-AY-tah

*Pennisetum alopecuroides*  
pen-is-EE-tum ah-lo-pe-cure-oh-EYE-deez

*Phimaea* fi-NAY-ee-ah

*Pinus strobus* PY-nus STRO-bus

*Plectranthus* plek-TRAN-thus

*Polyscias* po-LIS-ee-us

*Populus fremontii*  
POP-yew-lus free-MON-tee-eye

*Prosopis* pro-SO-pis

*Pseudotsuga menziesii*  
sue-doe-SUE-gah men-ZEES-ee-eye

*Pterocarya rhoifolia*  
ter-oh-CARY-ah rho-ee-i-FOL-ee-ah

*Quamoclit pennata*  
QUAM-oh-clit pen-NAY-tah

*Q. × sloteri* q. SLOT-er-eye

*Rechsteineria leucotricha*  
rek-stein-AY-ree-ah leu-co-TRI-cah

*Rhododendron japonicum*  
ro-do-DEN-dron ja-PON-i-kum

*Rhus typhina* ROOS ty-FY-nah

*Ricinus communis*  
ry-SIN-us com-MOON-iss

*Saintpaulia* saint-PAUL-ee-ah

*Sasa* SA-sah

*Schefflera arboricola*  
chef-LAIR-ah ar-bor-i-CO-lah

*Seemannia latifolia*  
see-MAN-nee-ah lat-i-FOL-ee-ah

*Sequoiadendron giganteum*  
see-quoy-ah-DEN-dron ji-GAN-tee-um

*Sinningia canescens*  
sin-NIN-gee-ah kah-NESS-enz

*S. cardinalis* s. card-in-AY-liss

*S. concinna* s. con-SIN-nah

*S. pusilla* s. pu-SIL-lah

*S. speciosa* s. spee-see-OH-sah

*S. sylvatica* s. sil-VAT-i-kah

*Smithiantha* smith-ee-AN-thah

*Streptocarpus saxorum*  
strep-toe-CARP-us sax-OR-um

*Taxus* TAX-us

*Tetrapanax papyriferus*  
te-tra-PAN-ax pa-pee-RI-fer-us

*Tilia cordata* TILL-ee-ah cor-DAY-tah

*T. japonica* t. ja-PON-i-kah

*Tsuga diversifolia*  
SUE-gah di-vers-i-FOL-ee-ah

*Wisteria* wis-TEER-ee-ah

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Richard M. Adams, II

# DESERT NATIVES:

## *Adaptations to Drought*

BY RICHARD M. ADAMS, II

From inside the Plexiglas bubble of a helicopter, a typical residential area of southern California looks like a miniature railroad landscape. Stands of trees and shrubs blend together like patches of multicolored green shag against a background of drought-browned native scrub the color and texture of particle board. The sparse greenery, confined to areas around buildings and to moist valleys, appears to be the work of a miniature railroader who ran short of allowance and left most of his train table bare.

The limiting factor here is water. The patches of green are mostly exotic vegetation that is too water-thirsty to exist here on its own and survives only because it is within reach of hoses and sprinkler systems. These bluegrass lawns, bamboo hedges and marigold borders—well suited to the moist East Coast but foreign to the arid Southwest—consist of the plants people brought with them when they moved west to enjoy the perennially fair weather.

Fair weather means little rainfall, so keeping the imported jungle luxuriant re-

quires the regular hiss of lawn sprinklers, the chatter of Rainbirds atop water pipes and the trickle of drip irrigation systems. Irrigation requires water, and southern California imports water by the riverful—from the north via the California Aque-

ABOVE: *Agave victoriae-reginae*, a native of Mexico, has succulent leaves that help it conserve water. RIGHT: Many species of monkey flowers, *Mimulus* sp., are desert annuals. The 150 species in the genus are distributed in South Africa, Asia, Australia, and North and South America.





duct, a 400-mile-long concrete channel, and from the east, from the Colorado River along the California-Arizona border.

Still, California is running out of its reliable sources, and water is becoming more expensive. Since about half the water used by many single-family homes in the Southwest goes to the landscape, homeowners and landscapers should be looking for ways to reduce the need for irrigation. One solution is to switch from water-thirsty plants that are foreign to the desert, to drought-tolerant natives.

The southwestern United States and other arid regions abound with plants that are drought-resistant *and* beautiful. These little-noticed species fill the landscaper's knowledgeable palette with a variety of sizes, shapes, colors and textures. Gardening with water-conserving plants may one day become very popular in the Southwest—and with good reason.

## Climate

Why is the Southwest, including southern California, so arid? Circling the globe at approximately 35 degrees north and 35 degrees south of the equator are two permanent bands of high atmospheric pressure, dubbed the “horse latitudes” by sailors in times past, since the lack of wind often stranded sailing ships and forced the crew to sacrifice livestock. These high-pressure regions tend to exclude storm systems and help create the continually fair weather of the world's deserts. The southwestern United States falls within the horse latitudes part of the year, as do many other well-known arid regions: the Sahara Desert, the Gobi Desert, the Mediterranean region, South Africa, much of Australia and part of South America.

Mountains, with their “rain shadow” effect, also help exclude storms. As air rises, it becomes cooler and cannot hold as much moisture; as storm systems pass over mountains, they cause most of the rain to fall upwind of the mountains, leaving the downwind sides dry. Many deserts fall not only within the horse latitudes but also downwind of mountains. For example, California's Mojave Desert, home of the Joshua tree, lies downwind of the San Gabriel Mountains.

## Adaptations to Drought

How do plants of arid regions survive with little water? Of all the water absorbed by a maple tree, approximately 90 percent passes directly through the plant, evaporating from the leaves. Although this process—called transpiration—cools the leaves, it uses lots of water. If you have ever been unable to hold onto a car door handle in the hot sunlight but pinched a cool sprig



Richard M. Adams, II

*Aloe dichotoma*, a tree aloe from South Africa, growing in the University of California, Riverside Botanical Garden. It is one of many drought-tolerant leaf succulents in the family.

of mint in the same hot sun, you can appreciate the cooling value of transpiration.

Plants native to arid regions cannot afford to transpire as much water as their northern cousins. In order to preserve this limited commodity, they have evolved various adaptations for storing water, reducing water loss, increasing water uptake, or growing only when water is available.

## Storing Water

**Succulent Plant Habit.** A thin leaf, like that of a maple, has a large surface but little tissue inside. This allows it to absorb carbon dioxide rapidly, transpire water and cool itself efficiently, and thus grow quickly. On the other hand, thick, succulent leaves, like those of a jade plant, contain much more tissue in relation to the enclosing surface. Unlike the maple leaf, they are “small on the outside,” reducing the surface from which water evaporates, and “big on the inside,” where water is stored. (Ecologists call this a low “surface-to-volume ratio.”) Therefore, a jade plant stores more water and loses less of it than a maple tree. This adaptation allows a jade plant to grow in areas that are too dry for maples.

In addition to jade plant, *Crassula argentea*, there are many other members of the Crassulaceae, or stonecrop family, with succulent leaves, including sedums and echeverias. The mesembs, such as ice plants (*Mesembryanthemum* spp.) and living-stones (*Lithops* spp.), are succulent plants in the Aizoaceae, or carpetweed family.

*Aloe* spp. and *Haworthia* spp. are also examples of succulent plants.

When the whole plant—not just the leaves—is succulent, it can store even more water and lose less of it. “Stem succulents,” such as the cacti, have evolved so that their stems have greened and taken over photosynthesis. In many cases, these plants have lost their leaves. The ribbed structure of many stem succulents allows them to expand as they take up and store water, and to contract as the water is used—all without damaging the plants. In addition to the cacti family members, which are from the Americas, many of South Africa's succulent *Euphorbia* species and carrion flowers (from the Asclepiadaceae) exhibit this type of plant habit.

Other desert plants that are not succulent have a low surface-to-volume ratio. The Southwest's palo verde tree, *Parkinsonia aculeata*, whose common name is Spanish for “green stick,” has green branches and twigs but only tiny leaves. **Reducing Water Loss.** Desert plants have evolved a variety of seemingly clever adaptations for reducing water loss that involve stem and leaf surfaces.

The waxy covering on the leaf and stem surface, called the cuticle, is thicker and waxier in desert plants than in plants of moister environs. The cuticle seals the leaf, ensuring that water transpires only through the leaf pores or stomates.

Leaf hairs, spines and other projections act like windbreaks, by slowing the wind. (Wind makes water transpire faster.) They also help create a layer of stagnant air around the leaf called a “boundary layer,” which helps retain water as if the leaf were enclosed in a plastic bag. Oleander, *Nerium oleander*, exhibits a slightly different adaptation. It has leaf pores or stomates that open into sunken areas on the leaf surface, called “stomatal crypts,” which shield the stomates from wind.

Some plants also have light-reflecting adaptations that provide protection from the sun. Light-colored hairs, waxes or scales on leaves and stems all serve to reduce the amount of sunlight that strikes a plant. Since reflecting reduces heat buildup, plants that exhibit this adaptation need less water to transpire for cooling. Light-reflecting adaptations, which are found in many species, are notable in Mexican blue palm (*Brahea armata*), California brittlebush (*Encelia farinosa*) and old-man cactus (*Cephalocereus senilis*).

Wilting—a common problem in hot, dry climates—can cause permanent damage in plants. Many shrubs and trees native to arid regions have protected themselves by developing leaves that are too stiff to wilt. California lilac (*Ceanothus* spp.), man-



Richard M. Adams, II



ABOVE: *Stapelia gigantea*, commonly called Zulu-giant or giant toad plant, is a stem succulent from South Africa. Its ill-smelling flowers attract flies as pollinators. LEFT: Sand verbenas (*Abronia* spp.) are desert annuals native to Western North America. They appear only when water is readily available.

Pat O'Hara

zanita (*Arctostaphylos* spp.), Australian mimosa (*Acacia* spp.) and proteas (Proteaceae) all have these "sclerophyllous" leaves of hardened tissue. These hard, stiff leaves have very thick-walled cells and reduced intercellular spaces.

Almost all succulents, as well as many non-succulent plants from arid regions, have evolved a mechanism for opening their stomates and absorbing carbon dioxide—the raw material of photosynthesis—at night; accomplishing this vital process when the air is cool and damp minimizes water loss. These plants store carbon dioxide as more complex compounds than do most plants. During the day, when light is available, the stomates close and the plant photosynthesizes the stored carbon dioxide. This adaptation, called carboxylic acid metabolism (CAM), is found in many unrelated

plant families.

**Increasing Water Uptake.** Instead of forming the typical root ball associated with most plants, many cacti have shallow roots that fan out just beneath the soil surface. Thus, they can rapidly absorb water when an occasional quick shower falls on the desert.

Other plants, such as mesquite (*Prosopis* spp.), desert willow (*Chilopsis linearis*), and cottonwood (*Populus*), grow in desert washes where subsurface water may be far beneath the surface. They grow long taproots that allow them to sip subsurface water.

**Seasonal Growth.** Many plants grow only when conditions are favorable. Seasonal growth is a strategy exhibited by many desert shrubs, which turn brown and may look dead in the summer but turn a verdant

green after extended rains. These include many scrub and chaparral plants like the sages (*Salvia* spp.), brittlebushes (*Encelia* spp.) and monkey flowers (*Mimulus* spp.). The spindly, thorny ocotillos (*Fouquieria* spp.) of the Southwest shed their leaves during times of drought but quickly grow new ones after sufficient rainfall. Leaves are a plant's biggest water-loser, and these "drought-deciduous" species conserve water by shedding their leaves in dry weather.

Like ostriches with their heads in the sand, many bulbous perennials go underground during the driest part of the year. The members of the Amaryllidaceae, or amaryllis family, are just one example. An underground bulb of stored food and water sustains them until the rainy season, when leaves sprout and the plant flowers.

Another kind of plant "lives" only when conditions are favorable. As if living on borrowed time (actually, previous rainfall), desert annuals grow, flower, set seed quickly and die. The seeds of these plants—which include the desert evening primrose (*Oenothera deltoides*), sand verbena (*Abronia villosa*) and many others—contain germination inhibitors that prevent sprouting; only when sufficient rainfall leaches out these inhibitors (sometimes after several years) do the seeds germinate.

## Design Use

These forms and adaptations of drought-resistant plants bring to mind various possibilities in the water-conserving landscape: a bed of bulbous perennials—a riot of color in spring—disappearing into dormancy in the dry summer; a cactus garden with year-round interest and water economy, occasionally surprising the visitor with its colorful flowers; a hedge or background of sclerophyllous-leaved shrubs, blooming and remaining green throughout the summer; a shade tree of velvet-leaved *Fremontodendron californicum*, which survives all year on natural rainfall, or of Fremont cottonwood (*Populus fremontii*), which reaches with deep taproots for subsurface water.

Some nurseries, garden centers and landscape architects in the Southwest can help in the design of a water-conserving landscape. The main rule in such a design is to minimize lawns and emphasize water-conserving ground covers, shrubs and trees.

To design your own landscape, consider the functions it must serve—for example, screening, ornament, recreation, production of edibles—and look for plants that meet your requirements. How high, wide, and fast will a plant grow? What makes it attractive? Foliage, flowers or fruit? When is it attractive? All year, or a certain sea-





Richard M. Adams, II

son? What are a plant's problems? Aggressive roots, messy fruit drop, insect or disease susceptibility, or others? How will one plant harmonize with another aesthetically and culturally? Do all plants need the same amount of water (for example, those watered by the same sprinkler)? You can find the answers to these questions by reading books and catalogs, looking at pictures in magazines and references, and visiting nurseries and botanical gardens to see live specimens.

## Culture

**Planting.** Nursery stock is available in convenient containers and sometimes as economical bare-root stock. Plant in the fall to ensure the greatest chance of survival. Unestablished plantings, even of drought-resistant plants, may require watering every day in the summer.

A layer of mulch over soil helps save water, keeps plant roots cool and controls weeds. It also helps preserve soil structure,

which tends to be broken down by sprinkler spray.

**Drainage.** Most water-conserving plants do poorly or die in waterlogged soils, and therefore, need good drainage. A well-drained soil will absorb at least half an inch of water per hour.

On level sites, poor drainage may be caused by an impervious layer in the soil—a subsurface “hardpan.” To get good drainage, break through the hardpan with deep planting holes, make dry wells or plow deeply. Or, mound up well-drained soil several feet high for planting.

Clayey topsoil may be poorly drained, but clay can be flocculated into larger-sized particles by adding gypsum and long-lasting organic matter such as fine pine or fir bark. The subsoil must be well drained.

Sandy soils, which can be too well drained, will hold more water if you add organic matter, such as peat or fine bark.

**Watering.** Your irrigation can easily be halved by landscaping with water-conserving plants. Apply water slowly and evenly to avoid run-off and evaporation. (Drip irrigation systems water deeply and thoroughly while saving water.) Water only when the plants need moisture, rather than on an automatic schedule. Check the subsurface soil for moistness, and look for any wilted plants.

**Weed Control.** Weeds that cannot grow under dry conditions may be a problem in an irrigated garden, even if it is conservatively watered. Pre-emergent herbicides have recently been developed that prevent the germination of seeds without affecting established plants (when applied at the proper rates). These herbicides are useful in beds of ground covers or plantings of succulents where weeds are hard to control. Sold in granular or wettable-powder formulations, pre-emergent herbicides last several months.

For controlling established weeds, post-emergent herbicide sprays save labor in weeding and hoeing. These chemicals kill all higher plant life with which they come in contact; even unseen, drifted spray can damage desirable plants. Special wick applicators make it easier to treat weeds in ground covers. ☉

The American Horticultural Society's Spring Symposium, to be held March 20-23 in Los Angeles, will feature drought-tolerant plants and gardens, among other topics of interest to Sunbelt gardeners. For more information on the program, write to Robin Williams, American Horticultural Society, P.O. Box 0105, Mount Vernon, VA 22121.

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LEFT: Cacti such as this beaver-tail cactus, *Opuntia basilaris*, are among the most drought-tolerant of plants. ABOVE: *Lampranthus primivernus*, a member of the Aizoaceae, is a native of South Africa. It has succulent leaves and makes an excellent ground cover for desert gardens.

# One Day in the Mountains

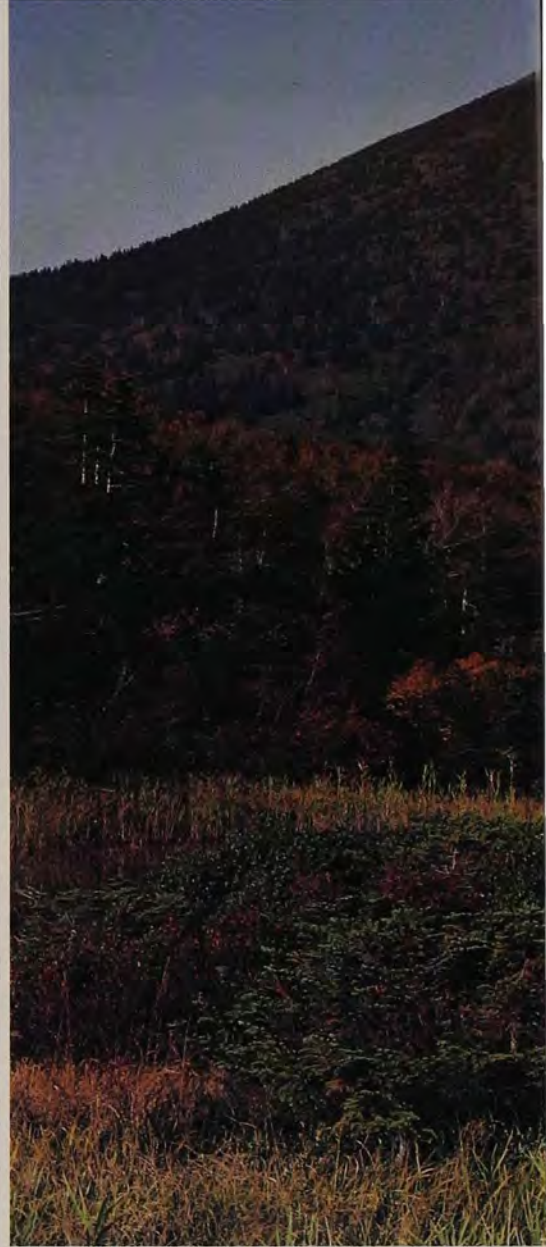
TEXT AND PHOTOGRAPHY BY DR. JOHN L. CREECH

**T**he United States Department of Agriculture's plant-collecting team had just ended a 2,200-mile trip through Hokkaido, Japan's northern-most island. They had been gathering seeds and plants that would be of particular value in the development of improved trees and shrubs for the colder parts of the United States. I had just completed a visit to Sapporo, capital of Hokkaido, where I had been gathering information on Louis Boehmer, a little-known horticulturist who worked for an American mission in Hokkaido in 1872.

Before we left the U.S., we had arranged to meet and make a short collecting stop at Mt. Hakkoda. We met at the port of Hakodate on Hokkaido and were ferried over to Aomori, a city on the northern tip of the island of Honshu. At Aomori, we rented a van and met our Japanese colleague, Dr. K. Mochida, head of the Hakkoda Botanical Laboratory of Tohoku University. The team now consisted of Dr.

Mochida; Dr. Max Kawase of the Ohio Agricultural Research and Development Center, who served as leader of the expedition; Dr. Frederick G. Meyer, botanist, and Mr. Sylvester G. March, horticulturist, both of the U.S. National Arboretum; and myself, retired director of the U.S. National Arboretum. The date was October 8, 1982—about the peak of the seed-collecting season at Hakkoda-san. (Japanese mountains are usually given the honorific title *san*.)

Hakkoda-san, our destination, is a 1,600-meter-high (about 5,200 feet) mountain to which many foreigners have come to collect plants over the years. Professor C. S. Sargent of the Arnold Arboretum, and Charles Maries, a British plant explorer, collected here in the late nineteenth century, and E. H. Wilson of the Arnold Arboretum visited in 1914. I had collected on Hakkoda-san in 1955 with the famous Japanese botanist H. Takeda, and again in 1961. For the other members of the team,



ABOVE: Mt. Hakkoda at the height of the seed-collecting season in autumn. BELOW: Members of the plant-collecting team gather *Tilia* fruits and branches for herbarium specimens.



it was the first visit. But Meyer, March and I had worked together in similar mountain habitats in Japan on several earlier occasions. In addition, Kawase, Meyer and March were fresh from their collecting work in Hokkaido. There was plenty of experience on the team.

Dr. Kawase had established a number of target species for collecting, including *Abies mariesii*, a handsome, high-mountain fir; *Tilia japonica*, a fine, round-headed shade tree species not cultivated to any extent in the United States; and *Rhododendron japonicum*, a red-flowered azalea whose northern limit of natural distribution is Hakkoda. (More and more, collectors and plant breeders are recognizing the importance of collecting from various pre-selected localities within the total range of a promising species. This method of collecting enables breeders to take advantage of the individual variation within a species—such as unusual cold hardiness at the northern portion of a plant's range—when

developing plants for landscape purposes.) We also planned to collect other species we encountered if they were fruiting and looked promising.

Hakkoda-san is part of the Towada-Hachimantai National Park, and consists of eight dormant volcanoes that are covered with mixed conifer-deciduous forests and alpine bog communities. There are numerous hot springs and spas in the area, the most famous and probably the largest of which is Sukayu, a meandering collection of buildings on several levels, complete with restaurants, shops, overnight accommodations and large communal hot spring baths. Although we stayed at the nearby botanical laboratory, we ate and bathed at the Sukayu Onsen. Meals were also brought over to us. Sukayu operates during the spring and autumn months, but closes down in winter when the snows reach impassable depths. However, this was a weekend at the peak of the fall color, so everything was operating at full capacity,

and the road from Aomori was clogged with cars.

On our drive to Hakkoda-san, we jotted down notes on places where the collecting promised to be rewarding. It was afternoon when we reached the laboratory, so we stowed our gear and made a survey of the area. In a nearby bog called Suirenuma, we gathered seed of *Ilex crenata*, the common Japanese holly; *I. sugerokii*, an evergreen holly similar to *I. crenata* but with red fruit; and *Alnus pendula*. Lower down at Tsutanuma (*numa* means bog—in this case, *tsuta*, or ivy bog), we found plenty of seeding plants of *I. crenata* var. *radicans* (a decumbent form of Japanese holly), *Magnolia hypoleuca* (formerly *M. obovata*) and *Aucuba japonica* var. *borealis*—all of interest either for direct use or for breeding. When we returned to the laboratory at dusk, bad news awaited us: a typhoon was now off the coast of northern Honshu, and rain and high winds were forecast for the next day.

Saturday, October 9, dawned with the expected leaden skies, some wind, and rain showers, but the weather was not bad enough to halt our fieldwork. We loaded the van and descended to Kayankogen, a parkland, where we had observed *Tilia japonica* the previous day. This linden is a close relative of the European linden, *T. cordata*. The Japanese linden is a handsome, round-headed tree that should be more desirable than the European linden, because it reaches only 60 feet at maturity. (The European linden grows to 90 feet.) Nurserymen are always interested in small trees for residential landscaping. *T. japonica* grows in temperate forests throughout Japan, but we were in the northern part of its range, so the plants collected here would be more cold-hardy than plants from farther south. In Japan, the linden is used for building material, and in earlier times, the tough inner bark was woven into rope. An excellent honey tree, it is admired for its fragrant flowers and golden fall color. Unfortunately, the Japanese linden is not available in American nurseries at this time.

So here we were, an eager team in a parkland naturally landscaped with scores of specimen trees of *T. japonica*, at just the right time for a bountiful seed crop. At first we were apprehensive, because the closest trees were barren, but as we moved deeper into the park, the trees were well fruited. The park was a curious sight that day; it was occupied by scores of student land surveyors carrying out practical examinations. Campsites, transit lines, tapes, judges' tables and hundreds of surveyors were everywhere. Wandering through this confusion were five plant collectors snipping branches with pole pruners, stuffing seeds in canvas bags and wrapping herbarium specimens in newsprint. But we respected each other's purposes, and our team was rewarded with an excellent crop of *T. japonica* seed.

We retraced our route to the top of Hakkoda-san, stopping at several sites along the way to collect specimens. One such site was Kanzuigawa, at an altitude of 730 meters (about 2,400 feet). We dispersed to collect in the sparse woods bordering the road. Dr. Meyer returned with a number of specimens, including both fruit and cuttings of a great find: the yellow-fruited form of *Lindera umbellata*. This species, a relative of our native spicebush, *L. benzoin*, is the only Japanese species of this genus found in northern Japan. Like all

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TOP RIGHT: Pine, holly, azaleas and *Vaccinium* sp. display brilliant autumn color at the edge of Mt. Hakkoda's bogs.  
BOTTOM RIGHT: Team members had to use a telescopic pole pruner to reach and collect seed.







species of spicebush, the fruit is normally black at maturity. Such yellow-berried plants are of interest for landscape purposes. Since we could find only one reference to the yellow-fruited type in the literature, it was an exciting collection both botanically and horticulturally.

At this stop we also collected female plants of the decumbent *Aucuba japonica* var. *borealis*, which occurs only in northern Japan and is an excellent plant for use as a coarse evergreen edging. Ample seed of *Magnolia salicifolia*, a small pyramidal tree that grows to 30 feet, was also on hand. It was exciting to find this species in fruit, especially at the far northern limit of its range. Japanese villagers enjoy this magnolia because it has fragrant bark and pure white flowers, and is a harbinger of spring.

In the afternoon the sky had cleared, and we drove down to a small river called Oirase-gawa. Open, sunny stream banks, edges of woods and newly cut roads are usually productive collecting sites (deep forests tend

to be rather unproductive), so we stopped along the roadside at the edge of a wooded site near the river. Here, we gathered seeds of the Japanese wingnut, *Pterocarya rhoifolia*, a tree that grows to 75 feet and bears winged nuts in long, necklace-like catkins. We then made our way to the river. Collecting here was out of the question, however, as the water was bordered by tall hemlocks and beech, oak and ash trees, so we decided to head back to Hakkoda.

“Skip” March wanted to collect the diminutive water lily with white flowers, *Nymphaea tetragona* var. *tetragona*, for the National Arboretum’s water plant collections. We had seen it the previous day, and although we had full authority to collect, it would not have created a good impression to do so in front of the public. So at dusk, as the cold fog began to settle, we stopped the van near the vast sphagnum bog below the laboratory. Dr. Mochida knew of several interior pools in the bog where we could find the plant. Reaching these pools required sloshing through the bog and across holly-rhododendron thickets for several hundred yards. The light had faded quickly, and the sounds of the highway had ceased. If any of us had lost our way here, it could have been quite serious, as the temperature was barely above freezing. When we arrived at a pool, which was perhaps eight feet across, it was impossible to reach the plants. Dr. Mochida stripped to his underwear, slipped into the icy water and extracted some roots from the mud. He quickly dressed and led us back to the now-darkened road. After returning to the laboratory, we accompanied Dr. Mochida to the Sukayu hot spring bath to soak away the chills. As we bathed, we praised Dr. Mochida for his courage.

Work was, of course, still far from finished. The plants we had collected had to be washed free of soil, cuttings needed to be prepared and wrapped in damp sphagnum, and seeds had to be cleaned of fruit and packaged for shipping. Some seed required special handling; acorns, for example, must be shipped in moist moss, because they usually germinate en route. In addition, the field notes had to be completed for each collection, and labels—with names, appropriate field numbers, and special instructions for the propagators at the Arboretum—had to be prepared. (Ultimately, all living collections were sent by air mail to the USDA Quarantine Facility at Beltsville, Maryland.) Meanwhile, Dr. Meyer worked on his herbarium material, completing his field notes and drying the specimens, which would be sent to the University of Tokyo Botanical Garden for final processing and shipment to the National Arboretum. All these tasks had to

be completed every evening of every day there was fieldwork, and no one left for bed until they were all finished.

On the final day, October 10 (Sunday), we scheduled our departure for early afternoon. First, however, we had to collect the fir *Abies mariesii* and the hemlock *Tsuga diversifolia*, both of which occurred at the summit of Tamoyachidake (at 1,300 meters or about 4,200 feet). By now, the wind had died down, so we took the ropeway. We could see a solid stand of fir and hemlock below the cable car, but from the summit we had to work our way down to the trees. Penetrating shoulder-high *Sasa* bamboo—still partially iced—proved to be a real struggle. Everyone tripped and fell down the slope to where the conifers dominated the bamboo thickets. Then we had to crawl along the slanted moss floor or resort to aerial acrobatics on the interlaced hemlock branches. Occasionally, we had to pop up like ground squirrels to keep track of each other. Despite the difficulties, we discovered many hemlock cones and managed to gather an ample supply. We returned to the summit by pulling and thrashing our way up through the bamboo, to the amusement of sightseers looking down from above.

At the summit, we found a number of fine specimens of *Abies mariesii*, with cones still not shattered. These trees yielded to the climbing skills of March and Mochida. Thus having fulfilled our objectives, we returned to the laboratory, completed the necessary final packing, and took some photographs of the scenic green, gold and scarlet vegetation for which Hakkoda is famous. We then drove down the mountain, held a farewell dinner with Dr. Mochida, and boarded the night express from Aomori to Tokyo. We were typical examples of what the Japanese call *henna gaijin* (strange foreigners), carrying our 25 pieces of baggage in relays to the train. In all, we had gathered some 52 collections of significant plants, together with 44 herbarium collections, at this short stop at Hakkoda-san.

The results of our trip will be shared with the sponsoring institutions—the U.S. National Arboretum, the Chicago Botanical Garden, and the North-Central Regional State Experiment Stations. The success of our “one-day-in-the-mountains” may not be immediately apparent, but it will no doubt be revealed in the years to come. ☉

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Dr. John L. Creech is a past president of the American Horticultural Society and former director of the U.S. National Arboretum. A world-renowned authority on azaleas, he is co-author of the recent Japanese reprint of *A Brocade Pillow: Azaleas of Old Japan*.

# Wave HILL

BY PETER LOEWER

**T**he night before our first visit to Wave Hill was spent fighting a traffic jam on the Henry Hudson Parkway and driving in circles for what seemed like hours in search of a place to park for the night. Next, my wife and I stepped nimbly around mounds of garbage that lined many Manhattan streets, and partially digested an overpriced and unusually tasteless meal in a Greenwich Village restaurant. The damp heat rose from the city streets; concrete had been soaking up the sun for months, and this September night lacked both breathable air and cooling rain.

After a mostly sleepless night filled with the sounds of traffic and low-flying aircraft, we picked up the car. Soon we were directly involved in the New York City rush hour, playing a three-dimensional video game with a bumper-to-bumper line of cars, all searching for a way to drive on what's left of the West Side Highway. Eventually, we moved uptown, past the George Washington Bridge, north on the Henry Hudson Parkway and over the Harlem River. Leaving the Parkway at 254th Street, we turned left at the stop sign, left at the traffic light, and then right at 249th Street. Following discrete green and white signs labeled "Wave Hill," we finally reached the gate.

I've always had a problem with things mechanical—a lack of patience on my part. It was inevitable that the first thing to occur after parking the car was the jamming of the trunk lock. After five minutes of jiggling, the lid suddenly snapped up, narrowly missing my beard. At the same instant, I dropped my camera bag, and five boxes of film wound up under the car. My temper was short.

After gathering my equipment, notebook and pen, we walked through the gate, noting that at ten-thirty in the morning, the parking lot was almost full.



Peter Loewer

ABOVE: Wave Hill House. RIGHT: The great lawn at Wave Hill offers a spectacular view of the Hudson River and Palisades of New Jersey.

As we walked through the gate, 50 years slipped away. Traffic stopped, planes ceased to fly, and a sky of cerulean blue displayed just enough puffs of cloud to contrast perfectly with a golden sun and the free-wheeling sea gulls gliding above. The Hudson River flowed gently by, and the breeze that swept up the immaculate lawns smelled of the sea. (The waters of the Atlantic sometimes move up the river.)

Wave Hill is in the northwest corner of the Bronx, one of five boroughs that make up the whole of New York City, in an area called Riverdale. Its 28 acres overlook the river and beyond to the Palisades of New Jersey—great rock cliffs that bear evidence of the might of geological change—but the mid-morning haze veiled the views of upstate New York far to the north and the George Washington Bridge just to the south.

Today, Wave Hill is a public garden landscaped to perfection. There are two

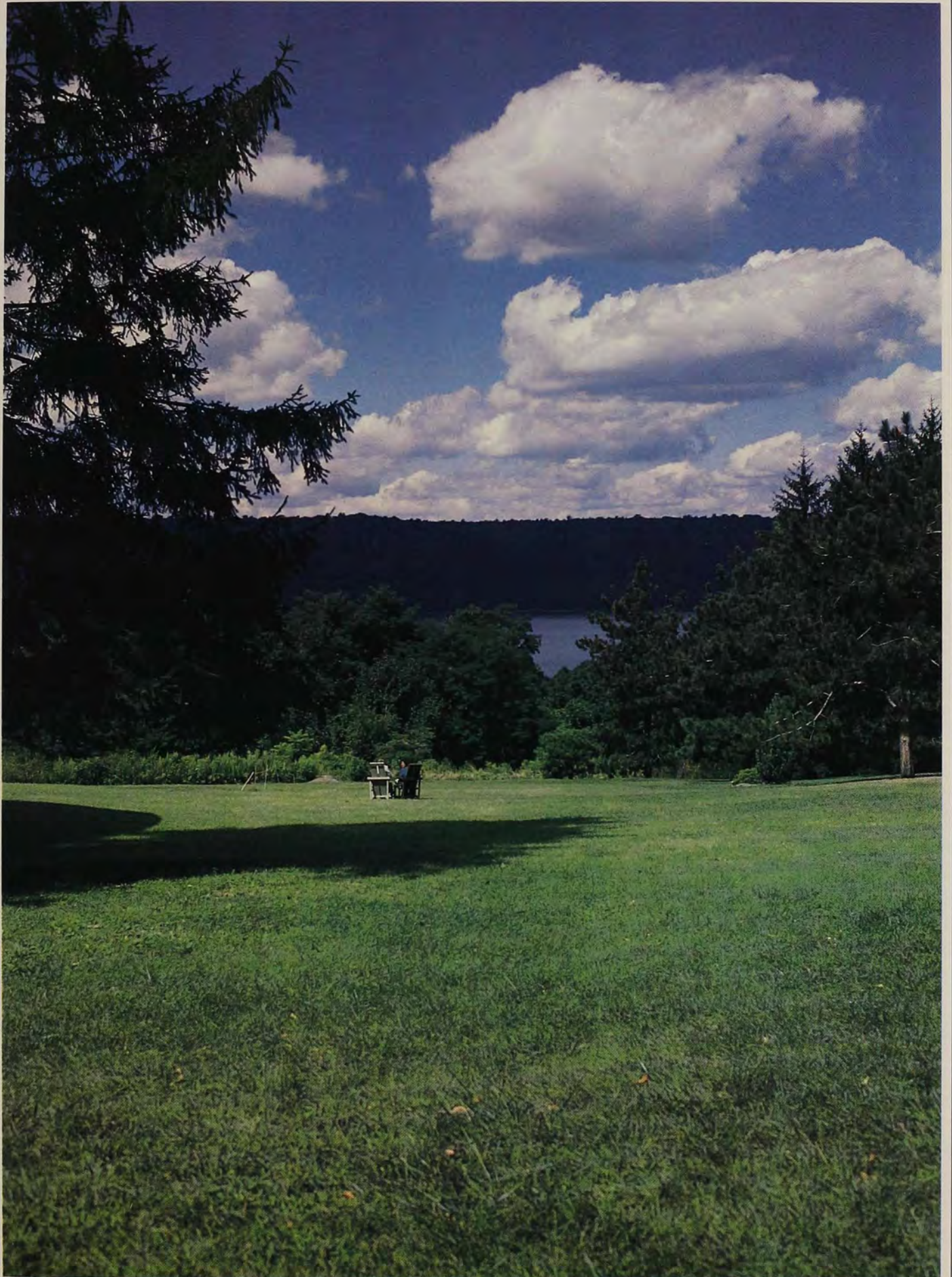
houses: Glyndor, with administrative offices, and Wave Hill House, which includes galleries, a gift shop, the Learning Center and the Toscanini Archives. There is also a large greenhouse, an alpine house, the Herb Garden, the Wild Garden, the Aquatic Garden, a shaded garden (under development), and woodland nature trails.

Wave Hill House was built on 15 acres in 1843 by the jurist William Lewis Morris as a summer home for his young wife. It was to be a place far from the heat and noise of a growing city. It is rumored that the name originated with Mrs. Morris; as Mr. Morris carried his new bride up the hill from the river—no mean feat even for someone in perfect health—she saw the hill and exclaimed, "It looks like a wave."

By 1849, when the railroad was introduced, the area was only 30 minutes from midtown Manhattan, and more people came. Two planned villa communities were soon constructed—one to the north of the Morris house in 1852, and one to the south in 1856. Then in 1866, William Henry Appleton, of the famous publishing house, bought Wave Hill. He cut a road to join the villa developments, and the community of Riverdale was begun.

Appleton changed Wave Hill into a grand Victorian estate. He built a greenhouse and stable, made extensive landscape plantings (silver maples, Norway maples and copper beeches), and imported exotic plants from the world's four corners. The estate became an intellectual center of the day; such luminaries as William Thackeray and T. H. Huxley were known to stop by for tea.

In 1903 George W. Perkins bought the Appleton property and created an 80-acre estate with several houses, including Wave Hill and the neighboring manor house of Oliver Harriman, called Glyndor. Perkins then hired a royal landscape gardener from Vienna, Albert Millard, to help him design and develop a garden that would be worldly



Peter Loewer



Peter Loewer



Peter Loewer



Margaret Parke

LEFT: Near the center of the Wild Garden is an impressive specimen of staghorn sumac, *Rhus typhina*. ABOVE: An annual garden overlooking the great lawn is filled with spider flowers, *Cleome* sp. BELOW: The Herb Garden, built on the foundation of the old greenhouse, contains approximately 100 herbs.

and charming, and that would also conform to the natural topography of the area.

After Perkins died in 1920, his widow continued to manage the estate. In 1926 she hired a Scottish gardener, John Sutherland, to replace Millard, and in that year, 20 men worked on the grounds, while three more worked in the greenhouse. For the next 40 years, both family and tenants continued to live on the estate. During this time, Mrs. Perkins donated two houses to the Riverdale Country School, as well as land to New York City for a Park-Along-the-River. The transition from public to private estate was completed in 1960, when Wave Hill House and Glyndor, along with 28 acres, were donated to the City. In 1965,

Wave Hill, Inc. was formed to manage the property and plan the course of its development. With city funds and private donations, the public gardens have continued to grow under the skilled leadership of Marco Polo Stufano, director of horticulture, and a dedicated and sophisticated staff of gardeners.

We walked along a paved path, past Glyndor and under a vine-covered pergola with an unobstructed view of the river and the Palisades beyond. Here was a garden made entirely of annuals, but so perfectly done that it looked more like a perennial border. A mix of pink and white spider plants, *Cleome hasslerana*, stood among vast stands of dahlias. These flowers were,

in turn, jostled by the strands of love-lies-bleeding, *Amaranthus caudatus*. Brightly-colored nicotianas sparkled against a backdrop of the giant leaves of the castor bean, *Ricinus communis*. The nicotianas and castor beans were guarded by tall cosmos, both pink and white.

We then passed through the Herb Garden—whose orderly paths divided dozens of different plantings—and climbed steep steps to the pebbled walks of the Wild Garden. This area, developed on a natural slope that overlooks the two houses below, features an overgrown summerhouse at its peak, a cool and dark spot with one chair that looks through a screen of living brush to the garden.

This garden is wild in plan only. It is not an English-style garden with neat groupings of plants all contained and fettered, but rather a staggering collection of stems and flowers, tints and textures—more like the blur of an impressionistic painting than a landscape by Gainsborough.

Near the center is a staghorn sumac, *Rhus typhina*, its main trunk bounded by smaller suckers. The whole effect is one of gnarled age far in excess of the plant's actual 50 years. And all along the garden's winding paths, grasses grow next to cacti, ferns touch annuals, and sunflowers hobnob with thistles.

I stopped to put down my weighty camera bag and marvel at the burgeoning seed pods of some mature cannas, *Canna × generalis*. In this garden, cannas are not ripped up after blooming but left to seed in a natural way.

"What are you doing?" asked an elderly gentleman who carried a folded copy of the *New York Post* and a small plastic bag with two peach pits while he held a third peach, half-eaten, in his hand.

"I'm writing an article on the park," I replied.

"That's too bad," he said. "It's such a beautiful place that once you know of it, you want to keep it private. I don't mean that in a selfish way, but it's almost too fine for people."

"I don't entirely disagree," I answered. "Do you come here often?"

"As often as I can. There's always something happening in this garden, whatever the time. . . . It's even beautiful in the winter. The gardener is a nice man, and the young people who work here are wonderful. Once you get dirt under your fingernails, I guess you become a different person."

We wished him a good day and continued along, gingerly stepping around a sprinkler that arched high above our heads and covered the waving plumes of a blooming ornamental grass with drops that

sparkled like diamonds.

We soon reached the Aquatic Garden, where a formal lily pool was surrounded by more wondrous mounds of ornamental grasses—*Calamagrostis arundinacea* var. *brachytricha*, *Pennisetum alopecuroides*, and species of *Miscanthus*. At one end was a healthy planting of the sacred lotus, *Nelumbo nucifera*, its huge, rippled leaves set above the water on stout stems. A small child, first enchanted but soon bored, was dishing up handfuls of water and tossing them at the leaves to watch the droplets shimmer and fall back into the water like quicksilver, repelled by the surface of the leaves.

A middle-aged couple was watching a green heron artfully dive for fish in the pond.

"He's been here for days," said the man. "If you don't move too fast, he'll ignore us."

A dragonfly darted from one water lily to another. High above, a jet bound for Europe left a white trail in the sky but was so quiet it did not intrude on the scene. We watched the bird in its quest.

"Do you come here often?" I asked.

"Every day that we can," answered the woman. "We live at the other end of the Bronx and come by bus. This is such a beautiful and peaceful place."

We left them and walked on, behind the pool and under a cool and dark-tunneled pergola festooned with annual vines; gourds, morning-glories, moonflowers (some shriveled and dead, others ready to open that night), cardinal climbers (*Ipomoea* × *multifida*, formerly *Quamoclit* × *sloteri*) and cypress vines (*I. quamoclit*, formerly *Q. pennata*) all fought for air, their leaves and tendrils a maze of twisted green strings against the shadow of the noon sun. Through a break in the leaves, we looked back upon the pool with the couple watching and the heron still fishing.

We soon reached Wave Hill House. Stopping at the sales desk, we picked up a guide to the Conifer Walk. Out of 54 genera of conifers growing on earth, 24 are found at Wave Hill; two additional genera native to a warmer climate are in the greenhouse.

The well-designed guide gives a natural history of the conifers and, with the help of drawings, shows the distinctive characteristics of the individual species. The walk carries you over most of the grounds: from an aged white pine (*Pinus strobus*) just to the rear of the house, to a grouping of Douglas fir (*Pseudotsuga menziesii*); past a magnificent Japanese cedar (*Cryptomeria* sp.), then on to a giant sequoia (*Sequoiadendron giganteum*) and a huge China



Peter Loewer

fir (*Cunninghamia* sp.), which, from its arched top, must offer a superb view of the river.

Next we passed the new alpine house (then still under construction) that would house choice rock garden and alpine plants. When covered by the snows in their high-mountain habitats, these wild gems are hardened to the worst climates of the world. Subjected to the rigors of a New York climate, however, they need all the protection they can get. The alpine house is called the T. H. Everett Greenhouse, in honor of the senior horticulturist-specialist at the New York Botanical Garden just a few miles away.

As we walked back along the path to Glyndor, I remembered another aspect of Wave Hill: the new and permanent home of the Toscanini Collection, consisting of all of the maestro's commercial recordings and tapes of approximately 150 concerts, most of which have never been released to the public.

Back on December 1, 1980, a demolition crew—without warning—began tearing down one of Riverdale's historic treasures: Villa Pauline, the former mansion of Arturo Toscanini. Concerned members of the community did not sit idly by. Remembering that Toscanini had once rented Wave Hill for four years and would have purchased the estate had it been up for sale, this group of people suggested that Wave Hill could be the new home for the collections and the memorabilia.

On November 10, 1981, the Toscanini Collection was dedicated, and 50 tapes of NBC concerts were incorporated in the Wave Hill Library. Today, 137 of the 231 broadcasts the maestro led with the NBC Symphony Orchestra are on file and tape.

We stopped to talk with another couple.

The man turned out to be the retired registry clerk at the Riverdale Post Office who sometimes substituted as a carrier whenever the office was shorthanded.

"Those were wonderful days around here," he said. "So quiet. . . . Why, the British government leased this as the home of the British Ambassador to the United Nations in the early '50's. Madame Chiang Kai-shek stayed in the neighborhood. And Toscanini. . . . I remember when he would walk his dog before concerts, all dressed up in top hat and tails."

Later that afternoon, my wife and I returned to Wave Hill to attend the Annual Garden Party given by the Friends of Horticulture at Wave Hill. Shadows from the sun setting over the Palisades lengthened across the river under a clear sky. Two musicians—a violinist and a cellist—sat next to a giant clump of ravenna grass (*Erianthus ravennae*) and played Mozart. The night was cool, and the air had lost its humid feel. We talked with visitors and many of the staff about the gardens of today and of the future.

"We have many plans," said Mr. Stufano. "The Shade Garden, the Monocot Garden. . . . But I guess the biggest problem is to keep up the quality of care that we give to the gardens while still having the means to expand their scope."

As twilight deepened, lights came on along the walkways leading guests to dinner at Glyndor. The sky turned purple, and over the garden's rise the lights that string the George Washington Bridge came on and twinkled in the river's slight haze. New York seemed far, far away. 🍎

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Peter Loewer is a botanical artist and scientific illustrator who writes and illustrates his own books. He is the author of *Peter Loewer's Month-By-Month Garden Almanac*.



Margaret Parke



FAR LEFT: A sculpture by Mary Frank stands above the ornamental grasses that surround the pool. ABOVE: Water lilies and papyrus add an ornamental touch to the Water Garden. LEFT: Colorful autumn leaves and the blue and green foliage of evergreen conifers highlight the Wild Garden.

Margaret Parke

# Miniature Cyclamen

BY ALLEN LACY



Michael Lacy

When it's cold and gray outdoors, among the cheeriest of indoor sights are potted cyclamen from the local florist. The color range of these undeniable beauties includes flamboyant crimsons and fuchsias, as well as more subtle pinks and lavenders, not to mention whites as pristine and lovely as new-fallen snow. I've always loved the upswept, strongly-reflexed petals of these plants, so perky and graceful, and so strongly reminiscent of the flowers of shooting-star. What's more, cyclamen's heart-shaped leaves—as mottled as trout—are, by themselves, fetching, and call to mind Gerard Manley Hopkins' joyous outcry, "Glory be to God for dappled things."

But I've always had more than my share of problems with the florist's cyclamen, *Cyclamen persicum*, which has been hybridized for generations. *C. persicum* is a tender species native to the eastern Mediterranean. It's finicky about both temperature and moisture; it dislikes direct sunlight and temperatures of more than 68° F during the day or less than 55° F at night. The books on house plants all offer the not-very-specific advice that it will bloom for two or three months provided its soil is kept "moist, but not too moist."

Over the years, I have had a consistent pattern with these temperamental charmers: I've never been able to meet their needs. Each time around, after much indecision

about which color to get, I bring one home with high hopes. But the story has always had, until quite recently, the same sad dénouement: a couple of weeks after acquiring the latest in my long line of cyclamen, I come downstairs for breakfast and discover that its flowers are sprawling, its buds dropping, and its leaves turning a sallow yellowish-brown.

But now there's a happy ending. Last year I did not buy a cyclamen; someone gave us one just before Christmas, and it was still blooming, if looking a little peaked, when I threw it away after Memorial Day. This fall I bought four cyclamen.

Miniature cyclamen overlook a winter scene.



men, in four different colors. I liked them so much that I went out and got four more, in slightly different shades. And again, they stayed in full and glorious bloom well into the summer.

I take no credit for my sudden success with these lovely plants, and nothing has changed in the treatment I've given them. What *has* changed are the cyclamen, thanks to the problems that have beset greenhouse operators since the onset of the energy crisis, the ingenuity of plant breeders, and the work of Dr. John Seeley, Professor Emeritus of Ornamental Horticulture at Cornell University. Dr. Seeley realized several years ago that some new and richly promising cultivars of cyclamen were becoming available from hybridizers in Holland, Switzerland, Germany and Japan. These new strains, developed by crossing the old florist's cyclamen with the much tinier and hardier species *C. purpurascens*, had a great deal to offer. They appealed to Dr. Seeley, who was convinced that both the interest of the public and that of the floral industry would be well served by developing potted plants so cheap to produce that they could be sold for under \$5.

The most immediately obvious feature of these new cyclamen is their small size—less than half the size of the ones I used to buy and then torture to death. These small plants don't take up much greenhouse bench space. Many more can be grown in a given area than before, so the energy costs per plant are considerably less. And while cyclamen used to take 15 months or more to flower from seed, these new ones can be induced to flower in eight or nine months; therefore, seeds planted in mid-February can be sold in full bloom from Thanksgiving to Valentine's Day, a busy season for the nation's florists.

The economic benefits of these new, scaled-down cyclamen to florists and greenhouse operators are obvious, but since I am not in the trade, I find the benefits mildly boring. What *does* excite me is that these miniature plants are tough enough to survive my less-than-scrupulous care. They can take a little heat in their stride,

and they aren't as persnickety about being kept "moist but not too moist." The experts still advise keeping them out of direct sunlight, but my plants seem to have no complaints thus far about their location in windows on the west side of the house. They bloom prolifically—and over a long period of time. (In his technical publications on the subject, Dr. Seeley has been

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## Propagation

**S**eeds of miniature cyclamen, unlike seeds of their hardy kin, require no stratification. Before planting, they should be soaked in warm water (warm to the wrist) for 24 hours, a trick managed by putting them in a Thermos bottle or placing them near the pilot light of a gas oven. Thereafter, they should be germinated in the dark at a constant temperature of 60° F. Dr. Seeley recommends 68° F. The plants require constant moisture from germination, which takes from four to eight weeks, until blossoming finishes. If growth is checked, blooms may not appear.

There is considerable variation in the onset of bloom, even within the same strain. The plants must be pot-bound if they are to flower.

It is possible to save these cyclamen from one season to the next, inducing dormancy during the summer by laying pots on their sides and withholding water. When new growth of leaves first appears (described by some as little, worm-like projections on the tubers that rest on top of the soil), the pots need to be righted and watering should be resumed.

Especially good specimens grown from seed can be propagated vegetatively, if desired, by lightly scooping out the top-center of a tuber with a sterile knife and then painting the cut surface with alcohol. The numerous small pips that subsequently form in the cavity may be planted separately and grown on to maturity.

conservative in estimating their season of bloom. However, in a telephone conversation he told me he knew of instances in which some had stayed in bloom one solid year.)

Personally, I like the miniature cyclamen even better than the old *C. persicum*. They're sold in four-inch pots, not the six-inch ones their bigger brothers require. As a result, they fit easily on windowsills, four or five per sill. In my own kitchen, where I keep them, the sills are high enough that the plants are almost at eye level, so I can look at them in a new way, discovering the fascinations of their architectural structure. The round, flattened tuber of each cyclamen sits above the soil in its pot. Each leaf and flower is borne on its own individual stalk, and all of the stalks are arranged in an intricate and attractive spiraling pattern that I suspect mathematicians would identify as exemplifying that most elegant of numerical arrangements, the Fibonacci series.

Cyclamen, I now discover, are wonderfully suited as house plants for placement on windowsills in groups. If it's dark outside when I get home from work, the first thing I see is the bright rows of them in both kitchen windows, where they glow with the light from inside. In the mornings, when the sun from the east touches the snowdrifts in the garden beyond the window, the plants become wonderfully translucent with subtle color.

I could raise these new, fairly undemanding, and quite marvelous cyclamen from seed, I'm told. But techniques for propagation are somewhat complicated, and I have a lazy streak. Besides, the owners of the retail greenhouse just down the street have been selling them lately for only \$2.99. Unless they raise their prices quite a bit, I'll let them do the work. I'll still have all the cyclamen's beauty—and a grateful heart for Dr. Seeley. ♣

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Allen Lacy, a professor of philosophy at Stockton State College in New Jersey, contributes regularly to the gardening column of *The Wall Street Journal*. He is the author of *Home Ground: A Gardener's Miscellany*.

# Sources

## THE GINSENG FAMILY

The following companies offer an excellent selection of ivy cultivars and other family members:

- Glasshouse Works, 10 Church Street, Stewart, OH 45778, catalogue free.  
Logee's Greenhouses, 55 North Street, Danielson, CT 06239, catalogue \$2.50.  
Merry Gardens, Camden, ME 04843, catalogue free.  
Tropexotic Growers, 708 60th Street, NW, Bradenton, FL 33529, catalogue free.

## DESERT NATIVES

Seed for water-conserving plants—both native and foreign species—is available from:

- J. L. Hudson, Seedsman, PO Box 1058, Redwood City, CA 94064, catalogue \$1.00.  
International Seed Supplies, PO Box 538, Nowra, NSW Australia 2541, catalogue free.  
Plants of the Southwest, 1570 Pacheco Street, Santa Fe, NM 87501, catalogue free.  
Rainman Succulent Nursery, 20101 Hanson Road, Fort Bragg, CA 95437, list free.  
Clyde Robin Seed Company, Inc., PO Box 2855, Castro Valley, CA 94546, catalogue \$2.00.  
Southwestern Native Seeds, Box 50503, Tucson, AZ 85703, catalogue free.  
Thompson and Morgan, PO Box 100, Farmingdale, NJ 07727, catalogue free.

The following specialists offer many cacti and succulents that are appropriate for desert gardens:

- Altman Specialty Plants, 26963 Sea Vista Drive, Malibu, CA 90265, catalogue \$1.00.  
Cycadia, 17337 Chase Street, Northridge, CA 91328, catalogue free.  
Grigsby Cactus Gardens, 2354 Bella Vista Drive, Vista, CA 92082, catalogue \$1.00.  
Highland Succulents, Eureka Star Route, Gallipolis, OH 45631, catalogue \$1.00.  
K & L Cactus Nursery, 12712 Stockton Blvd., Galt, CA 95632, catalogue \$1.00.  
Mesa Flora, Star Route 1, Box 1047, 1163 Luna Mesa, Yucca Valley, CA 92284, catalogue \$2.00.  
Pacific Tree Farms, 4301 Lynwood Drive, Chula Vista, CA 92010, catalogue free.  
Singers' Growing Things, 17806 Plummer Street, Northridge, CA 91324, catalogue \$1.50.  
Ed Storms, Inc., PO Box 775, Azle, TX 76020, catalogue \$1.00.

The Saratoga Horticultural Foundation, Inc., offers publications of interest to dryland gardeners. *Selected California Native Plants in Color* is an excellent guide, with photographs of over 100 native plants, and is available for \$7.75, including postage and handling. A second publication, *Success List of Water-Conserving Plants*, is also available for \$7.75. The two books may be purchased as a set for \$13.50, including postage and handling.

To order the above publications, write Saratoga Horticultural Foundation, 15185 Murphy Avenue, San Martin, CA 95046.

Many public gardens in the desert Southwest have periodic plant sales that are excellent sources of rare, desert-tolerant plants. Write or call the botanical gardens in your area for information about their plant sales. For a list of some of the gardens that have such sales, send a self-addressed, stamped envelope to Assistants to the Editor, American Horticultural Society, PO Box 0105, Mount Vernon, VA 22121.

## WAVE HILL

Wave Hill is open daily, 10:00 a.m. to 4:30 p.m. Admission is free on weekdays; week-

ends, \$2.00 (senior citizens \$1.00, children under 14 free). For specific directions to the gardens, information on memberships and a schedule of events, write Membership Secretary, Wave Hill, 675 West 252 Street, Bronx, NY 10471.

## MINIATURE CYCLAMEN

Seed for miniature cyclamen is available from:

- Geo. W. Park Seed Company, Inc., PO Box 31, Greenwood, SC 29647, catalogue free.  
Thompson and Morgan, PO Box 100, Farmingdale, NJ 07727, catalogue free. (The Customer Service Department provides detailed information for home growers about the propagation of these plants.)  
Readers who enjoyed Allen Lacy's article may want to order *Home Ground: A Gardener's Miscellany*, which was reviewed in the August 1984 issue of *American Horticulturist*. *Home Ground* is a series of essays on a myriad of gardening subjects. It is available at the AHS discount price of \$13.45, including postage and handling. To order, write Jeanne Egge-man, AHS, PO Box 0105, Mount Vernon, VA 22121.

## THE FLOWERING HOUSE PLANT FAMILY

The following companies offer a wide variety of gesneriad family members:

### Plants

- Buell's Greenhouses, Inc., PO Box 21818, Eastford, CT 06242, catalogue \$.25.  
Country Hills Greenhouse, Route 2, Corning, OH 43730, catalogue free.  
Glasshouse Works, 10 Church Street, Box 97, Stewart, OH 45778, catalogue free.  
Kartuz Greenhouses, Inc., 1408 Sunset Drive, Vista, CA 92083, catalogue \$1.00.  
Lauray of Salisbury, Undermountain Rd., Route 41, Salisbury, CT 06068, catalogue \$1.50.  
Logee's Greenhouses, 55 North Street, Danielson, CT 06239, catalogue \$2.50.  
Lyndon Lyon Greenhouses, Inc., 14 Mutchler Street, Dolgeville, NY 13329, catalogue \$.50.  
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Tinari Greenhouses, 2325 Valley Road, Huntingdon Valley, PA 19006, catalogue free.

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Zaca Vista Nursery, 1190 Alamo Pintado Road, Solvang, CA 93463, catalogue free.

### Seed

Far North Gardens, 15621 Auburndale Avenue, Livonia, MI 48154, catalogue free.

J. L. Hudson, Seedsman, PO Box 1058, Redwood City, CA 94064, catalogue \$1.00.

Thompson and Morgan, PO Box 100, Farmingdale, NJ 07727, catalogue free.

Gesneriad enthusiasts may want to write to the following African violet or gesneriad societies for membership information:

African Violet Society of America, Clarice Bell, Office Manager, Box 1326, Knoxville, TN 37901.

American Gloxinia and Gesneriad Society, Inc., Ellen M. Todd, PO Box 493, Beverly Farms, MA 01915.

Gesneriad Hybridizers Association, Anne Crowley, 88 Maynard Street, Roslindale, MA 02131.

Gesneriad Society International, June Tilley, 1800 Grand, Box 549, Knoxville, TN 37901.

Saintpaulia International, June Tilley, Box 549, Knoxville, TN 37901.

Since so many gesneriad family members are grown indoors in terrariums or under artificial light, the following two organizations may also be of interest:

Indoor Gardening Society of America, Inc., Virginie F. Elbert, 801 West End Avenue, New York, NY 10025.

The Terrarium Association, Robert C. Baur, 57 Wolfpit Avenue, Norwalk, CT 06851.

*The Miracle Houseplants: African Violets and Other Easy-to-Bloom Plants in the Gesneriad Family*, by Virginie F. and George A. Elbert (Crown Publishers, New York, New York, 2nd Edition, 1984, 272 pages, Softcover) is available through the Society. (See "Book Reviews" in the June 1984 issue of *American Horticulturist* for a review.) Regular price, \$11.95; AHS discount price, \$11.05 including postage and handling. To order, write Jeanne Egge-man, American Horticultural Society, PO Box 0105, Mount Vernon, VA 22121.

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**Virgin Islands Cruise** (January 6-13) Tour St. John and the British Virgin Islands, and visit private gardens and famous landscaped resorts.

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**Barbados Exploration** (March 1-9) Explore this small Caribbean island, and tour areas of botanical interest, including Welchman Hall Gully and Andromeda Gardens. Tour Leader: Everitt Miller, Former Director of Longwood Gardens.

**Hawaii** (March 4-16) Tour Hawaii's experimental gardens and arboreta, as well as unique nurseries, private gardens and estates. Tour Leader: Ernie Chew, Former Horticulturist of the San Diego Zoo.

**Spring Gardens of the Southern United States** (March 30-April 21) Visit the most beautiful gardens in New Orleans, Natchez, Savannah, Charleston and Atlanta during the spring blooming season. Tour Leader: Mildred Mathias, Emeritus Professor of Botany, UCLA.

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**England & the Chelsea Flower Show** (May 16-30) Tour public and private gardens in England during the spring blooming season, and visit the famed Chelsea Flower Show. Tour Leader: John Clayton, Retired Curator of Horticulture, Royal Horticultural Society.

**Waterways of Western Europe** (May 26-June 11) Explore France, Portugal, Spain and England aboard the yacht *Argonaut*. Tour Leader: Dorothy Temple, White House Floral Designer.

**Romantic France** (June 1-10) Visit the gardens of Princess Sturdza and the Comte de Brogue's chateau in Normandy. Stop in Giverny for a visit to Monet's garden and house, and explore Paris.

**Fabled Gardens of China** (June 10-27) Explore the Chinese garden cities of Suzhou and Hangzhou, and visit the Ming Tombs and the Great Wall in Peking. Tour Leader: Edwin T. Morris, author of *Gardens of China*.

**Tropical Ecology: The Amazon** (June 26-July 15) This tour provides an in-depth look at the plant and animal life in remote, undisturbed habitats along the Amazon. This is a wilderness experience for the adventurous traveler only. Tour Leader: Mildred Mathias, Emeritus Professor of Botany, UCLA.

**Gardens of Gertrude Jekyll** (July—dates uncertain) Tour the gardens of Gertrude Jekyll during a mid-summer visit to England. Tour Leader: Carlton Lees, Retired Vice-President of the New York Botanical Garden.

**South Africa** (September 10-29) Tour the Drakensburg Mountains, Kruger National Park, Durban, Kirstenbosch and other public and private gardens. Tour Leader: Ernie Chew, Former Horticulturist of the San Diego Zoo.

**Autumn in England** (September 11-26) Visit the Royal Horticultural Society's Great Autumn Show, and tour the rolling, unspoiled English countryside. Tour Leader: John Clayton, Retired Curator of Horticulture, Royal Horticultural Society.

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**Autumn in the Orient** (November 1-20) Visit private gardens in Japan, the temple gardens in Kyoto, autumn chrysanthemum festivals, and gardens in Taiwan and Hong Kong. Tour Leader: Robert Savage, frequent escort of Society tours.

YES! Please send me more information on the tours I have checked below.

- Virgin Islands Cruise
- Carnival in Rio
- Barbados Exploration
- Hawaii
- Spring Gardens of the Southern United States
- Spring in the Mediterranean
- Belgium and Holland by Road and Waterway
- England and the Chelsea Flower Show
- Waterways of Western Europe
- Romantic France
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# 1984 Index

An annual index to articles appearing in *American Horticulturist* magazine is printed in each December issue. A separate cumulative index has also been published for the years 1922-1971 and is available in paperback for \$10. Address inquiries to Jeanne Eggeman in care of the Society. Although no index for the years 1972-79 has yet been published, these back issues have been catalogued by the editorial staff. Back issues (if available) are \$2.50 each and may be obtained by writing to Sharon Barnes in care of the Society.

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Spurge Family, The. Part II. June 9.

Strange Relatives. The Caper Family. February 4; The Ginseng Family. December 4; The Protea Family. August 38; The Spurge Family, Part I. April 5; The Spurge Family, Part II. June 9; Strangely Few Relatives. October 40.

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# The Flowering House Plant Family

**A**frican violets, gloxinias, achenes, lipstick plants, episcias, goldfish plants and Cape primroses are all familiar names of flowering house plants. Yet the family name that links all of these plants together—Gesneriaceae, or the gesneriad family—is not nearly as familiar as other family names—for example, Orchidaceae (orchids) or Bromeliaceae (bromeliads). Although gesneriads may be less easily distinguishable as a group than orchids or bromeliads, they nevertheless comprise a distinct community and are worthy of our attention. In fact, anyone interested in growing flowering plants indoors should become acquainted with them. Nowhere else in the plant kingdom do we find a family that is so well adapted to bringing color into our homes throughout the year.

The gesneriad family has over 130 genera and over 2,000 species. An amazingly high number of these plants have showy flowers and are—or have the potential of being—superb house plants.

Most gesneriad flowers are slipper-, bell-, pouch- or tube-shaped, and have regularly or irregularly lobed corollas. (African violet flowers have five petals, but they are joined at the base.) Gesneriads are remarkably floriferous, and their blooms are shapely and colorful. However, these features alone do not account for their unique suitability as house plants. Gesneriads also make excellent house plants because of their proven ability to grow and bloom with comparative ease in the warmth and low light that a normal home provides. Furthermore, they can be quickly and easily propagated any number of ways. As a special bonus, several plants in the gesneriad family do not need a dormant period, and are capable of blooming continuously throughout the year. The following is a brief description of these plants, their relative ease or difficulty of culture, the species or cultivars that experience has shown to be the best, and some practical cultural tips for the inexperienced grower.

The modern African violet is a complex



*Aeschynanthus hildebrandii*.

Tovah Martin



*Chrysothemis pulchella*.

Pamela Harper

hybrid of a number of *Saintpaulia* species from southern Africa. This well-known plant needs no description; virtually every florist and garden center in the country displays African violets in bloom at all times of the year. They are deservedly the most popular of all flowering house plants. No other plant can compare in carefree culture, continuous bloom and variety of color. I would not venture to recommend any particular cultivar but should warn that not all cultivars are equally dependable, in part due to excessive hybridization. The African Violet Society of America issues a yearly "Honor Roll," which is the best recommendation available. After about a year of continuous bloom, the plants deteriorate, but they can be easily replaced by propagation. To propagate, remove a leaf with petioles attached, dust the stem tip with hormone powder, poke it into a sterile medium, and keep it warm, humid and moist. The leaves sprout young, rooted

plants very quickly. Older plants that may have developed several crowns can also be divided.

Gloxinia is the common name for a group of hybrids of *Sinningia speciosa*, a Brazilian plant with slipper-shaped flowers. During the nineteenth century, cultivated plants were developed with a rotate, or wheel-shaped, upstanding flower that plant breeders increased to a spectacular size. Gloxinias had their heyday then, and the names of the finest cultivars still date from that period: 'Emperor William', 'Emperor Frederick', 'Etoile de Feu', 'Blanche de Meru', 'Waterloo' and 'Roi des Rouges'. Of the modern cultivars, Buell hybrids have proven the best.

In recent years, plants sold in the shops have been less attractive and well grown. Gloxinias have become less popular because they require a period of dormancy and have large, brittle leaves that make them difficult to pack and transport. On the whole, they make better holiday gift plants than year-round pleasures. Nevertheless, you should not throw out your gloxinia when it is finished blooming; put the pot away in a cool (not cold), shaded spot, and wait until new growth starts. Then bring the plant into the light, water and fertilize. Propagate leaves as you would for African violets. Gloxinias are still among the most spectacular of house plants.

In our southern states, members of the genus *Achimenes* are widely grown in pots or hanging baskets on porches. Blooming from May to June, and again from September to October, they offer large trumpet flowers in an array of colors with interesting, contrasting markings. As indoor plants, though, they are often frustrating. They almost never bloom in urban and industrial centers because they are very sensitive to smog. Their worm-like, scaly rhizomes need to be stored dry from autumn until they show signs of growth in spring. Once growth resumes, achimenes need rapid forcing with light, warmth, humidity and regular fertilizing.

The name lipstick plant is familiar to most indoor gardeners. These plants bear spectacular clusters of brilliant blood-red to orange tube flowers at the tips of numerous branches. Unfortunately, most of them are disappointing as indoor plants. Healthy specimens are no problem; however, inducing them to bloom is another matter. These plants are best left to experts or greenhouse growers.

Still, there are two species of *Aeschynanthus* I can recommend. *A. hildebrandii*

is a shrub with pale, narrow leaves that produces quantities of red-orange, somewhat pouched, tubular flowers from all joints and throughout the year. This species lacks the long, flexible branches and thick, dark green leaves of the other species. It does particularly well under fluorescent lighting.

*A. marmoratus*, also recommended, has lovely leaves that are barred beneath with maroon. It is an excellent foliage plant for a window or in artificial light. Its flowers are green and unspectacular.

Most species of *Columnnea* present a problem indoors because of their very long branches that may dangle many feet below a hanging basket. Yet amateurs continue to grow them because of their striking beauty. When the plants are in bloom, the branches are covered with vivid red and yellow, three- to four-inch flowers that look like flying fish. Some cultivars and species are decidedly cool-growing, though the majority accept normal house temperatures. Some are definitely seasonal, while

others bloom on and off throughout the year. Watch out for the plants that are described in catalogues as "everblooming," such as 'Early Bird' and 'Mary Ann', and make sure that you have the right temperature environment in your home to keep them happy.

Attempts to make columnneas more compact have not been very successful. However, the result of one such attempt—'Chanticleer'—is just right. The branches of this cultivar are short and sturdy. The orange flowers, though not very large, are in proportion to the plant and appear at all seasons. 'V. Covert', with short, pink flowers, is also a compact charmer, and Kartuz Greenhouses' 'Butterball' is a fine yellow of this type.

Episcias, with their trailing habits and richly textured, oval-pointed leaves, are quite different from the plants described thus far. The leaves of episcias are of two principal color types: brown with silver or pink veining (the latter colors become predominant over much of the surface), and

## Gesneriads for Beginners

The gesneriad repertoire is so huge, and so many of the plants are comparatively simple to grow and bloom, that it is difficult to decide which are the best to recommend to a beginner. The following, available from the principal gesneriad nurseries, are my choices, for better or for worse.

**African violets.** Start with the Honor Roll plants listed by the African Violet Society of America. My individual all-time favorite is Ballet 'Lisa', a pink commercial variety. I've found the plants of Lyndon Lyon Greenhouses remarkably sturdy. See "Sources" on page 32 for the addresses of the firms listed below.

***Aeschynanthus parvifolius*.** Vigorous basket plant with flaming, blood-red flowers from long, hairy, nearly black tubes. Spectacular, but not a frequent bloomer.

***Chirita micromusa*.** A yellow-flowered annual that blooms quickly and can be planted any time of year. Seed available from Far North Gardens.

***Codonantheranthus 'Aurora'*.** Handsome basket plant with pink tube flowers. From McKinney's Glasshouse.

***Codonanthe carnososa* and *C. crassifolia*.** Sturdy, little trailing shrubs suitable for the terrarium, with white flowers and red berries.

***Coltricantha 'Golden Nugget'*.** Colum-

nea-type plant with erect branches. Available from Kartuz.

***Columnnea 'Chanticleer'*.** Compact, everblooming, definitely the best. 'Early Bird' (orange and yellow) and 'Mary Ann' (pink) are compact and floriferous. *C. erythrophaea* is a large plant with big orange-red flowers.

***Episcia 'Moss Agate'*.** An old favorite with large, lush green leaves and brilliant tomato flowers. 'Toy Silver', a new miniature, is charming in a small pot.

***Gesneria cuneifolia*.** A superb terrarium plant, everblooming and spectacular. Requires plenty of lime.

***Gloxinia 'Arion'*.** Handsome spikes with bell flowers. For fluorescent light or a sunny window. Available from Kartuz.

***Kohleria 'Pamola'*.** Best of the recent kohlerias. Red flowers on a compact plant.

***Nematanthus 'Bijou' and 'Castanet'*.** Fine basket plants with colorful, dangling, pouched flowers.

***Sinningia*.** 'Bright Eyes', 'Freckles', *S. pusilla*, 'Snow Flake', 'Tinkerbell' and 'White Sprite' are all everblooming and are easily grown in a terrarium. Some newer hybrids are more colorful but, in my opinion, not as dependable. 'Cindy' and 'Cindy-Ella' are larger; they are best grown in a terrarium but also do well on the open shelf, especially under fluorescent light.

## THE INDOOR GARDENER

green and heavily felted. Flowers are small but such a brilliant tomato-red that a few are quite sufficient to light up a plant. There are a few yellow- and pink-flowered cultivars.

Most episcias grow well in pots or baskets. They bloom all year 'round, require somewhat more light than African violets, and should not be overwatered. Normal leaf size is three to four inches. Some miniatures with one-inch leaves are now appearing and have proved quite charming and dependable.

I believe the finest episcia for bloom is 'Ginny Elbert', a chance discovery at Lauray of Salisbury. Although the flowers of most episcias are borne quite low or are partly hidden by leaves, 'Ginny Elbert' has erect stalks, and the flowers are very visible. Furthermore, flower production from each node is abnormally large; a hanging basket full of these flowers displays a blaze of color for months on end.

Some extraordinarily beautiful sports have turned up among the episcias. The most famous of these is 'Cleopatra', which has leaves zoned in bands of pink, white and green. Since it is low in chlorophyll, it is a tender cultivar. However, 'Cleopatra' is not at all difficult to grow in terrariums placed rather close to fluorescent tubes. Specimen plants are so colorful that the occasional flowers are superfluous. They

are truly among the wonders of horticulture.

*Episcia hirsuta* and *E. lilacina* challenge the skills of the plant enthusiast. The former is a short plant that produces a great quantity of white and purplish flowers. The latter, in the best clones, has gorgeous lilac flowers and leaves as thick and woolly as Turkish towels. Both are seasonal bloomers.

Hybridizers and commercial growers alike believe that Cape primroses, *Streptocarpus* spp., may one day become as popular as African violets. Plants in this genus are either stemless or bushy. The stemless plants are the most interesting because of their large, handsome slipper flowers, which are borne on long peduncles. The range of color is astonishing, and many cultivars have beautiful markings in the throat. The flowers are borne in clusters that arise from the bases of individual leaves, and each peduncle produces two to six flowers that measure two to three inches in diameter.

These plants have two strikes against them as far as general popularity is concerned: the long, strap-shaped leaves are extremely brittle, and the plants wilt and die rapidly if exposed to high temperatures in mid-summer. The newer cultivars have shorter leaves but are still intolerant of heat. They thrive in parts of the country that have cool summers. Blue-flowered

*Hybridizers and commercial growers alike believe that Cape primroses, Streptocarpus spp., may one day become as popular as African violets.*

'Constant Nymph' and related Nymph hybrids are somewhat easier to grow than most hybrids but lack the bright colors and distinct markings of the older Wiesmoor hybrids. All *Streptocarpus* are seasonal, blooming spring to fall and resting in winter. If breeders find the breakthrough they are looking for, there will one day be *Streptocarpus* cultivars to meet all of our indoor gardening needs.

The shrubby plants of this genus have fleshy stems and much smaller, less colorful flowers than those of other plants in the genus. The best known of the shrubby types is *S. saxorum*, which has pleasant, light blue flowers and small, fuzzy, fat leaves. The bushy or shrubby members of the genus *Streptocarpus* are all best grown in the greenhouse.

Some gesneriads are restricted to the domain of the hobby grower and specialist, only turning up occasionally in commercial nurseries. The variety is astonishing and offers a small world of delightful plants waiting to be discovered by ambitious amateurs.

First in line are the gloxinia relatives, a strangely mixed and fascinating lot. *Sinningia pusilla* is a tiny plant with half-inch-long, bluish-violet flowers. The fuzzy leaves arise from thread-like petioles attached to a small tuber. Despite the tuber, which indicates that the plant goes dormant, *S. pusilla* is capable of blooming most of the year. There is no finer blooming terrarium plant. A close relative, *S. concinna*, is a little larger. Its flowers are wider lobed and white flushed with red-purple dots. Crossing of these two relatives has produced a swarm of plants with charming names, including 'Freckles' and 'Bright Eyes'. These miniatures have been hybridized with larger *Sinningia* species having nodding slipper or tubular flowers. The plants and flowers that resulted are larger and suitable for four-inch pots. 'Doll Baby', 'Cindy' and 'Cindy-Ella' are older cultivars that make excellent house plants. They all

## Cultural Recommendations

Changes in the last 50 years in the home environment as well as soils, fertilizers and equipment have made culture of virtually all of these plants relatively easy. Naturally, individual species and cultivars react in different ways, and there are innumerable ways to produce healthy, long-lasting plants. The following is only a practical summary of basic needs.

**Temperature.** A range of 60° to 85° F is best. Most gesneriads suffer above or below these temperatures. Exceptions are the true alpine and a number of species that are rather cool-growing. On the whole, however, these plants require warmth in winter and air conditioning or fans in summer.

**Light.** Light requirements range from 400 to 1,000 foot-candles for bloom. This can be translated into partial sunlight or reflected light. Two-tube fluorescent fixtures, fitted with one Cool White and one Warm White tube, provide sufficient light

for most of the plants. With high humidity, less light is needed.

**Water.** These plants like even moisture but do not like to be damp.

**Soil.** A porous, well-aerated, partially organic soil is ideal. House plant mixes should include peat moss, perlite and vermiculite. A simple mix can be made at home by combining equal amounts of these ingredients. Add two tablespoons of ground eggshell or one tablespoon of horticultural lime to each quart of mix.

**Fertilizer.** Fertilizer should be high in nitrogen for growth and high in phosphorus for bud formation. Leach soil with clear water every three months to remove excess salts.

**Potting.** Gesneriads usually have rather shallow roots, and they like to be snugly potted.

**Humidity.** Humidity of fifty percent or higher is ideal, but not essential. The smaller and more delicate plants require terrarium culture.

thrive in terrariums and in the open.

Further hybridizing with other sinningias has resulted in the red-flowered 'Tinkerbell' and in the extraordinary *Sinningia* hybrids often referred to as gloxineras, developed by Ted Bona of Reading, Pennsylvania. The latter are bigger and sturdier, and come in a great range of colors, including a very elegant and unusual tan.

Three other sinningias deserve special mention. *S. cardinalis* has velvety leaves topped with two-inch, red tube flowers arranged like the spokes of a wheel. *S. canescens*, formerly *Rechsteineria leuco-tricha*, grows inch-long, pink tube flowers and delightful, woolly-white leaves that look like rabbits' ears. Both go dormant, like gloxinias, but are quite easy to grow in moderate light. *Sinningia sylvatica* (formerly *Seemannia latifolia*) is a stemless plant with long, narrow leaves and an orange-red pouch flower set pertly on long, erect petioles. This is also a superb terrarium plant, much neglected at present.

I have had both a red- and an orange-flowered plant of *Gesneria cuneifolia*. Both grew slowly under artificial light, filling five-inch pots and blooming with 30 or more tube flowers every day for five years. 'Lemon Drop', a hybrid of *Gesneria citrina* produced by Kartuz, was as spectacular. These are truly unique plants. There are a large number of species from Jamaica, Puerto Rico and other Caribbean islands, all of which can be grown in the open or in a terrarium. Such plants do not appear in the shops, since they are too small to attract buyers. Incidentally, they readily produce viable seed.

*Nematanthus* (formerly *Hypocyrtia*) has charming pouched flowers that earned an early species, *N. wettsteinii*, the common name candy corn plant. To me, it is still the most beautiful of all because of the contrast between the tomato-red and yellow flowers and the brilliant, shiny, green leaves that form a solid curtain around baskets. The gifted hybridizer William Saylor, of Brewster, Massachusetts, has produced many fine cultivars, some with candy-corn-shaped flowers and others with long shapes that dangle from thin threads under the branches. 'Aurora' and 'Bijou' are among the few that have been grown successfully in commercial nurseries and sold in florist shops. They are lovely but are seasonal bloomers that lose leaves in periods of high heat and humidity. Mr. Saylor has also made some attractive hybrids between *Nematanthus* and *Codonanthe*. *Codonanthe* is a charming, trailing



*Streptocarpus* 'Constant Nymph'.

Pamela Harper

shrub with waxy, white flowers. Saylor hybrids are larger and have flushes of pink on the blooms.

*Kohleria* species are rhizomatous plants with velvety leaves and spires of nodding, trumpet-shaped flowers that are richly colored and spotted. The best known of these is Mrs. Frances Batcheller's fine hybrid, 'Rongo'. There are a number of handsome species and hybrids, including dwarfs. *Smithiantha* species, commonly called temple-bells, are similar in habit; the flowers tend toward yellows and burnt oranges, and the leaves, a rich red. They were extremely popular as holiday gift plants in England a few years ago.

The following are a few of the many other attractive genera in the wonderfully rich gesneriad family.

*Agalmyla parasitica*. A big, crawling, semi-vining plant for the warm greenhouse. The upstanding clusters of vibrant red tube flowers, similar to those of *Aeschynanthus*, are truly startling in beauty.

*Bellonia aspera*. A lovely woody shrublet with little, shiny, serrate leaves and one-inch, five-petaled, white flowers.

*Boea hygroskopica*. A charming Asian miniature with bright blue flowers for the terrarium.

*Chirita sinensis*. A species with gorgeous, flat clusters of five-inch leaves that look like leather tooled with a rich design of silver and green. *Chirita elphinstonia* is an annual that produces seed readily. Planted at any season of the year, it grows to about a foot in height and bears charming, rich yellow, half-inch flowers.

*Chrysothemis pulchella*. A foot-high plant with four-inch-long, serrated leaves and clusters of flowers in the axils. The yellow corollas are short-lived, but the bright orange calyxes persist for a long time. The brown-leaved variety is superior in bloom to the green-leaved variety.

*Diastema*. A plant with low, spreading mounds of hairy leaves and small, white flowers with purple spots. There are a number of species.

*Gloxinia*. The true *Gloxinia* genus. These plants produce spires of large lilac flowers like short-stemmed Canterbury bells.

*Koellikeria*. A lovely terrarium subject with white, spotted, hairy leaves and hairy stalks loaded with little white and pink flowers.

*Nautilocalyx*. A sturdy-looking genus of handsome bronze- and red-leaved plants bearing tube flowers in the axils. These plants are of particularly easy culture.

*Phinaea* and *Niphaea*. Not true twins. Little *Phinaea* has white, cupped flowers that are strictly erect. *Niphaea* is a larger plant bearing five lobed flowers that are somewhat similar to those of *Bellonia*.

The above is just a small sampling of the enormously rich gesneriad family. Many genera have numerous species and hundreds of cultivars, all of which can be bloomed in the house or greenhouse. The hobbyist who is bitten by the gesneriad bug will never tire of collecting and growing these wonderful plants. —George A. Elbert

George Elbert and his wife, Virginie, have recently completed a revision of *The Miracle Houseplants*, first published in 1976.

# Garden Seats

**M**any gardens are designed for walking—around ponds, along streams, past flower borders, and through woods and herb gardens. . . . the scenes and moods are constantly changing. With so much to see, it is not unusual to find the only seats at some far corner of the garden, placed so the journey can be appreciated in retrospect.

Other gardens, like those of Japanese Zen temples, are for sitting. Here, there is time to witness small events—a leaf falling, or a tree's shadow darkening a bed of moss.

Whatever a garden's style or intent, seats can be used to define an area's use and enhance existing themes. A wooden bench, deep in a corner of meadow grass and wildflowers, becomes an excuse for a picnic, while green bentwood chairs beneath an old apple tree seem to cry out for old friends to take time out for long conversations.

If there is one bench or chair in a garden, chances are it will be used, no matter where it is. But if placed with some thought, seats can be used as design elements to lure people across a lawn or through trees and compel them to linger once they've arrived.

Once you've captured the garden visitor with an invitation to sit down, a bench can focus attention on a scene in the garden, or a view outside the garden can suddenly catch the eye from this vantage point. A seat, perhaps encircled by an arbor of *Wisteria*, can also become the focal point.

Seating can also be used to highlight an area. For example, a shady and otherwise obscure garden corner can be made bright and inviting, particularly on a hot summer day, by placing a white, wrought iron bench amid hostas and ferns.

Not surprisingly, a lawn is one of the most difficult spots on which to arrange seating effectively. If disassociated from permanent elements like houses, trees or even the shade of trees, chairs—particularly those white, plastic-coated mesh types—invariably look like escapees from the kitchen. But when used as design elements in their own right, variously styled and strategically placed seats can set or reinforce the mood of a garden area, or provide striking contrast.

One lawn chair that is very much in keeping with the mood of an informal



A wooden bench set in a hillside at Dumbarton Oaks in Washington, D.C.



Margaret Hensel

country setting, and very much at home in unkempt grass, is the Adirondack-style chair. Made of simply cut boards that are stained or painted white or green, they look like giant grasshoppers poised for take-off. Like rustic wicker or bentwood, with their grape-vine look, all of these chairs have an almost organic feel. Their simple, straightforward design makes them seem like the lawn and the land.

The solid English teak garden benches and chairs are successful in a similar way. Like trees, they seem to have grown from the earth. Yet, interestingly, they are entirely appropriate for both formal and woodland gardens. They tend to be a bit more formal if painted white.

A more extreme example of stylistic sympathy between garden and seating occurs in a woodland garden a few miles from my home. There, benches of rough wood, cut from surrounding ash trees and planed on one side, are nailed to stumps sunk beside a stream thick with bloodroot, hellebores and skunk cabbage. This seating is so appropriate to the setting that it seems almost an outgrowth of the woods.

Now that our fancy is attuned to the harmony of site and man's invention, the next seat is all the more unexpected. Through a pine grove, the path turns and the woods open into a beech grove, at the far end of which sits a wild concoction of white marble. A six-foot half-circle, this seat is a tangle of twining grapes and bare-bottomed angels, with scowling gargoyles serving as legs. In short, this is something you'd expect to see in a staunchly formal English garden.

In autumn, walking from the resinous darkness of the pine woods, the beech grove is all crackling gold. At that time of year, the marble bench presents an even more striking picture in its woody setting. It is entwined with ferns and the scarlet leaves of woodbine, *Parthenocissus quinquefolia*, that echo the leaves of solid marble. The line between the bench's formality and the surrounding wildness becomes even more finely drawn, and makes for a great bit of garden theater. ☉

—Margaret Hensel

Margaret Hensel is a landscape designer and writer living in South Lee, Massachusetts.



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