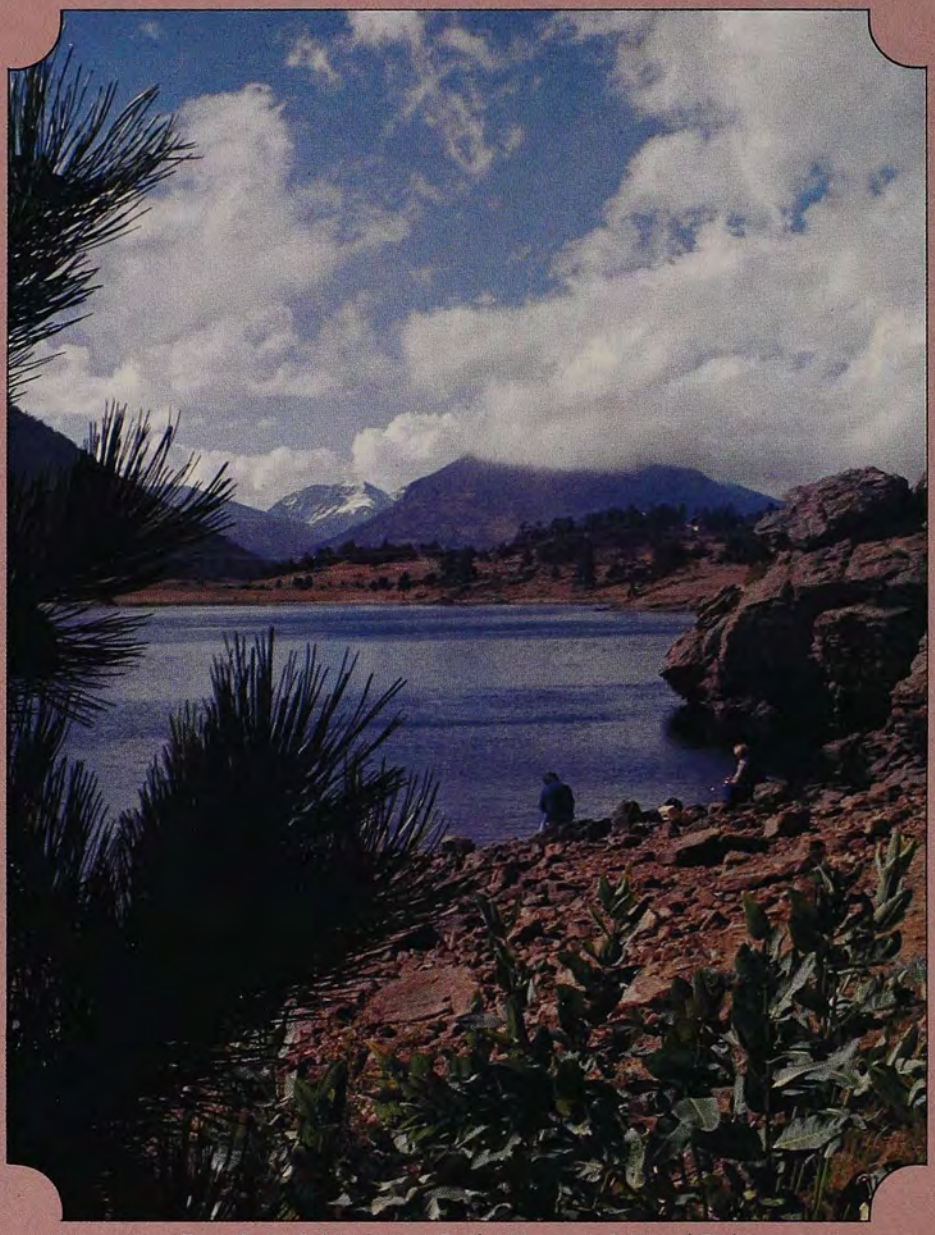
AMERICAN HORTICULTURIST

APRIL 1981

The American Horticultural Society Presents
An Exploration of Colorado
July 14-27, 1981



Estes Park, Colorado near Rocky Mountain National Park
Photograph by Carol Schmeidel

When the rest of the country is beginning to feel the heat of summer, the Rocky Mountains are in the midst of an Alpine spring. Lovely alpine flowers cover the fields and mountain sides with a canopy of color—a display we invite you to enjoy for two weeks as a participant in the Society's special excursion to Colorado and Utah. You will begin your visit in the Mile-High City with a special all-day tour of Denver's Botanic Gardens, then continue west to such lovely areas as Aspen (the famous music festival will be taking place while you are there), Grand Junction, Durango, Winter Park, Colorado Springs, Moab, Utah—and all the breathtaking national parks along this route. Accommodations will be at picturesque inns whenever possible; in Denver, the famed Brown Palace Hotel will be home. Look for more details in the tour brochure inserted in the March issue of *American Horticulturist* news, or write Dorothy Sowerby in care of the Society for registration material. Join other members of the Society and celebrate the coming of Alpine spring.

AMERICAN HORTICULTURIST
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ON THE COVER: Futura impatiens mixture. Photograph courtesy of Goldsmith Seeds.

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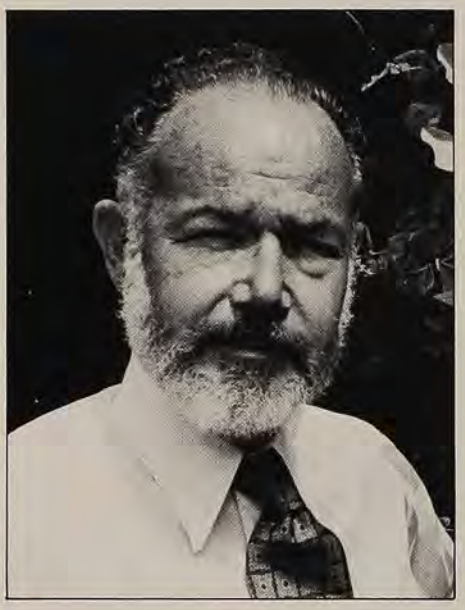
PRESIDENT'S PAGE



I am sure all of you have noticed that the amount of advertising appearing in our magazine has gradually been increasing. This pleases me for two very different reasons. First, I have always believed that by including advertising in *American Horticulturist* we provide a service as valuable to readers as the magazine's editorial content. After all, gardening is not a static interest. As gardeners, we are always looking for sources of new plants and equipment. Secondly, the income from advertising will potentially allow us to expand the magazine's use of color and, eventually, the number of pages per issue, thus providing you with an even better editorial product.

From our membership surveys we know that all of you represent a highly motivated group of buyers of the products advertised in *American Horticulturist.* Nevertheless, several of our infrequent advertisers report less than satisfactory results from the ads they place with us. Most of these advertisers use *American Horticulturist* to promote their seed catalogues, and they claim that they get very few requests for the catalogues considering the number of readers they reach. We believe that most of you, being long-time gardeners, already receive these catalogues directly from the seed companies as a result of previous purchases. But because there is little catalogue advertising in *American Horticulturist,* you miss out on announcements of new plants that usually accompany these advertisements, and we miss out on much needed revenue.

To make advertisers more aware of the significance of AHS members' buying power, we would like to ask all of you to help us by telling advertisers that you are members of AHS whenever you place an order. If you are writing for a catalogue or follow-up information, be sure to tell them you saw the advertisement in *American Horticulturist.* If you did not see the ad in our magazine, ask why when writing in response to an ad you spot in another magazine.

If we let our advertisers know that we are particularly aware of their advertisements in *American Horticulturist,* they should respond in turn with more advertising.

There is also another facet of our relationship with advertisers that you as individual members can affect. If you are pleased with a product, let the advertiser know, and tell him you are an AHS member. More important, if you are displeased with a product, write and tell him so, and also let us know. We try to screen potential advertisers to eliminate poor products or fraudulent advertising, but we can not always be successful without feedback from you.

Advertising is an important way to learn about new products for the garden. As members, you can help us provide more of this kind of information in the magazine while at the same time improving the quality of mail-order products generally. Write to advertisers and tell them what you think of their products—and let them know you speak as a member of the American Horticultural Society.

Gilbert S. Daniels

—Gilbert S. Daniels
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DENVER: TROPICS TO TUNDRA

ABOVE: The Boettcher Conservatory at Denver Botanic Gardens. RIGHT: Waterways were made possible in many parts of the Garden after Garden associates underwrote the digging of a 1,000-foot well. FAR RIGHT: This spectacular border display on the south side of the Conservatory always delights visitors.

Photography by Merle M. Moore

Visitors to Denver Botanic Gardens have a unique opportunity to study and explore the world of plants "from tropics to tundra" in an 18-acre, High Plains setting. Incorporated only 30 years ago, the Garden is already an established Denver landmark. Today, it boasts a conservatory, a fine educational facility, and test and display gardens at both its Denver location and other sites higher up in the Rockies. Plans for the future call for the establishment of an arboretum and environmental study area and additional test and display gardens designed to help Denver area residents cope with their unique climate.

It is to the area's unusual climate that Denver Botanic Gardens really owes its existence.

When early explorers first studied the area of which Denver is now a part, they called it "The Great American Desert." The vegetation they confronted consisted mainly of plants such as buffalo and grama

grasses as well as yucca, cactus and sagebrush. The only trees were found along streams, and flowering herbs that appeared in spring died down as soon as the warm summer approached.

Fortunately, this comparatively drab landscape did not deter later Denver settlers from pursuing horticultural interests. One of the city's first such horticultural pioneers was William Newton Byers, founder and editor of the *Rocky Mountain News*. Byers reached Denver in the year it was founded, 1859, and almost immediately began to advocate experiments with fruits, vegetables and trees. In 1860 he held Denver's first exposition of grain and vegetables in his office. An agricultural society was formed in 1863, and the first territorial fair took place in 1866. In 1880 the first horticultural society was formed.

Nevertheless, the difficulties connected with growing anything in such a semi-arid environment persisted. By 1910, city leaders, notably Mayor Robert W. Speer and S. R. DeBoer, realized the need for a botanic garden dedicated to finding the answers to these problems.

Finally, 41 years later, in February, 1951, a plan drawn by DeBoer for a botanic garden to be located in Denver's City Park was accepted by the city, and construction work began.

By 1959, 1,000 species and cultivars of plants were growing at City Park, and an alpine tundra study area had been set aside on Mt. Goliath about 50 miles from Denver. The Mt. Goliath Alpine Unit, still a part of the Garden today, consists of 160 acres ranging in altitude from 11,500 to 12,150 feet with a spectacular timberline forest of bristlecone pine (*Pinus aristata*). A two-mile trail leads visitors during summer months on a self-guided tour to study and enjoy wildflowers and other plants typical of the Arctic.

About this time the decision was made to move the garden to its present York Street location. Here the delicate plantings could be given better protection than was possible at the City Park location. Vandalism had also been a major problem at the old site. Effective policing of the displays had proved impossible.

On April 1, 1959, Botanic Gardens House, once a private residence and now a designated Denver historical landmark, was dedicated as the new garden's headquarters. Shortly thereafter, work began on an herb garden, a model low-maintenance garden and the Gates Memorial Mountain Garden.

The formal herb garden, with brick paths of interlocking circles forming a traditional bowknot design, is enhanced by a center statue, "The Boy with Frog," by the late Elsie Ward Hering. An extension of the garden, with a raised red sandstone sundial and a small gazebo, was added recently. This extension contains a wide variety of plants used for culinary and medicinal purposes, as natural dyes and for fragrance. Several fund-raising projects for the Garden originate here. Divisions of plants growing in the area are sold at an annual plant sale, and volunteers bottle and sell flavored vinegars made from the herbs. These dedicated volunteers also help maintain the garden. Recent plantings of Lavalle hawthorne (*Crataegus* x *lavallei*), a red horse chestnut and Bradford pears (*Pyrus calleryana* 'Bradford') afford colorful autumn interest.

Just west of the Herb Garden lies the new Scripture Garden, which is still under construction. Two highlights here are a bronze medallion by William Joseph, which incorporates symbols of the Jewish and Christian faiths, and a Prayer Stone, typical of biblical gardens throughout the world. A high, buff sandstone wall screens the garden from nearby residences. Although some plants must be transferred indoors during winter months, the garden will boast an apricot tree, bullrushes, willows, herbs and reed grasses growing near a bog planted with lotus. Cedar-of-Lebanon, fig palm, black mulberry and other exotics are planned as well as benches for rest and meditation. Such groundcovers as lentils, faba beans, garlic, onion, endive, chicory, true myrtle and even dandelion will be used here in nontraditional yet aesthetically pleasing ways.

Utilizing the three R's of simple construction materials—rocks, reeds and redwood—the Model Low-Maintenance Garden was planted in 1963. This garden spotlights white fir (*Abies concolor*), limber pine (*Pinus flexilis*), various viburnums, chokecherries and low junipers. Benches edge a wooden deck, and woolly thyme, sedums and other groundcovers border a dry stream bed.

An official All-America Rose Selections Test Garden has been located at the Garden for many years, but the fifth official miniature rose test garden in the United States was started here only two years ago

with 28 cultivars; 30 additional cultivars were planted the following year.

A delicate framework of shrubs and trees will offer a visual wall of greenery for the Rose Display Garden, where planting began last spring. Brick detailing for both raised beds and beds following the contour of the slope are part of the plan that will feature roses most adapted to the climate. The area includes old garden and species roses as well as the latest introductions. Miniature roses will cascade from a decorative structure to furnish colorful blossoms and pleasant aromas at various visual levels—a pleasing alternative to tree roses, which are not winter hardy in Denver.

Shofu-en, the Garden of Pine Wind, an intimate, classic Japanese garden, was dedicated in June, 1979. Its authentic teahouse is reserved for ceremonial, plant or floral displays and is an educational tool to promote international understanding. The teahouse, elaborate gates, bridges and fences were made in Japan, dissassembled there, then reassembled at the garden. Copper and stone lanterns were donated by Denver's sister city, Takayama, Japan, whose mayor was present for their dedication. A number of character pines were donated by local bonsai enthusiasts. 'Sunset' red maple, *Zelkova,* Sargent crabapples (*Malus sargentii*), a number of cherry cultivars and 'Winter King' hawthorn are among the trees planted here. Many of the plants were meticulously located on the site by University of California professor Koichi Kawana, the garden's designer. Here, too, are dwarf lilacs, white-flowering potentillas and forsythias. Groundcovers include native kinnikinick (*Arctostaphylos uva-ursi*, a common, low-growing evergreen of the Rocky Mountains), white and blue myrtles, creeping thyme and moneywort.

Spectacular water displays highlight plantings of spring bulbs, irises, daylilies, gladioli, chrysanthemums, dahlias, peonies and lilacs in other test and display gardens. Thousands of colorful annuals are tested yearly. There is a turf plot demonstration area, and a Horticultural Therapy Training Garden has been planned. The Children's Garden program has become family oriented and is now a Community Gardens Program.

The "Covered Wagon Frieze," depicting the westward journey of pioneers to Denver, graces a pseudo-adobe brick wall which forms the background for the Plains Garden, scheduled for completion this summer. The frieze was part of the dismantled Midland Savings Building and was executed by Denver sculptor Robert Garrison in early 1920. The Plains Garden will illustrate a pioneer woman's attempt to beautify her modest sodhouse or wooden shelter with cherished plants from "back home" or with wildflowers that dotted her new environment.

Planned to portray a bit of Rocky Mountain landscape, the Gates Memorial Garden combines plantings of native conifers, deciduous trees and shrubs with rocky cliffs, a waterfall, pool and meandering stream to form a serene mountain setting. It is a delightful transition between the Japanese Garden and the Alpine Rock Garden to the south.

Dreams for an outstanding alpine rock garden with a dynamic collection of representative plants, both native and exotic, neared reality last year with construction completed and planting well under way. Five basic types of rock were carefully selected and blended with one another so that a maximum number of rock plants could be grown among them. Soils were prepared (every type from acid, peaty soils to limy screes) which, when combined with 20-odd watering regimens, provided suitable habitats for an unusually wide variety of plants—30 species of alpine, Himalayan and Japanese rhododendrons and other arctic heaths as well as other acid-loving groups such as woodland primulas, epimediums, hellebores and ferns. Other parts of this garden accommodate desert plants such as agaves, a few high-altitude cacti and many Central Asian xerophytic (tolerant of dry conditions) alpines. In the first year of planting, workers in this garden have documented and planted some 1,200 species and cultivars and over 15,000 individual plants. Perhaps a fifth of these are Colorado natives and half are true alpines. The heart of the rock garden, however, is classic alpine.

The adjacent Alpine House, just completed, will contain plants that cannot endure the extreme variation of temperatures and humidity found outdoors in Colorado. Equatorial alpines are examples.

According to Panayoti Callas, curator of the Alpine Rock Garden, "*Our summers may have hot weather, but nights are invariably cool, a situation that places plants under far less stress than in muggy climates where they succumb to fungi and bacteria from extreme heat and humidity. Our winters are long, sunny and dry, a situation that suits alpines quite well. The wet winters along the two coasts of the continent are injurious to most alpines which are accustomed to a dry mantle of snow. As a result, this garden can grow not only a broad variety of alpine plants and arctic plants, but many montane, steppe and desert plants inconceivable in the wet climates where most institutional gardens exist. It is perhaps in this area—in the dryland plant materials—where this garden will achieve lasting importance.*"

The garden's existence belies the claim of early explorers that the Denver area looked like a "Great American Desert."

The Alpine Rock Garden represents plants from many parts of the world, and it is also an excellent example of the cooperation that exists among the Garden's supporters. The garden was a gift of the Gates Foundation; the Alpine House and a stipend for the curator were sponsored by the Associates of Denver Botanic Gardens; the cold frames on the north of the house were a gift of a small group of volunteers; the rock wall that links the house to the garden was donated by the Guild; and finally, most of the actual planting and weeding was performed by many volunteers.

From every part of the Garden the Boettcher Conservatory is visible, with its graceful, interlacing, concrete arches and faceted Plexiglas walls dominating the grounds. The oblong dome of the structure rises 50 feet above a garden floor graded to various levels in order to create a naturalistic, rugged, tropical terrain with a dramatic waterfall and pools. Trails and rivulets wind through plantings of jungle trees, shrubs, vines and flowers. Palms touch the roof and overshadow figs, lipstick trees, an African tulip tree, a tropical almond and hundreds of other plants. Epiphytes, mainly orchids and bromeliads, cling to the trunks or perch on tree branches. Economic plants such as sugar cane, tapioca plant, banana, citrus and macadamia diversify the collections. Surprisingly, due to the hot westerly exposure, many New and Old World succulents are thriving at the far end of the jungle. Although un-

Continued on page 13

Announcing a totally new, comprehensive, and authoritative reference work that has already been hailed as "an encyclopedia which is destined to become a standard work in American horticulture and which belongs on the shelf of every serious gardener,"* "truly a landmark reference work," "attractive, well written, interesting, informative, and incorporates the latest advances in horticulture,"*** and a work that "should become standard in the field."******


Alpines, in containers

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by Thomas H. Everett, *Senior Horticulture Specialist The New York Botanical Garden*

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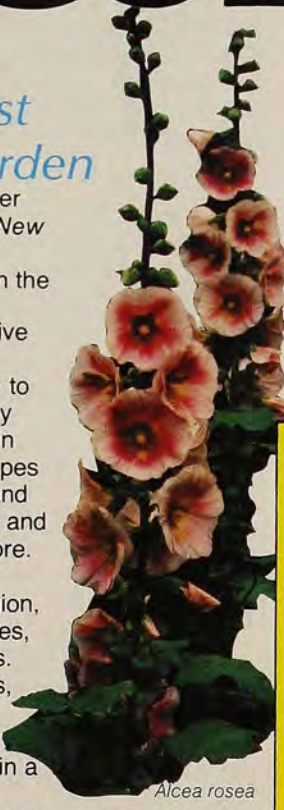
Alcea rosea

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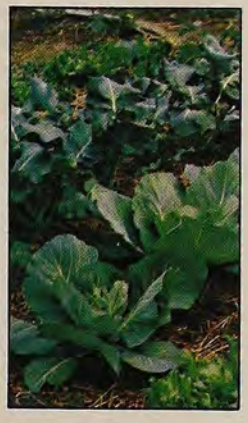

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THE LAUREL FAMILY

. . . I espouse thee for my tree,
Be thou the prize of honor and renown;
The deathless poet and the poem crown.
Thou shalt the Roman festivals adorn,
And, after poets, be by victors worn.

It is laurel of which Apollo is speaking in this passage from Ovid, the Latin poet. Ovid tells of Daphne's transformation into a laurel tree to save her from pursuit by Apollo and of Apollo's adoption of the tree as his own. This is the *Laurus* of the classics, sacred to Apollo, with which poets, triumphant generals and kings were crowned. The garlands at the famous games in early Greece were of laurel, too. Our words laureate and baccalaureate have their origins in these historic uses of the laurel.

We know this legendary laurel as *Laurus nobilis,* the sweet bay, laurel bay, poet's laurel or the green bay tree; it is also our culinary bay. It has given its name to a whole family of plants, Lauraceae, the laurel family.

Plants of the laurel family are noted for their aromatic bark and beautiful, scented foliage. The clustered flowers, some of them fragrant and either bisexual or unisexual on the same plant, are generally not a significant feature of a plant. The fruit, a one-seeded berry, is often colorful and ornamental, and in some cases it is of commercial value. Leaves in this family are usually leathery and evergreen, and, along with other parts of the plants, they contain numerous oil cavities, hence the aromatic nature of some of the products of some species. Timber and cabinet wood are other products.

Members of the laurel family can be found throughout tropical and subtropical regions of the world; the main centers are in southeast Asia and tropical America; a few reach temperate zones. Mountain laurel, familiar to temperate zone gardeners, belongs to another family, the Ericaceae or heath family, not the Lauraceae.

The laurel family includes familiar plants whose relationship on the surface is far from obvious, the green bay tree, cinnamon, avocado, the native American sassafras, spicebush, California laurel and red bay. As we read about their distinguishing features and special attributes we become aware of the continuous thread of family traits these strange relatives exhibit.

Illustration by Alice R. Tangerini

As a rule bay trees are not good house plants because they do not tolerate the dry heat of our dwellings. However, some house plant specialists offer it for sale, and occasionally small potted specimens appear at herb society sales.

Avocado, or alligator pear, *Persea americana,* is the chief horticultural species in the genus *Persea,* which encompasses about 50 species; all but one are American. Most are tropical or subtropical trees and shrubs.

Avocado has persistent, leathery leaves; little green flowers are followed by the familiar, large, mild-flavored fruit with green skin that in some varieties is anise-scented. The tree may grow to 65 feet but in cultivation is usually somewhat less tall and much branched.

Laurus nobilis, the green bay tree, a native of Asia Minor, has long been naturalized in southern Europe. It is a small tree with handsome, stiff, aromatic leaves. The flavor of bay leaf has seasoned foods of many lands for centuries. Yellowish flowers in early spring are followed by succulent purple, cherry-like fruits. Oil from the fruit is used in making perfume. It is not the bay from which bay rum is made.

Through the 18th and 19th centuries, Belgium became the center of culture of laurel as a showy evergreen tub plant. Although it needs winter protection, it has remained a favorite container plant for terrace, esplanade, garden restaurant and similar locations. The tree can be shaped by shearing in a variety of ornamental forms, and the growth can be kept within limits year after year.

The avocado, which originated in Mexico and Central America, is the only *Persea* of economic importance. Cultivated avocados are classified in three races—West Indian, Guatemalan and Mexican, based on ecological adaptations that determine where they can be grown successfully. Modern cultivars are the result of much interracial hybridization. Increased consumer awareness of the avocado's nutritional value and improved fruit quality account for expansion of world markets for this fruit, as revealed by modern statistics. But there is archaeological evidence that at least 9,000 years ago people living in the Mexican state of Puebla had begun to use and select preferred forms of the avocado fruit.

Two other horticultural perseas are *Persea borbonia* and *P. indica. P. borbonia,* the red bay, a large evergreen tree, is native to our southeastern states. Its small, red-stalked fruits make it especially ornamental in winter, although, being a swamp tree, it is not much planted. Its very strong reddish heartwood is used in cabinet making and interior finishes. Like its green bay relative, red bay has leaves that are good for seasoning soup and other savory dishes.

The small evergreen *Persea indica* is

occasionally used ornamentally in Florida and California for its handsome foliage. Called the Madeirabay, it comes from Maderia, the Azores and Canary Islands.

Also of commercial importance in the laurel family is *Cinnamomum.* These evergreen, aromatic species come from tropical Asia.

Production of true cinnamon, *Cinnamomum zeylanicum,* is an important industry in Sri Lanka (Ceylon), which has been the cinnamon capital of the world since Biblical times. The trade in cinnamon, and other spices, was a major influence on the spread of the Dutch and British colonial empires, and collaterally on the growth of ports on the east coast of America.

Cultivation of true cinnamon is widely dispersed in tropical countries and many forms have been described. The bark of young growth is stripped and the inner bark layer is separated. When dried, it curls into the familiar rolls of our culinary stick cinnamon.

Cinnamomum camphora and *C. cassia* are occasionally planted in Zone 9 of the United States. *C. camphora,* the camphor tree or camphor laurel, is noted for its scented foliage. Wood of this species is the commercial source of camphor. Planted as a park specimen in southern California and the Gulf Coast states, it occasionally escapes from cultivation. Most of the world's supply of natural camphor used in manufacture of collodion and explosives comes from *C. camphora.* Currently these products are made synthetically because the natural substance has become so costly.

Cinnamomum cassia, cassia bark tree, can sometimes be seen as an ornamental plant in Florida and California. This is the Chinese cinnamon; its taste is more pungent and its flavor less delicate than true cinnamon. When ground as a spice, it is difficult to distinguish cassia from cinnamon, and it is common practice to substitute cassia for the more valuable true cinnamon. Cassia is preferred in Europe, but in North America ground cinnamon is sold without distinction as to the species of bark from which it is obtained. Chief uses of cassia are for flavoring liqueurs and chocolate and in cooking.

Because of its place in the commerce of colonial America, sassafras captures our fancy. It is of further interest as an example of a genus of only two species, one of which is native to eastern North America, the other native to China.

Sassafras albidum, the American species, ranges naturally from rich woods of southern Maine south to the Gulf and westward into Michigan, Iowa and Kansas.

Sassafras is the popular name given by early French and Spanish settlers in Florida. These early explorers and settlers came to have great faith in the curative and restorative powers of the Indian remedy—sassafras tea. A common name still associated with it is ague tree. Other names, cinnamon wood and smelling stick, seem to have come from the early belief that this was a "red cinnamon."

The powers attributed to sassafras resulted in such demand that the root became of immense commercial value. Special expeditions were sent to the New World to collect it, and it became the first commercially important botanical product exported from North America. Records of voyages and descriptions of life in the colonies refer repeatedly to the trade in sassafras.

Various parts of the tree give off a spicy fragrance when crushed, and the oil distilled from the bark has been used commercially as a flavoring in candy, medicine and soft drinks and as a perfume in soaps. Pulverized leaves are used in flavoring in soups and condiments. In addition, tea brewed from the root bark has long been a popular drink in this country as a refreshment or as a "spring tonic."

A sad denouement brings the sassafras story up to date. Gradually, interest in the medicinal properties of the oil of sassafras (safrol) waned. Extensive testing of primary constituents of the oil by the U. S. Food and Drug Administration led, in 1960, to the banning of safrol and even of the root itself as potentially harmful materials.

Sassafras albidum is one of our most ornamental native trees. A tree in full bloom in spring before the leaves emerge is a pleasing sight with its mass of yellow flowers. The leaves are unusual in that basically three types are produced, all three of which may occur on the same branch: lopsidedly lobed or mitten shaped, three-lobed, or not lobed at all. This oddity helps in identification of the tree in the wild. The color and effect of the fall foliage is another ornamental plus, showing spectacular tints of orange, red and salmon. The fruit, which is eaten by a variety of birds as soon as ripe, resembles a dark-blue cherry perched on a thickened red calyx—attractive in itself if the birds don't get there first. Gen-

Continued on page 35

BOOK REVIEWS

AFRICAN VIOLETS: QUEENS OF THE INDOOR GARDENING KINGDOM. Melvin J. Robey. A. S. Barnes & Co., Inc. San Diego, California. 1980. 288 pages; hardcover, $14.50.

In spite of its continuing popularity as a house plant, the African violet has not inspired very many books in recent years. The present volume is the first in some time, but unfortunately the information is not very new. Most of the text is devoted to cultural information. It is well written and can be recommended for the beginning grower, but information about new varieties is limited to only eight pages of unillustrated text. The four-color plates have no captions, so they are not much help either. If you want to know how to grow African violets, this book will be useful. If you want to know about available varieties, this book will not help you.

THE PRAIRIE GARDEN—70 NATIVE PLANTS YOU CAN GROW. J. Robert Smith and Beatrice S. Smith. University of Wisconsin Press. Madison, Wisconsin. 1980. 219 pages; softcover, $9.95, hardcover, $22.50. AHS discount price, $9.20 softcover including postage and handling; $19.25 hardcover including postage and handling.

Prairies are technically the great grasslands of the American Midwest, but the plants described here are suitable for a meadow wildflower garden in almost any portion of the United States. Seventy of the choicest wildflowers and grasses of the Midwest prairies are described along with information on height, color, flowering season, seed collection and treatment, propagation and habitat. Fifteen pages of color photographs supplement the line drawings of each plant. Habitat, color and flowering time are also summarized in three tables in the appendix. If you are interested in establishing a meadow or prairie garden, this book is an excellent place to begin your research.

TWO ON THE WILD SIDE

USING WILD AND WAYSIDE PLANTS. Nelson Coon. Dover Publications. New York, New York. 1980 (original edition, 1957). 284 pages; softcover, $4.00. AHS discount price, $4.45 including postage and handling.

WILD GREEN VEGETABLES OF CANADA. Adam F. Szczawinski and Nancy J. Turner. University of Chicago Press. Chicago, Illinois. 1980. 179 pages; spiralbound softcover, $9.95. AHS discount price, $9.20 including postage and handling.

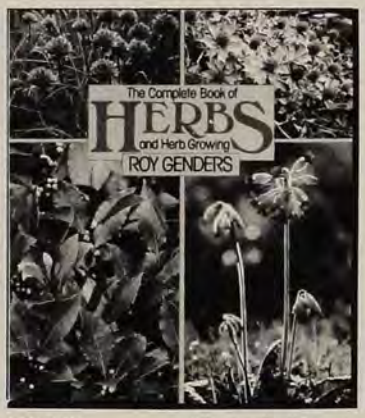
The Dover reprint of Nelson Coon's guide to the use of wild plants is particularly appropriate to the current interests of many gardeners. Information is given on both native and escaped species that can be used medicinally, as food or elsewhere in the home. Instructions are given both for harvesting and preparation for use. The distribution maps show a definite bias for the eastern United States, and the excellent line drawings will help in identification. Decorative as well as utilitarian features of the plant and its products are discussed where applicable. The text is essentially that of the original edition, but the bibliography has been updated to 1979.

Wild Green Vegetables of Canada is number four in a series about the edible wild plants of Canada. Each plant is illustrated with either a good color photograph or a clear line drawing. These illustrations, together with a verbal description of the plant and habitat information for each species, should make identification easy. General use is discussed and detailed recipes are included. The earlier volumes in the series dealt with edible garden weeds, wild coffee and tea substitutes and edible wild fruits and nuts. Because of the extended ranges of many of the included species, all of the books in this series should be useful in the northern half of the United States as well as in Canada.

FLOWERS OF GREECE AND THE BALKANS—A FIELD GUIDE. Oleg Polunin, Oxford University Press. Oxford, England. 1980. 592 pages and 64 plates; hardcover, $125.00. AHS discount price, $105.00 including postage and handling.

For the European traveler, the Polunin field guides are a must. This latest volume treats specifically with the flora of southeastern Europe, and while it may be used by itself in that region, the author suggests that the traveler might do well to also carry the *Flowers of Europe* for a more complete treatment of the more widely spread species. Although good keys are given to the species within each genus, the reader is left to find the genus on his own. For the non-botanist, the excellent color photographs (six to nine to a page) contained in the 64

THREE ON HERBS



PARK'S SUCCESS WITH HERBS. Gertrude B. Foster and Rosemary F. Louden. Geo. W. Park Seed Co. Greenwood, South Carolina. 1980. 192 pages; hardcover, $9.95.

THE COMPLETE BOOK OF HERBS AND HERB GROWING. Roy Genders. Sterling Publishing Co. New York, New York. 1980. 176 pages; softcover, $8.95; hardcover, $14.95. AHS discount price, softcover $7.50 including postage and handling; hardcover $11.70 including postage and handling.

SPICES AND HERBS—LORE AND COOKERY. Elizabeth S. Hayes. Dover Publications. New York, New York. 1980 (original edition 1961). 266 pages; softcover, $3.50. AHS discount price, $4.05 including postage and handling.

Park's Success with Herbs follows the same clear format as their earlier *Park's Success with Seeds*. Small color illustrations of each plant are accompanied by brief discussions of habitat, culture and use. All of the plants were selected for successful growing in a temperate climate, and the more tropical species, which the authors define as "spices," were purposely omitted. Most of the herbs are for culinary use, but a few are included that can only be attributed with probable medicinal value. The cultural instructions for each species are particularly useful, and special emphasis is given to the individual requirements for successful germination of seed.

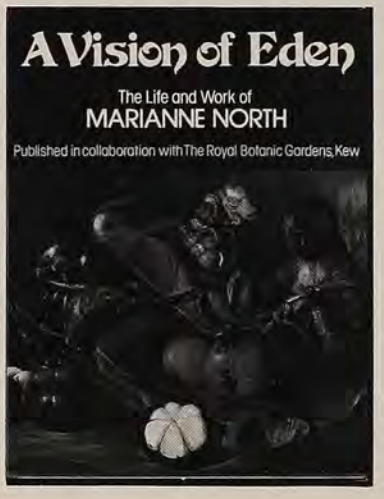
Roy Genders' book covers much the same material, but the color photographs are larger, and excellent line drawings appear throughout the text. As in the Park's book, a portion of the text is devoted to garden design and harvest preservation, but the majority of the text is devoted to a discussion of individual species. Genders gives both medicinal and culinary uses for nearly all plants and has a particularly enjoyable narrative style.

The Dover reprint of the Hayes book follows the text of the original 1961 edition, omitting only the list of suppliers, which would by now be very out of date. Each herb and spice is discussed, both for its uses and its historical background. The illustrations are simple line drawings which, while decorative, do not provide enough detail for any use in identification. Cultural information about the plants is grouped together in a single table.

For successful growing, I would recommend the Park book. Genders' book is the best for pleasant reading, and Hayes has the best presentation of historical background. Take your pick.

plates provide an easy way to find the genus by comparison with a living plant. As a further guide to what one might expect to find, the first 200 pages discuss the specific flowers of each of the ecological regions of southeastern Europe. Line drawings scattered through the text are a further aid to identification, but only a limited number of species are illustrated. The plant descriptions are excellent, but this is not a book for the beginner. A certain amount of botanical knowledge is necessary for the user to feel comfortable with it.

A VISION OF EDEN—THE LIFE AND WORKS OF MARIANNE NORTH. Marianne North. Holt, Rinehart and Winston. New York, New York. 1980. 240 pages; hardcover, $22.95. AHS discount price, $20.75 including postage and handling.



Marianne North lived from 1830 to 1890. The daughter of a member of Parliament, she traveled extensively with her father until his death in 1869. Thereafter she traveled throughout the tropics of the world by herself. Everywhere she went she painted the local flora and kept a journal. In 1882 her paintings went on permanent exhibit in a special gallery that she had donated to Kew Gardens. The present book is the story of her travels as told through her own journal entries. It is also beautifully illustrated with color reproductions of her paintings. This is not only the story of a remarkable woman but also a wonderful way to share in her enthusiasm for plants. The reader will see the world as it was in the late 19th century through the eyes of a keen observer.

RODALE'S ENCYCLOPEDIA OF INDOOR GARDENING. Anne M. Halpin (editor). Rodale Press, Inc. Emmaus, Pennsylvania. 1980. 902 pages; hardcover, $24.95. AHS discount price, $22.45 including postage and handling.

The title of this new book is exactly right. It is not so much a book about indoor plants as it is a book about how to grow them. The first 165 pages provide information on growing, fertilizing, propagating and generally keeping plants healthy. The next 346 pages are devoted to specific cultural instructions for 16 different plant groups such as ferns, bromeliads and carnivorous plants. Then come 216 pages about special environments such as light gardens, windowsills and greenhouses. Finally, 138 pages in encyclopedia format relate cultural information for many genera of plants that can be successfully grown indoors. Good photographs and line drawings generously used throughout supplement the excellent text to make this a very worthwhile cultural guide to a great many different kinds of plants. Highly recommended for the avid house plant enthusiast. —*Gilbert S. Daniels*

Instructions for ordering books by mail: Send orders to the attention of Dorothy Sams, American Horticultural Society, Mount Vernon, VA 22121. Make checks payable to the Society. Virginia residents, add 4% sales tax. When a discount price is not listed for a book, please add $1.25 to the price listed to cover the cost of mailing and handling.

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

Continued from page 6

expected in a subtropical environment, they are extremely popular with visitors, and this is the only area for their display.

In January of 1980, a striking pavilion was opened adjacent to and west of the Conservatory. Its small dome is similar to that of the Conservatory and sits atop a large greenhouse spreading around its base, rather like a skirt. This area is about 40 feet square and has a circular viewing platform. Lavish displays of orchids and bromeliads are in the public area under the dome.

The Boettcher Memorial Center is the educational hub of the Garden. It contains a research library with over 10,000 bound volumes and 280 journals. In this building the Kathryn Kalmbach Herbarium is also located. The collection was begun in 1941 and contains over 15,000 specimens. Of particular interest to specialists in the field is the Center's Mycological Laboratory and Herbarium of Fungi. This herbarium contains over 12,000 fungi specimens, about half of which are myxomycetes. These are very primitive organisms that start life as amoeba-like creatures, changing as they mature into fungi and reproducing by forming spores rather than seeds. Despite Colorado's dry climate, 225 species of myxomycetes are known to grow here. There are only slightly over 500 species described in the entire world.

Everything from test plants to rare books—Denver Botanic Gardens is filled with a wealth of information and plant material every visitor can appreciate, whether he be botanist, horticulturist or amateur home gardener. Soon to be added to the Garden's list of accomplishments is an arboretum, planned for a 700-acre site near Chatfield Dam in the Rockies. On that site is a pioneer homestead, Hildebrand Farm, which the Garden also hopes to restore.

The Garden's existence belies the claims of early explorers that the area looked like a "Great American Desert." Here, members of the American Horticultural Society who register for the "Exploration of Colorado" July 14-27 will be able to see thousands of healthy, vigorous plants growing far from their native habitats and, most intriguing, many lovely alpines adapted to the unique climate of this part of the Rockies. ❶ *—Bernice Peterson*

Bernice Petersen has been a volunteer at Denver Botanic Garden for 30 years and is the Garden's historian.

Ferns in Herbals

TEXT AND PHOTOGRAPHY BY F. GORDON FOSTER

During the Middle Ages ferns were surrounded by an aura of mystery because they lacked flowers and seeds. Folklore and tales of their magical powers were rampant, and concoctions prepared from their leaves and roots were thought to have great curative values. Recipes employing ferns as antipyretics for reducing fevers, diuretics for removing body poisons and vermifuges for ridding the intestinal tract of ever present parasitic "flat worms" were an important part of early herbals.

The early herbals were not just simple pamphlets; they were large volumes handsomely illustrated with both black and white as well as hand-colored plates (Editors note: see "A History of Old Herbals" in *American Horticulturist,* October/November 1979). With their odd printing and quaint spelling, the herbals described many recipes or "receipts" in which the ferns were dominant ingredients. Truly, the herbals were the physician's bible of the period and the progenitors of today's modern pharmacopoeia.

Since herbals had their origin prior to the introduction of the Linnean system of binomial nomenclature, the plant names used in these early works can be confusing. Some ferns were designated by common names that still exist today; other ferns were given Latinized forms of their common names that became, after much shuffling around, the forerunners of today's botanical names. Thus we find John Gerarde of London, in 1636, referring to the male fern as *Filix-mas,* using a common name remaining to the present. This common name has been in use for over 300 years, but Thomas Moore, in *Nature Printed British Ferns,* showed that the scientific name had been changed no less than 11 times before 1859.

Throughout the world there are about 10,000 species of ferns distributed from the equator to the near polar regions. The British Isles and Europe, birthplace of the herbal, have a proportionate share, with species ranging from thumb-size to those two meters or more in height. If we omit the many variants and mutations with their minimal differences, there are about 12 species that played an important part in the medieval herbal, of which seven will be covered in this article.

Among these selected ferns, only the scale

F. Gordon Foster is the author of *Ferns to Know and Grow.* He holds honorary fern specialist positions with the Brooklyn and New York Botanical Gardens.

ABOVE, LEFT TO RIGHT: Scale fern, *Ceterach officinarum;* hart's-tongue fern, *Phyllitis scolopendrium;* and moonwort, *Botrychium lunaria* as they appeared in Blackwell's herbal. FAR LEFT: Hart's-tongue fern growing in garden.

fern carried the now officially accepted name of *Ceterach officinarum* in early herbals. Scale fern, densely covered with rust-colored scales on its underside, is one of our smaller species and is sometimes called the finger fern because of the size of its short, once-pinnatifid leaf. It is a lime-loving plant and is commonly found on old masonry bridges and the ruins of ancient cathedrals and abbeys in southern Ireland and England. I have seen it growing far to the southeast in Greece on the foundation walls of the Temple of Zeus.

The name *Ceterach* is of Persian-Arabic origin, coming from their word *cheterak*. Regarding the common name, Turner wrote in his *Herball* (1551), "I have heard of no English name of this herb, but it might well be called in English *Ceteracke* or *Miltwaste*." Miltwaste, in reference to the spleen, came from the belief that the fern had been fed to Cretan swine, resulting in the destruction of their spleens. The opinion of its "miltwasting" property continued to the time of Gerarde, who wrote, *"There be empiricks or blind practitioners of this age who teach that with this herbe not only the hardness and swelling of the spleens, but all infirmities of the liver may be effectually and in a very short time removed . . . But this is to be reckoned amongst the old wives' fables, and that also which Dioscorides telleth of touching the gathering of spleenwort in the night, and other most vaine things which are found here and there scattered in old books."*

In spite of Gerarde's opinion, *Ceterach officinarum* continued to be listed in herbals as a diuretic, as a salve base for ulcers, and as a liver-spleen cure-all. It was also recommended as a bait for rock-cod fishing on the coast of Wales.

I have long admired the hart's-tongue fern, *Phyllitis scolopendrium*. Perhaps this fondness has come about because of its unusual strap-like leaf architecture, its beautiful shade of green and its rarity. Our American species, now thought to be of English origin, is nearly extinct. In England and Ireland, hart's-tongue fern is fairly abundant, its robust, simple leaves growing straight and vertically 16 inches or more. For some unknown reason many of the English ferns have produced mutations ranging from simple-forking leaf tips to the most bizarre patterns imaginable. None of these ferns has been more prolific in this respect than the hart's-tongue fern. In 1859, Thomas Moore listed and described 155 varieties in *Nature Printed British Ferns*. Lowe illustrated 183 varieties in leaf structure and further listed 44 named botanical variants in *Our Native Ferns, Vol. II*, published in 1869.

From the literature it is apparent that both the botanist and herbalist had a great affinity for *Phyllitis scolopendrium*. Medicinally, the herbalist recommended an ointment prepared from the bruised leaves of the plant to be used as an astringent and vulnerary for dressing wounds, especially those of burns and scalds. Horticulturally, hart's-tongue fern makes a beautiful indoor plant, and specimens with any of the unusual leaf patterns become focal points when displayed in pockets of eroded limestone in the rock garden.

Among the most commonly mentioned names of ferns in the herbals are those of the male fern, Filix-mas, and the female fern, Filix-femina. These names are given in such close association that it would almost appear like a Mr. and Mrs. Fern relationship. Actually, these names have no scientific foundation. Further, the two species have no generic relationship, leaving us to believe that the name female fern, now commonly called lady fern, *Athyrium filix-femina,* was derived from the beautiful, soft, lacelike structure of the leaf. The leaf structure of the male fern, Filix-mas, now *Dryopteris filix-mas,* is just the opposite, having a coarse, leathery texture and heavily-scaled stipe.

John Gerarde's *Herball,* published in 1636, mentions a use for both ferns, and we are left wondering whether the cure was worth the treatment. The author states, *"The root of the male ferne being taken to the weight of halfe an ounce, driveth forth long flat worms out of the belly, as Dioscorides writeth, being drunke in mede or honied water and more effectually, if given with two scruples or two-third parts of a dram of Scamonie, or of blacke Hellebor: they that will use it, saith he, must first eat garlicke. After the same manner, as Galen addeth, it killeth the child in the mother's wombe."*

Continuing, Gerarde further states, *"The female fern is of like operation with the former, as Galen saith. Dioscorides reports that this bringeth barrenness, especially to women to be delivered before their time. He added that the powder here if finely beaten is laid upon old ulcers and healed the galled necks of oxen and cattell. It is also reported that the root of the fern cast into a hogshead of wine keepth it from souring."* More or less agreeing with Gerarde, Elizabeth Blackwell, in *A Curious Herbal,* published in London in 1739, further stated that "the Male Fern, *Filix-mas* accounted good for Obstructions of the Liver and Spleen."

Blackwell also mentioned, in volume two, *Osmund-royal* or *Filix florida,* now known as our royal fern, *Osmunda regalis*. She wrote that "Roots are esteemed good for Rickets in Children, as for Ruptures, Wounds and Bruises, and Obstructions of ye Liver and Spleen." From a cursory survey of these medieval herbals, it would seem that "ye liver and spleen" were among the major offenders of good health of the day!

There are no ferns that I enjoy discovering more than the moonwort, *Botrychium lunaria,* and the adder's-tongue, *Ophioglossum vulgatum*. Both of these are small species and far from common. Various species of the adder's-tongue fern may be found throughout the United States. The moonwort is a boreal fern; I have found a solitary plant growing in upper Michigan, and large patches of this unfernlike gem in the Mt. McKinley area of Alaska. Although the ferns are widely different in appearance, both of their genera are included in the family Ophioglossaceae. Both ferns are well known in folklore for their supernatural powers, and their "therepeutic" value seems to be included in all herbals. Fresh moonwort, said one, "when bruised and laid on a cut would stop bleeding and heal in a day or two."

Adder's-tongue was recommended as a fine cooling herb for a general ointment by Dr. John Hill in *Family Herbal,* published in 1812. His recipe called for *four* pounds of this tiny fern boiled in three pounds of suet to which one pint of oil was to be added.

Fortunately, some of the more vile tasting and meaningless uses that early "physiks" found for ferns have long since given way to effective prescriptions for convenient pills and capsules. Today, we are left with the much more pleasant task of enjoying ferns for their beauty and botanical interest. ●

Grateful acknowledgement is made to Quentin Schlieder, Director of Horticulture, Frelinghuysen Arboretum, Morristown, New Jersey for allowing the author access to the arboretum's archives.

A Selection of Perennials For the Garden

Herbaceous perennials add character to a garden. There are plants to suit every taste, location or climatic condition. With imagination they can be combined in an infinite number of ways, allowing every gardener to develop his own unique display.

Astilbe, with its pink or white spires, can add pastel color and feathery texture to the garden if given ample water. Blocks

BY ALEXANDER IRVING HEIMLICH

There are as many ways to landscape a garden as there are gardeners. The gardener with a methodical mind will solve his problems with a straight-line, point-to-point approach. A row of pines or hemlocks planted to ensure a complete enclosure for privacy will satisfy him. He ends his short sally into the world of trees with a three-inch application of bark mulch or peat moss to control weeds. The trees and a large lawn appease his sense of order.

Another gardener may be a student of trees and shrubs. After a deep, penetrating study of growing habits and color contrasts, he will grade his trees and shrubs—tall trees in the rear and low-growing material in the foreground. From the species and cultivars of magnolia to sourwood (*Oxydendrum arboreum*), he will enjoy a constant succession of color. He will carefully place evergreens to afford winter privacy. He will also cover the earth beneath his trees and shrubs with a mulch to inhibit weed growth. With a somewhat smaller lawn to care for, he is content with this arrangement.

Yet another type of gardener will plant trees and shrubs to blend into a harmonious whole, but he will also add another dimension—a bracelet of charming perennials along the edge of his plantings.

To achieve his goal, our third gardener will plan throughout the year. In the fall he might plant early blooming crocus species, scillas and many dwarf bulbs that tie in the plantings to the lawn. His border in cold, early spring will be a sure promise that a speedy end to winter is at hand.

He might select about 20 varieties of perennials to complete his walk from spring until fall. Although there are endless plants to choose from, he will select only plants that are completely hardy in his area. Knowing that he has a good, well drained garden soil, and that his garden is in full sun, he will be careful to see that the plants he selects are suitable.

For additional bloom during the month of April, he might select *Draba sibirica,* a slow creeper growing close to the ground. The bright-yellow flowers appear on six-inch, slender stems. Commonly known as Siberian draba, it is a native of that land and is extremely hardy.

Another plant he might choose for April and May bloom is the beautiful pasque flower, *Anemone pulsatilla,* an eye-opener with its blue, bell-shaped flowers growing out of finely cut, silky foliage. The white cultivar, *A. pulsatilla* 'White Swan', bears exquisite, large flowers. A rich, dark-red cultivar with golden stamens is *A. pulsatilla* 'Rubra'.

Continuing the walk into the glorious month of May, his border planting might be ablaze with a few well-chosen *Phlox subulata* plants. As fast-growing mats, they provide large sheets of color that can be carefully selected to blend with existing vegetation. These are evergreen plants that grow to a six-inch height and tie the lawn to the existing trees and shrubs year round.

Because of the bewildering number of phlox offered by the trade, the selection to be applied to his bracelet of charm might lead our gardener to an approach of extreme caution with respect to growing habit and color. A good choice of a slow-growing *Phlox subulata* is a European variety called *P. subulata* 'Schneewitchen' ('Snow White'). This cultivar features small, dainty, snow-white flowers that cover the plant completely. It has dark, compact foliage that glitters.

A vigorous grower that requires a large area in which to expand is called *P. subulata* 'White Delight'. Beautiful, milk-white flowers cover the rich, evergreen foliage. A number of these plants will play a large role in bringing into view large drifts of white in a dazzling display that will provide the garden with a bright and clean look.

A clear, soft blue is *P. subulata* 'Blue Hills'. Each plant expands into a large mat in the border and can be greatly enhanced by incorporating a drift of *Scilla siberica,* planted in the fall, and perfectly content in the shade.

For a touch of pink, our gardener might select a plant with distinctive, deep, shining-green foliage that in spring is completely covered with brilliant pink flowers. It is called *P. subulata* 'Pink Sensation'.

For more bloom during May, our gardener might plant Europe's basket-of-gold, *Aurinia saxatilis* 'Compacta' (formerly *Alyssum saxatile* 'Compacta'). This common, mat-forming, durable plant will be the star of his bracelet of charm in late April and May. Unfailingly, a profuse mass of gold highlights the border and is repeated many times. Many references report that this plant will grow in any kind of soil. Although it is tough and durable, it does have definite limitations. It will not thrive in an acid soil and demonstrates its displeasure in a hard-to-penetrate clay soil. It also shows its dislike of a shady location by growing stringy, limp and unattractive. In a sympathetic, porous soil, it forms an attractive, compact plant, and the silver-gray foliage complements surrounding trees and shrubs when not in bloom. It seeds freely, and clusters of small plants can be moved by trowel as long as roots and soil stay intact. The new location must have drainage and ample sun. These tiny plants

Alexander Heimlich

Alexander Irving Heimlich is a trustee of the Massachusetts Horticultural Society and has been the recipient of over 60 medals and awards from horticultural groups.

like to be flooded in to assure an immediate hold.

In his careful selection of plants, our gardener might choose *Geranium sanguineum* var. *prostratum*, a six-inch-tall, ground-hugging plant that covers itself with a bright-pink color, its blossoms dancing on delicate, thin stems. The blossoming begins in late May and continues to the end of the season.

The border is now in June color. The gardener might choose *Dianthus* x *allwoodii* for a striking effect at this time of year. It is a beautiful hybrid, available in white and shades of pink to deep rose, which flowers lustily and continues into July. In July the flowers give way to seed heads that can be cut to encourage several new periods of bloom the balance of the season.

The border can sparkle as gaily in June and July as in early spring. Members of the genus *Thymus* are extremely hardy and feature aromatic foliage as well as innumerable, tiny blossoms that cover the plants. The plants themselves spread nicely into a handsome cover. *Thymus nummularius* is a fast, mat-forming spreader with rosy-pink flowers.

Our gardener might also choose several of the many plants in the sedum family for their June-July color. *Sedum kamtschaticum* has evergreen, thick, dark-green leaves and flowers of yellow turning to orange, borne on sturdy, four- to six-inch stems.

Another sedum of easy growth is the common gold moss stonecrop, *Sedum acre*. The gardener might add this wherever plants do not form mats. He will be rewarded with a spectacular three-inch-tall mass of pure gold that gives the border the appearance of being in full color.

To add to this "midsummer dream" border, the gardener might use late-flowering *Alyssum murale*, which increases the glow of yellow and gold. Growing on thin stems, it supports large flower heads that cover the entire plant. As the flower heads turn to seed and ripen, the wind throws a prodigious amount in all directions. By allowing only a small part of the seed heads to ripen, and by removing all others, our gardener will be rewarded with a second flowering in August. This plant attains a height of 12 to 15 inches.

As this mass of spectacular and striking color fades in early July and becomes an evergreen border, a somewhat less aggressive set of plants might provide interest in the shimmering heat of summer. The gardener might select *Astilbe* 'Granat' for display at this time. Although the plant, composed of graceful foliage, attains a height of 10 inches, the dainty, fluffy spikes of rosy carmine grow to 24 to 30 inches in height.

Another member of this genus, *Astilbe* x *arendsii* 'Peach Blossom', is an exquisite, soft, shell-pink, its flowers attaining a height of 15 inches. This plant also prefers a deep, rich, moist soil and demands copious amounts of water during periods of drought. Failure to adhere to this watering regimen will result in all cooperation between astilbes and the gardener coming to an abrupt end. Following a prolonged dry spell, the beautiful, fern-like foliage will

Continued on page 36

Alexander Heimlich

Blocks

OPPOSITE: *Geranium sanguineum* var. *prostratum*. ABOVE RIGHT: *Sedum spectabile*. BELOW RIGHT: *Achillea*.

Nepenthes

BY LAURALEE V. SMITH

The victim races through the jungle, head-hunters in hot pursuit. Looking frantically for a place to hide, he spots what looks like the opening to an underground cave and hastily climbs in. As his pursuers approach, he crawls deeper into his refuge.

After the head-hunters pass, the relieved fugitive attempts to climb out, only to realize that he is sliding closer and closer to the murky pool at the bottom of his hiding place. He is trapped in a giant, man-eating plant! With a last tremendous effort, the victim lunges at the pitcher's rim and, missing his mark, falls screaming into the waiting pool below.

Scenes like this involving man-eating plants became popular in the science fiction of the 1940's and 1950's. Today, writers and readers alike are no less fascinated by the thought of plants that digest living matter. What is the inspiration for tales of "man-eating plants"? Is there any truth to the stories?

One group of plants that stimulates the imagination in this way are the tropical pitcher plants, members of the genus *Nepenthes,* natives of such exotic places as the East Indies, the Malay Peninsula, northern Australia, the Seychelle Islands and Madagascar. Most of the prey of *Nepenthes* species are insects, but reports of large pitchers containing the skeletons of mice and small monkeys have been the subject of many stories.

The "deadly" pitcher of *Nepenthes* is actually part of the leaf. Each leaf has a blade with an elongated midrib that twines tendril-like around nearby branches to support the plant. In the wild, *Nepenthes* is generally found as a climbing plant, with some species reaching overall heights of 50 feet or more. The tip of the midrib develops into an expanded, hollowed end, which forms the trap. Pitchers of the different species vary considerably in shape, ranging from a simple cylinder to an open funnel or an oval sack. The outer surface of the pitcher may be covered with hairs and is usually green with red markings.

When new pitchers form, each one is covered by a lid that does not open until the pitcher is mature. A dense growth of branched hairs, present on both the rim and lid edges, interweaves to form a thick mat and seals the lid in place. As the pitcher matures, differences in the growth rate between the lid and the lower portion of the trap eventually cause the lid to open. Once open, the lid does not reclose. It generally remains angled above the pitcher to serve as protection from rain dilution of the digestive fluid in the trap.

Each plant has two types of glands, digestive and nectar-secreting. The digestive glands are found in a glaucous green or red zone inside the pitcher. These become active early in the plant's life, half filling the young, unopened pitcher with digestive fluid. After the lid opens, an influx of foreign matter increases the amount of fluid secreted, the amount depending on the nature of the trapped foreign substance. Organic matter stimulates the digestive process and brings on a much greater secretion than does inorganic matter. A pitcher usually holds about a half pint of liquid, but it could hold as much as several quarts.

The alluring, nectar-secreting glands are present on the leaf blade, midrib, pitcher lid and between the hairs around the pitcher's opening. They exude a sweet juice that tempts insects.

Exactly how does *Nepenthes* trap its prey? After the lid is open, insects are attracted to the plant by the alluring glands and eventually to the pitcher's rim. The rim slopes inward, and the walls inside secrete a wax. As the victim slides into the pitcher, its feet are covered with the slippery wax, which hampers its attempts to climb out. The victim soon succumbs to the fluid.

When insects and other organic matter enter the pitcher, special enzymes in the fluid digest the matter in much the same manner as digestion in an animal's stomach. The odor emitted in this process attracts a second harvest of flesh-eating insects.

Some organisms are resistant to the fluid and are able to inhabit the pitchers. Bacteria in the liquid help digest victims. Protozoans, diatoms, algae, worms, crustaceans and even tadpoles have been found living in the fluid. Some spiders build nests in the pitchers and live on the insects that fall in. These spiders also dive into the fluid for protection from predators.

With such an interesting structure, tropical pitcher plants would seem to be very desirable for greenhouse culture. They are widely grown in the Orient. But, because of a lack of suppliers and their demanding cultural requirements, *Nepenthes* is just beginning to gain popularity in the United States.

To understand the type of growing conditions needed, one must be familiar with their native habitat. *Nepenthes* species grow in two basic climatic conditions, the lowland rain forest and the highland mossy forest. The lowland rain forest conditions, which are warm and very humid, are easier to duplicate in a greenhouse. The elevation of this habitat is below 1,000 meters, and the light intensity is similar to that of a forest floor. Such species as *Nepenthes ampullaria, N. maxima* and *N. rafflesiana* prefer these conditions.

One method used to create conditions similar to the lowland rain forest is to suspend pitcher plants in baskets at least four feet below the greenhouse roof. Shading is then applied to allow 40 to 50 percent of full light intensity. The best indicator

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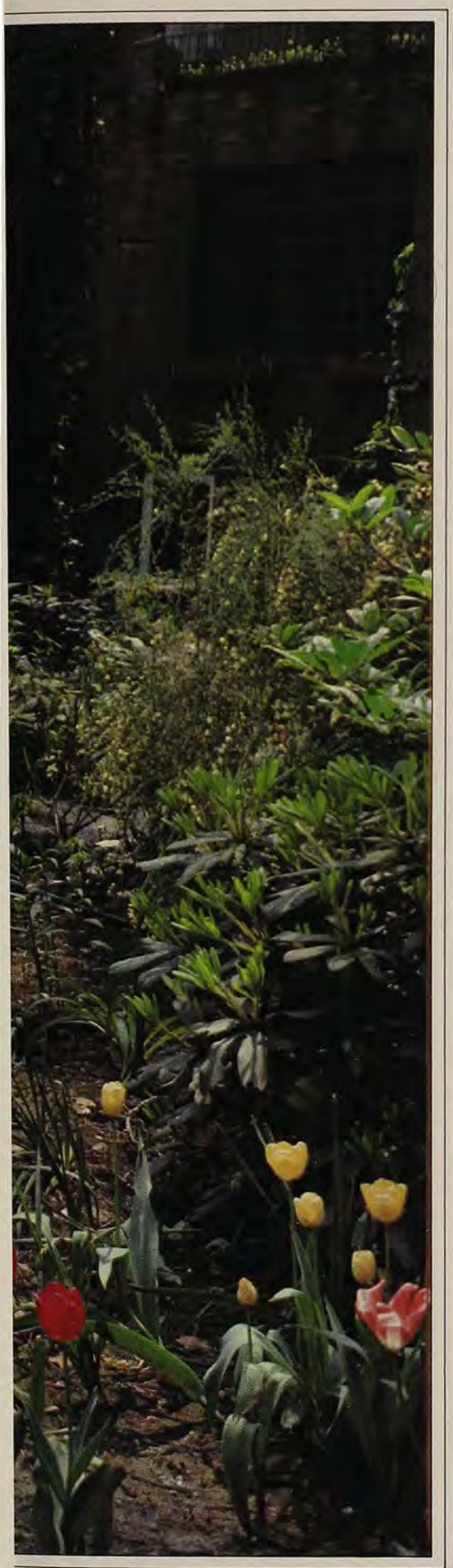
The tropical pitcher plant, a member of the genus *Nepenthes,* uses nectar-secreting glands to lure its insect prey.

Lauralee V. Smith is a program coordinator at Longwood Gardens. She received her Bachelor of Science Degree in Floriculture and Ornamental Horticulture from Cornell University.



A Garden In the Village

TEXT AND PHOTOGRAPHY BY LINDA YANG

The exquisite garden lying tucked out of sight behind the historic church of St. John's-In-The-Village in New York City wasn't always such a gem.

In the late 1800's rowhouses were built along the edge of the yard, completely encircling it. In addition to the shadow cast by these little houses and the church, rapidly growing ailanthus trees added their dense canopy of leaves and branches. Soon the formerly open yard was completely enclosed, a classic example of a problem the city garden often encounters. By the middle of this century, the area seemed doomed to become a study in English ivy survival techniques, since that was all that seemed to thrive there.

In 1974, the church members decided it was time to "do something" about the place. They turned to Pamela Berdan, a retired landscape designer who was active in local Greenwich Village civic affairs, and convinced her to volunteer her services. Intrigued by the challenge, she agreed to devote her time to the garden.

She began by having the large ailanthus trees thinned and shaped to permit more light to reach the ground and then ripped out large sections of the rampantly growing English ivy. Working deep into the long-neglected soil, she turned under generous quantities of cow manure, humus and peat moss to make it friable and to prepare it for the plants to come.

The irregularly shaped yard was criss-crossed with a number of fine stone paths, so Miss Berdan thought it wise to develop the areas one at a time, experimenting to see which plants would fare best. Since she was responsible both for the design and the physical installation, this approach eased the practical chores of planting as well as maintaining the developing garden.

Miss Berdan's goal was to develop a garden with seasonal interest all year long. With that in mind, she selected plants for their sequence of bloom, their color and leaf contrasts, as well as their ability to tolerate the varying degrees of shade.

Numerous azaleas and rhododendrons are featured in the early spring display at St. John's, an intimate church garden in Greenwich Village hidden behind this inviting wrought-iron entry.

The design for the largest area was developed first. Its center is a free-form island of grass that was grown from a shady lawn seed mix. This area was then surrounded with a backbone of winter hardy trees and shrubs, and later, with perennials and annuals.

In a departure from more traditional techniques, Berdan decided to plant the woody material as close together as possible. This provided the instant garden beauty that would satisfy impatient church members who might not understand the problems of long term garden planning and design. There was no way other than to plan, from the start, on digging up many of these plants later and moving them as they matured and needed more space. This approach proved advantageous in that she could use young plants which were able

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Linda Yang is a freelance garden writer and a regular contributor to the *Home* section of the *New York Times*.

April Diary

TEXT AND PHOTOGRAPHY BY MARTHA PRINCE

APRIL 1—The final legacy of March is a lacy covering of snow in the garden. A circle of crocus makes a brave showing anyway, with yellow and lavender cups embracing the bare trunk of our cherry tree. Early daffodils on the hill have shaken off the white flakes, too, and cheerily say, "It's spring."

APRIL 2—Took a look among the woodland pine needles, and yes, trailing arbutus (*Epigaea repens*) is opening pink-white buds. The fragrance always takes me back to an incident in childhood. I picked a tiny blossomed sprig and presented it to a friend of my mother's, a poet. The lady had but recently published a really rapturous verse to the little flowers. Greatly puzzled, she asked, "What *is* this?." My small gift was a great embarrassment.

APRIL 3—Miniature bouquets of the common blue violet (*Viola sororia*) have appeared between the terrace flagstones. Many gardeners banish them. We do, too, from "neat" places when the leaves grow tall and the plants are flowerless. However, I find them an attractive summer cover under rhododendrons. Most plants have places where they truly belong.

APRIL 4—It is most strange that bright blue *Chionodoxa luciliae* (glory-of the-snow) keeps appearing in places we never planted it. There are new clumps of the white-centered stars in the entry garden, and even some down in the woods.

Lenten roses (*Helleborus orientalis*) have been in bloom for weeks. These strange-colored "pink" and pendulous blossoms are perhaps the longest-lasting flowers in the garden. We must get some of the white, earlier Christmas roses (*Helleborus niger*) for next year.

Martha Prince is an artist and writer who gardens on Long Island. Her special interest is wildflowers, with emphasis on rhododendrons and azaleas. Exhibitions of her paintings have been held at many botanic gardens and arboreta.

Shortia *must be the most difficult of the wee woodland flowers to photograph. How many times have I tried lying down flat with a camera?*

APRIL 5—*Scilla tubergeniana* is a charming little bulb, my favorite of the squills. The rock garden has islands of pale blue this morning, so effective between gray rocks and dark, dwarf conifers. The brighter *Scilla siberica* seems almost garish by comparison.

APRIL 6—Our dog-tooth violets (what an ugly name!) again have only the mottled green and brown leaves and no blossoms. They should be in bright-yellow flower about now, so a visit to the woods at Planting Fields Arboretum (Oyster Bay) is in order. The botanical name of our native species is *Erythronium americanum*. In the Rockies we met a western *Erythronium* species, no prettier than ours but with a prettier common name, glacier lily. And the plants are lilies, not violets.

APRIL 7—All the andromedas are the showiest I've ever seen them. Such useful shrubs, especially for an evergreen garden like ours. Their lily-of-the-valley racemes are so pretty! I like the small ones (*Pieris japonica* 'Compacta'), and there is the pink-flowered one, 'Dorothy Wycoff'. I noticed the new red leaves of 'Flame of the Forest'—spectacular. All of which reminds me that I'd better check the seedlings of our native American *Pieris floribunda*. I found the seeds in the North Carolina mountains last fall, so any shrubs-to-be will be truly "mine."

Spent part of the afternoon at the Arboretum photographing the sweet, soft-pink *Viburnum* x *bodnantense* 'Pink Dawn'. I hovered around it like a bumblebee.

APRIL 8—Our bloodroot (*Sanguinaria canadensis*) buds are up. I think them uniquely charming now, each strongly-veined, gray-green leaf enfolds a single flower with such seeming protectiveness. The blossoms open only too soon (glisteningly white) and shatter just as quickly.

APRIL 9—It rained . . . and it rained . . . and it rained. . .

APRIL 10—Too soggy for walking on ground or grass. There was more than three inches of rain! At Planting Fields, *Anemone blanda* is visible from the gravel paths, so that was my garden for today. We have planted some, but the masses and masses of them here—pink, white, blue—are enough to make a joyful day out of a gloomy one.

APRIL11—Hyacinths are beginning to perfume the driveway edge.

APRIL 12—The maidenhair ferns (*Adiantum pedatum*) show tiny fiddleheads in the place where the new wildflower garden is to be. Right now this is really just a storage place for native plant material. The only contours for the final garden are some evergreens and a rock. There is *so* much to do!

APRIL 13—Back to our woods to try (again) to photograph *Shortia galacifolia* (Oconee-bells). This goes on year after year. *Shortia* must be the most difficult of the wee woodland flowers to photograph. It grows in deep shade, the flowers are white (pink bracts and stems), the leaves are dark, and, worst of all, the flowers nod from a height of three inches. How many times have I tried lying down flat with a camera? I wish I were content with painting it; I have, two or three times.

APRIL 14—'Red Emperor' tulips certainly look cheerful today. They make me think of Buckingham Palace ("When

Sanguinaria canadensis.

Christopher Robin went down with Alice"). True royalty.

APRIL 15—Our weeping cherry tree is in full bloom, so it is time for our annual visit to the handsome old ones at the Arboretum. The delicate pink *Magnolia stellata* 'Waterlily' should be open by now. We watch its "pussies" all winter for a sign of the coming spring. They were showing bits of pink last week.

APRIL 16—Early rhododendrons are open. The deciduous *R. mucronulatum* (only good in the pink forms, such as 'Cornell Pink') and the pale yellow of *R. keiskei* make good companions. The compact, dwarf form of *R. keiskei* doesn't mix here, but the "airy" form does. Six or seven of the larger plants in our nursery area are already somewhat oversize for moving, but it must be done. Besides, there is a special pleasure in using big, lovely shrubs one grew from seed. I can't quite describe the yellow . . . lemon ice with just a touch of lime?

APRIL 17—*Rhododendron* PJM looks very handsome. 'Mary Fleming', pale cream, flushed and edged with pink, is doing well this year. Our 'Brandywine' (one of the Guyencourt hybrids, a whole group of fine, small-leaved Nearing creations) is a beautiful bouquet outside the bedroom window.

APRIL18—What a little treasure we have in the rue anemone (*Anemonella thalictroides*). The white blossoms, the stamens, the leaves, the stems . . . all seem fragile; it is *really* a tough little fellow. Our one small clump has spread and spread. Also, it blooms for nearly a month.

The hepaticas are in bloom in the woods, too. Pale lavender—pink—white. The furry little plants hide well, but not from me. Ours are *Hepatica americana*. This is another of those flowers whose "petals" are really sepals.

APRIL 19—Spring-beauties (*Claytonia virginica*) are open. The petal striping looks like peppermint candy sticks! I wish the leaves didn't disappear so quickly after the plants bloom. I cannot remember from one year to the next where to look for them.

APRIL 20—We did a major plant-moving job today. Choosing the tallest and shapeliest *Ilex opaca* (American holly) in the nursery area, we hauled it to a showplace downhill from the front door. The plant we selected was 'Wyetta'. We worked all afternoon, with stops for lemonade. Trying to burlap the roots was a struggle. A child's round aluminum sledding "dish," with extra ropes, really does help in moving plants of such size. The route was 200 feet or so *along* the hill, but much downhill skidding needed much uphill tugging. Besides, I sat in some poison ivy. As the leaves aren't out I didn't see the enemy.

Amelanchier laevis *is dressed in white. I've loved this small native tree for as long as I can remember.*

APRIL 21—I found some white violets (stemless, uncut) with decisively lavender spurs and must look them up. They look like *Viola macloskey* var. *pallens* but for the color. Doretta Klaber's violet book doesn't help. . .

I noticed a bright-red flowering quince (*Chaenomeles* 'Boule de Feu').

APRIL 22—We always welcome the birds of spring. Today I heard the first towhee singing his request for a "Cup of tea?" There has been a black and white warbler in the woods too.

APRIL 23—The wake robins are open (*Trillium erectum*). Who on earth started calling these lovely things "stinking willy"? Their three mahogany-red petals are an indispensable part of spring.

APRIL 24—We have three large Schlippenbachii azaleas across an expanse of grass from the living room window. Against an evergreen background, this Royal Korean azalea (*Rhododendron schlippenbachii* . . . affectionately "Schlippi") is so beautiful. I was indoors writing all day, but I could glance across the lawn and see them. As the leaves aren't open yet, the plants seem to be densely covered perches for large, soft-pink butterflies.

APRIL 25—Why *Rhododendron* 'Christmas Cheer' has the name it does I don't know. A fine plant! The form is good (neat, compact), and it flowers reliably. The name would lead one to expect red, but the only red is the style. The pink is almost white. Last year we moved a large one (home-grown) to a spot visible every time we open the front door. Lovely . . . and there were so many trusses of bloom I could not count them.

APRIL 26—*Rhododendron* 'Idealist' is open, in its new home by the terrace. A pleasure. Rhododendrons with deep color in the buds and paler open flowers have a certain charm others lack. This has pink buds opening to cream.

APRIL 27—*Amelanchier laevis* (serviceberry) is dressed in white. I've loved this small native tree for as long as I can remember. My grandfather, a bird lover, planted a quarter-circle of them behind our Georgia home. Their berries were to be birdfood, strictly, though the berries make good jelly for people, too. Those trees died long ago, but I won't forget them. The serviceberry must be a rather short-lived tree.

APRIL 28—Planting Fields has a color combination of plants we must try. *Mertensia virginica* (Virginia bluebells), a nodding pink and blue wildflower, is planted under highbush blueberries, which have drooping bells in cream at the same time. Pretty.

APRIL 29—Redbud (*Cercis canadensis* and *Cercis chinensis*) is in bloom. The unusual pink pea-flowers may cluster tight along the gray trunk or branches. Redbuds are being planted in a few places along the Long Island Parkways, and the color makes it easy to spot. Someday I want to have serviceberry and redbud scattered down the whole of our hillside like a mountain above the Shenandoah Valley.

APRIL 30—Our best garden songster arrived for the summer, the wood thrush. This perky brown fellow with his spotted vest was exploring the edge of the terrace, hopping occasionally (for protection?) into the rhododendrons. I look forward to his serenade early this evening. Perhaps the weather is warm enough to sit on the terrace, for a while at least, to hear his concert.

MAY 1—The trees (especially the maples) are in full leaf now, that special green meaning spring is firmly installed in the garden. To think it is only a month since the first pale green haze appeared in the treetops!

Trillium erectum.

Pierre Magnol (1638-1715).

MONTPELLIER:

A Thousand Year Plant Heritage

TEXT AND PHOTOGRAPHY BY DAVID W. LEE

The countless plant varieties we use today to enrich our home landscapes and vegetable gardens are partly the result of a scientific development that began in Europe during the Renaissance. This was an age of geographical exploration when new plants were brought from the four corners of the world, and it was also a time of intellectual exploration when our understanding of the nature of plants was put on a scientific footing. Knowing the relationships of different plants and the functions of different plant organs became the basis of further progress. Although these developments took place in many cities in Europe, Montpellier was particularly important. The story of this French city gives us some insight into the development of this scientific tradition.

City of Spices and Medicine

Montpellier was founded during the 10th century on a small hill near the Mediterranean coast. Although over 900 years old, it is young when compared to nearby Roman cities, such as Nimes and Arles, and its relative youth poses the question of why it originated and grew into a large city so near other established cities. Its beginning was humble: just a few farmhouses and a chapel. The origin of its name is debatable. Some think the Latin name, *Mons Pistillaris*, describes a mountain of spices. Others believe it was the name for a small herb (the woad, *Isatis tinctoria*) collected for dyeing wool a pastel blue color.

Montpellier grew quickly. The small village was adjacent to the ancient Roman highway, the Domitian Way, and near several other important routes traversing southern France between the Rhone Valley and Italy to the east, and Spain to the southwest. Much of Montpellier's early settlement resulted from the evacuation of the ancient church and city of Maguelone, 12 miles to the southwest. Maguelone was subject to attacks by seafaring Muslims. Undoubtedly, Montpellier was a way station for the crowds of pilgrims traveling to and from shrines in Spain. This traffic increased as the fame of The Shrine to St. James in Compostelle, Spain spread throughout Europe. One can envision the weary travelers arriving at this small village on a hill just south of the highway. Many were suffering from illness, and the object of their pilgrimage was a cure. Herbal remedies, many collected locally, were probably sold to the pilgrims. Soon the demand must have been urgent enough for physicians to take residence in the growing village. They used medicines made from the fragrant plants of the surrounding Mediterranean vegetation (the *garrigue*) and prepared them from plants imported from the East.

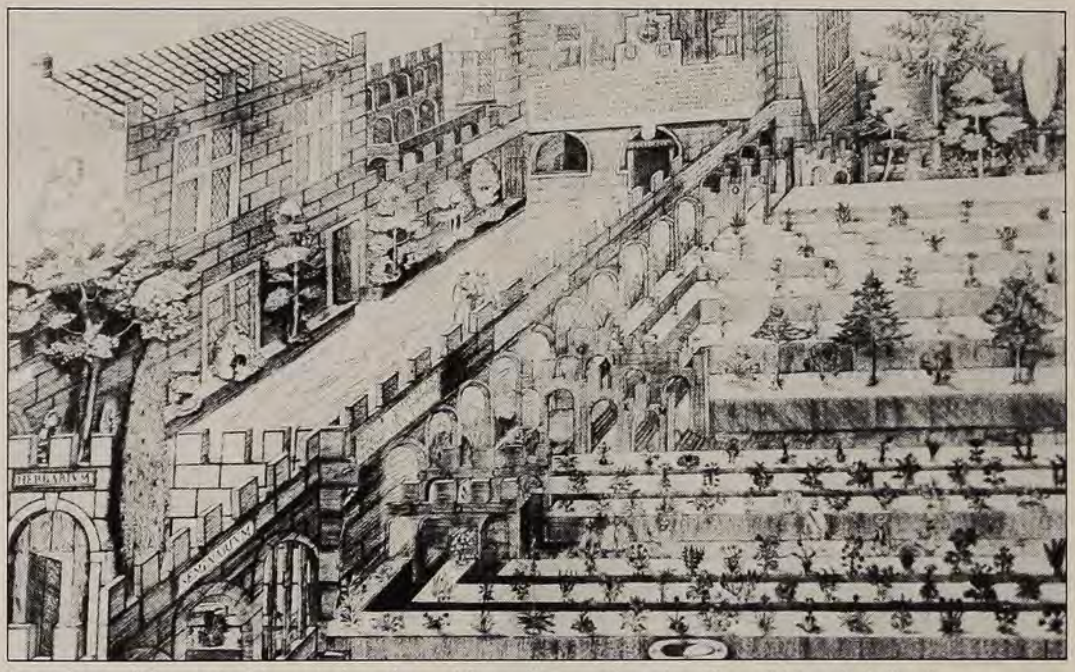
From these humble origins as a way station for pilgrims, Montpellier quickly developed into a grand and cosmopolitan city. It was served by the port city of Lattes and had a direct link with countries encircling the Mediterranean: Morocco, Egypt, Palestine, Greece, the Italian city-states and Spain. Yet it was far enough inland (and well enough fortified) to resist attacks by the Muslims. Montpellier was surrounded by vast grassland areas, suitable for grazing, and the source of materials used in the production of handcrafts and herbal medicines. The founding fathers permitted the development of a municipal autonomy of government by council. Councilors were elected by members of various trade associations in the city. In the 12th century the council oversaw the construction of a fortified city wall, the improvement of the port and the safeguarding of the route connecting the port to the city. Montpellier had sought and received Papal permission to trade with the infidels, the Muslims who monopolized the spice trade. The city became a major point of entry into Europe for all sorts of exotic goods.

By the end of the 12th century Montpellier was a city renowned throughout Europe and the Mediterranean for the importance of its trade and the quality of its medical care. The community of physicians first grew into an informal center for the teaching of medicine (through apprenticeship), and then into a full-fledged medical university, organized by the Bishop of Maguelone and authorized by Papal bull in 1220. The physicians were Jewish, Christian and Muslim. Although each of these cultures affected the practice of medicine at Montpellier, the strongest influence was the teachings of Constantin the African, who had founded the famed medical school at Salerno, Italy, a cen-

David Lee teaches and does research in the field of tropical botany at Florida International University in Miami. He was a Visiting Professor at the Institute Botanique in Montpellier during 1977 and 1978.

tury earlier. Soon medicine became part of a larger and more important university that also included faculties of law and the arts.

With the flourishing of medicine came hospitals and pharmacists. Large hospitals, run by religious orders, were functioning by the end of the 12th century. Some, such as the Hospital St. Eloi, have continued to this day. Along with its trade in spices it was logical that Montpellier also become a center for the production of medical remedies. Some were simple lozenges and syrups, and others were exceedingly complicated herbal potions such as mithridal and theriac. A quarter within the medieval city was devoted to the manufacture and selling of these potions.



An etching of the original botanical garden at Montpellier, attributed to Pierre Richer de Belleval.

Towards a Science of Plants

The medicines used by the physicians of Montpellier were part of a heritage of medical treatment handed down by the Greeks (Dioscorides) and Romans (Pliny and Galen) and amended by the Arabs (through Avicenna). Most of them were of plant origin. Galen had admonished physicians to "become experts in all matters of plants, animals and metals and to learn the materials of drugs by frequently personally inspecting them." Medicine was further modified by Eastern ideas conveyed through the practice of alchemy.

Physicians were beset with various problems in using medicinal plants. Many of the plants arrived as dried leaves or roots and were difficult to identify. Even if the plants were alive, the typical physician was not capable of recognizing them. Physicians, ignorant about the appearance of medicinal plants, depended upon but were suspicious of pharmacists. Throughout the Middle Ages the two professions viewed each other with mistrust, with the physicians frequently struggling to obtain the rights of inspection and licensing of pharmacists. It was the dependence on plants by medieval doctors, and their ignorance of the same plants, that set the stage for the scientific study of plants during the Renaissance.

Rondelet and His Circle

The scientific study of plants at Montpellier began under the energetic tutelage of a university physician. Guilliame Rondelet was born in 1507 of a Montpellier family of traders in aromatic plants. He studied arts and letters in Paris but returned to Montpellier to take a degree in medicine. After working and travelling abroad, he settled in Montpellier as a member of the medical faculty from 1539 onwards. Rondelet was a man of great wit and charm and tremendous intellect and energy. The generations of students he attracted to Montpellier laid the foundations of botany during the Renaissance. Best known for his study of fish, Rondelet described many new species unknown to classical authors and helped to create the science of ichthyology.

The bulk of his writings were on medicine, and we can only speculate on his ideas about plants from reading the contributions of his students. Mathias Lobel reputedly had the physician's personal permission to publish many of Rondelet's ideas in his writings on plants. Rondelet lectured on medicinal plants growing at the university, but with his passionate interest in natural history, he studied all plants. In addition to lecturing he personally led his students into the field, within the city walls to a garden of medicinal plants and then into the mountains some 30 miles north of the city. Rondelet impressed upon his students the importance of knowing medicinal plants and checking the accuracy of pharmacists. Even more significant, Rondelet embodied the Renaissance spirit of inquiry. He was interested in all living phenomena. In a period when human dissection was generally frowned upon by the Church, and even by most doctors, Rondelet autopsied his stillborn first son and other deceased family members in his passion to learn what caused their deaths.

Students came to Montpellier's medical faculty from all over Europe, and those particularly interested in studying

The master and his students, perhaps Richer de Belleval himself, instructing medieval students on the properties of plants. From the same etching.

plants came to study under Rondelet. The list of those he taught or corresponded with included almost every important figure in the development of botany during the 16th century. On an earlier visit to Italy he made the acquaintance of Ullysse Aldrovandi, the prolific naturalist; he corresponded with Valerius Cordus, eminent German Renaissance physician and botanist; Rabelais, the Renaissance master of French literature, came to Montpellier in 1530 to become a physician and lodged with Rondelet. Rabelais was an accomplished botanist, and he gave homage to his friend in the third book of *Gargantua and Panagruel.* In it, we find Rondelet, thinly disguised as Rondibilis the physician, discussing the eventuality of adultery in marriage. The Bishop of Maguelone, Guilliame Pellicier, was also a close friend of Rondelet's and shared his passion for natural history. This friendship was all the more remarkable because Rondelet was a Protestant and Pellicier was under extreme pressure to repress the growth of Protestantism in his district, which included Montpellier. Charles de L'Ecluse (better known as Clusius) came to Montpellier in 1550 to live and study with Rondelet. Previously he had studied civil law at Louvain, philosophy at Marbourg and theology at Wittenburg. Later on he collected and studied plants throughout Europe and eventually founded the celebrated botanical garden in Leiden, Holland, in 1577. Jean Bauhin came to Montpellier in 1561 and later worked in Switzerland; Conrad Gesner and Pierre Belon also studied with Rondelet. These students formed a network of cooperative research in the description and classification of plants that spread throughout Europe.

Academic life in 15th century Europe was similar to that today. Researchers communicated with each other regardless of political or cultural boundaries. They published manuscripts in the form of descriptive books. They travelled from university to university or from region to region to learn more about plants. Montpellier was *the* destination for learning about plants, because of Rondelet and the diversity of plant life in the surrounding countryside. As testament to their accomplishments, the Montepellier alumni have been commemorated in the generic names of many flowering plants: *Lobelia, Clusia, Gesneria, Rondeletia, Bauhinia* and others.

Richer de Belleval's Garden

Rondelet's responsibility for lecturing on medicinal plants was eventually assumed by Pierre Richer de Belleval. He was a much less ebullient personality than Rondelet and prone to neglect his teaching duties, but he possessed a single-mindedness toward one grand enterprise: the development of a garden such as the world had never seen. The first scientific gardens were founded in Italy (Padua in 1543, quickly followed by Pisa and then several others). These gardens displayed plants in very artifical ways, such as by fragrance or medicinal use. Richer de Belleval believed that plants should be grouped according to where they existed in nature, taking into consideration the ecological requirements of each species. Through some political maneuvering he obtained a charter and financing from King Henry IV, and his celebrated garden was opened in 1593. We have a good description of it from an etching commissioned by Richer de Belleval and from the correspondence of a Dutch medical student to Clusius in Leiden. The most remarkable feature of this garden was an artificial mountain on which plants were grown at various positions, according to their requirements in nature. The botanical garden at Montpellier, which anticipated the future science of plant ecology, led a very perilous existence. Protestantism had swept Montpellier early in the 16th century, and tension between Protestant and Catholic authorities eventually led to open warfare. The garden and city were repeatedly damaged during the 17th century. Belleval himself rebuilt the garden more than once. Despite further despoliations (most recently by the Germans in World

War II), the garden presently exists on its ancient site and contains vestiges of its origin.

Magnol and Successors

The supervision of the garden and the post of lecturing on medicinal plants passed on to several less illustrious successors. Then they fell under the responsibility of one of the most famous botanists of the 17th century, Pierre Magnol (1638-1715). Magnol was the son of a Montpellier pharmacist and studied medicine in the city. His contribution to the scientific study of plants was to help establish the notion of a natural system of classification. Previous artificial systems stressed the importance of a single character, such as growth form, for classifying plants. Magnol recognized that plants similar to each other in many ways could be grouped together into families, and he established the use of this unit of classification for plants. Magnol is, of course, the source for the name of a magnificent flowering family of trees, the Magnoliaceae.

Other successors made important contributions, and eventually a school of botany became separated from the Faculty of Medicine. Augustin Pyramus de Candolle directed the school and garden from 1808-17. Because of his Protestantism he was forced to leave, and he then formed the Institute of Botany at Geneva. At Montpellier de Candolle founded a school of forestry and made many improvements in the garden. The tradition of de Candolle continues to the present day in the modern Institute of Botany adjacent to the botanical gardens. Many illustrious botanists have worked there. Gaston de Saporta, one of the founders of the study of plant fossils (paleobotany), taught at Montpellier for most of his career.

Photo courtesy of French Tourist Office

The Place de la Comédie in Montpellier.

The City Today

The small medieval village of Montpellier, transformed into a cosmopolitan center of trade and scholarship, and then destroyed in the wars of religion, is today a fast growing metropolitan center of 150,000 inhabitants. Many monuments to its early history have disappeared, such as the Romanesque churches destroyed by Protestants, but many remain. One can walk in the same narrow streets where Rondelet and Rabelais laughed and argued. Some old professors' homes, such as Magnol's, still exist. The garden continues today, full of charm and tradition, and so do the old buildings of the medical faculty. Perhaps even more significant is the continuation of traditions begun a thousand years ago. Montpellier is a large educational center, with a cosmopolitan student population of more than 35,000. Students enroll in the faculties of medicine, dentistry, pharmacy, chemistry and agriculture, among others. Other institutions have been drawn by the tradition of scholarship in the city. Montpellier is the center in France for plant ecological research and also the center for research in tropical agriculture. The faculty of science is internationally known for its research in paleobotany, and other disciplines are presently expanding.

The Montpellier of today is the result of a millenium of traditions in the trade and study of plants. To visit or live there is to have the rare opportunity to retrace this tradition, which helps illuminate the pattern of development of the scientific study of plants.

What To See In Montpellier

Montpellier is in the midst of a very attractive region of France and can be visited along with the Roman ruins of Nimes and Arles, the papal palace of Avignon, as well as the medieval town of Aigue Mortes and Carcassonne. The city is connected by rail with Spain and all parts of France, and is reached by air from Paris and London. A city of students, businessmen and tourists, hotels for any taste or budget are available. Information on hotels can be obtained from the Syndicate D'Initiative, Place de la Comedie, 34000 Montpellier. Information about the sights of the city, including old streets and residences, can also be obtained from that office.

The Faculty of Medicine presently occupies a 14th century monastery; the earlier site is used by the Ministry of Health. The rooms adjacent to the library contain portraits and souvenirs of ancient professors, and the library possesses an extremely rich collection of early botanical and horticultural works. The botanical garden, which is still administered by the Faculty of Medicine, shows some signs of its first construction—rows of statues of the old botanical masters, a fine orangery dating from 1805, some magnificent trees and much more. The grand building of the Institute of Botany adjacent to the garden is presently occupied mainly by a new school of dentistry. Its rich and historic herbarium may be visited by contacting Mr. Granel de Solignac at the Institute, 5 Rue August-Broussonet. Its library, rich in ancient books, is of interest to book lovers. The municipal library, located in an old Jesuit college, also has a fine collection of books on all aspects and epochs of natural history. A visit to Montpellier should be rounded out by visiting one of the chateaux in the surrounding countryside. The Chateau de la Mogere (18th century), just east of the city, is particularly charming. ❶

The Municipal Library of Montpellier, a rich repository of ancient books on natural history and old manuscripts.

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of adequate exposure is the leaf coloration. If the leaves begin to turn bronze, the plant is receiving too much light. If the plants receive too little light, trap formation will be curtailed. Low levels of humidity will also cause the plants to stop forming traps.

Temperatures for the lowland rain forest species should be maintained above 70° F (21°C); optimum humidity levels range from 70 to 90 percent.

Small lowland species may be grown in large, covered terrariums; one species suitable for terrarium culture is *N. ventricosa*. Constant high humidity is maintained by adding water to the bottom two inches of the terrarium. An aquarium heater will keep the water warm and evaporating. Upside-down pots should be used to support the potted *Nepenthes* above the water level.

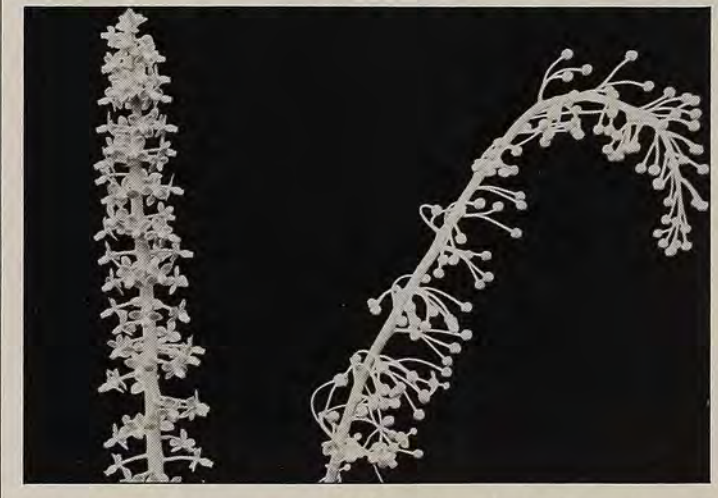
The highland mossy forests are over 1,000 meters in altitude and have a thick cloud cover and high humidity most of the time. Species such as *Nepenthes burbidgei, N. fusca* and *N. lowii* thrive in these conditions. Temperatures average 50°-68°F (10°-20°C) during the day but drop to about 40°F (5°C) at night. Maintaining these temperatures in a greenhouse during hot summers may require an air conditioning unit.

Due to their weak root systems, both groups of *Nepenthes* maintain their turgor by taking moisture from very humid air. In the greenhouse, a mist system is needed to supply the appropriate humidity, and watering is necessary even if a mist system is used. These plants easily suffer from drying out and ought to be thoroughly watered (from the top only) while the medium is still slightly moist.

Nepenthes should be potted in a light mix such as half sphagnum moss, half osmunda fiber and a small amount of charcoal. Apply only lateral pressure around the roots; vertical pressure may break the very frail root system.

Unlike some other carnivorous plants, *Nepenthes* will withstand relatively high fertilizer salt content in the medium. After the plants are established, they should be fertilized at least once a month. Fish oil emulsion or other organic fertilizers alternated with an inorganic fertilizer such as 20-20-20 will give the needed nutrients. An occasional application of an acid fertilizer is also beneficial. Supplementing the nutrient supply with insects is not necessary when such a program is followed.

Photography courtesy of Longwood Gardens



ABOVE: The amount of fluid in a pitcher may vary from half a pint to several quarts. LEFT: *Nepenthes* are dioecious. The male flowers (right) and female flowers (left) are borne on separate plants.

An ideal specimen of *Nepenthes* is low and shrubby with numerous, large pitchers. To obtain this form, a grower must prune back about a foot of the plant every year to force lateral buds into growth. Flowering plants no longer produce pitchers. Since flowering usually occurs in August and September, a late July pruning is recommended to prevent flowering and to promote pitcher formation.

Individuals interested in more information on *Nepenthes* or other carnivorous plants should consider joining the International Carnivorous Plant Society. An annual subscription of $10 ($15 for foreign) includes a subscription to *Carnivorous Plant Newsletter*, a quarterly publication that is both informative and attractively illustrated. Access to a seed bank, special society publications and regularly scheduled meetings are other benefits of membership. Correspondence regarding subscriptions should be addressed to Mrs. Kathy Fine, c/o The Fullerton Arboretum, California State University, Fullerton, CA 92634.

Where to obtain *Nepenthes:* World Insectivorous Plants, P.O. Box 303, Grant, FL 32949. Catalog 50¢. Subscription to update lists (3 or 4 per year) $1.00. Newest update list included with each catalog request; Peter Pauls Nurseries. Canandaigua, NY, 14424. Catalog, 25¢.

STRANGE RELATIVES CONT'D

Continued from page 9

erally, a tree is either male or female, so all trees do not bear fruit.

Lindera benzoin is the native American spicebush or benzoin, listed in some references as *Benzoin aestivale*. Benzoin is a vernacular word of Arabic or Semitic origin for an aromatic gum. The odor of the spicebush is said to resemble that of benzoin. This benzoin or spicebush is not the benzoin of druggists.

The spicebush is a hardy shrub in swamps and woods from northeastern United States southward and west to Kansas. It is widely used as a landscape plant. Its flowers, male and female on separate plants, small but crowded on the stems, provide yellow color in the spring scene; its aromatic leaves turn golden in the fall and are accompanied by bright red berries.

An aromatic tea is sometimes made of the young leaves, twigs or fruits of *Lindera benzoin*.

The only native American laurel is *Umbellularia californica*, a single species, known as California laurel, Oregon myrtle, bay tree and balm of heaven. One of the most abundant and characteristic of California trees and a striking feature of the landscape, this highly aromatic evergreen laurel is a source of wood for utilitarian and artistic products. Its leaves are used for flavoring although it is too strong a flavor to be as agreeable as leaves of *Laurus nobilis*. Kernels of the fruit were eaten by the Indians.

This account does not by any means exhaust the list of Lauraceae species, but mention should be made of the largest genus, *Ocotea*, a South American timber tree, and *Litsea*, or pond spice, another timber genus.

The green bay tree is legendary and ornamental—and aromatic.

Sassafras is historic and ornamental—and aromatic.

The spicebush is a popular American native, also ornamental—and aromatic.

Avocado is of archaeological and commercial interest—and aromatic.

Cinnamon is a culinary product with historic association—and is aromatic.

Oregon myrtle, or California laurel, is a woodcrafter's tree—and is aromatic.

What a breadth of intellectual and sensory stimulation is to be encountered in this family! ❶ —*Jane Steffey*

Jane Steffey is the horticultural advisor to the American Horticultural Society.

PERENNIALS CONT'D

Continued from page 19

shrivel and wither, and flowers will turn brown. Although this condition will continue for the remainder of the year, the plants are far from dead. The following spring a new cycle will begin. This is just one example of how plants detail their needs and demands for sun or water to teach the gardener a lesson.

For additional late summer color, the gardener might select a neat, yellow, daisy-like flower called *Inula ensifolia.* It is a tough, sturdy plant that furnishes durable blooms in July and August about two feet tall. Unmindful of the occasional torrid heat, it is at its best in full sun. It unfailingly reappears in the spring to groom itself for the part it will play in the summer border.

Another plant the gardener might choose for summer heat, which blooms from early July into September, is called *Achillea filipendulina* 'Moonshine'. This plant has cutleaf, silvery foliage about six inches high. Flower spikes reaching 18 to 24 inches are lemon yellow. The flower heads are 2½ to 3 inches across on strong stems and are durable as dried flowers. They are an arranger's delight.

As summer progresses, the border would be enhanced by the addition of *Thymus adamovicii,* which adds mats of rose-colored flowers that bloom during July and August and again in October. Another member of this genus, Baltic thyme, is a fast-spreading mat no higher than six to eight inches when in bloom. It is a most floriferous plant with lavender blooms that requires a three-foot space in the border.

The gardener might also add *Platycodon grandiflorus* 'Albus' to his August border for pure-white flowering sentinels that guard all low plants in the border, attaining a height of 24 inches. In the fall it vanishes and makes a slow reappearance in the spring without interfering with the splendor of the spring and early summer border.

In September, *Sedum spectabile* 'Brilliant' might be a good choice. It is 18 to 22 inches high, has blue-gray foliage and flower heads of a deep-rose color. It remains unobtrusive as the spring and early summer parade passes by, coming into its own when other plants find the struggle for survival difficult during the late summer heat.

Another plant the gardener might select for September bloom is called *Allium senescens* var. *glaucum.* It has bluish-gray, narrow leaves that have as a feature an intriguing twist from ground level to top. Out of bloom it is difficult to bypass with its twisted, clean-looking habit. In September, small, half-round, rose-colored heads on eight-inch stems supply a rich, warm tone. It spreads on creeping, branching rhizomes into a vigorous, nearly indestructible plant. It grows lustily in record-breaking heat and is likewise indifferent to intense cold.

The white-flowering *Allium tuberosum,* commonly called Chinese chives, is a good choice in the September-October border. The flowers rise from six-inch plants during the late summer months on sturdy stems to a height of 18 inches. Its snow-white heads are sweetly heliotrope-scented. Every inch an aristocrat, this allium takes icy winters and hot summers in its stride. It has a long flowering season, and as a cut flower is long lasting. Then, as flowers fade, the long stems are ornamental enough to be used as dried flowers.

Another fine addition to the border would be sturdy *Chrysanthemum arcticum,* commonly called arctic daisy. This chrysanthemum from the icy regions of coastal Alaska is ideal. In spring and summer it provides a rich, shiny-leaved groundcover and backdrop for the plants then in flower. During late summer, sturdy flower stocks emerge and grow a foot or more and branch into many parts. The ends, still growing, break into hard, frost-proof buds. It illuminates the border with bright-looking daisies in late September and during October. As shadows lengthen on the frosty border, it flares into a dazzling white that challenges winter's steady, relentless calm. Later, as the first snow blankets the garden, a brave stalk with a few hard buds may peek through, perhaps opening a bud or two, then blooming bravely for an hour or so before bidding a final farewell to the seasons of color achieved with a perennial border.

Plants may be ordered from:

Carroll Gardens, Westminster, MD 21150.

Spring Hill Nurseries, 6523 North Galena Rd., Peoria, IL 61632.

Sunny Border Nurseries, P.O. Box 86, Kensington, CT 06037.

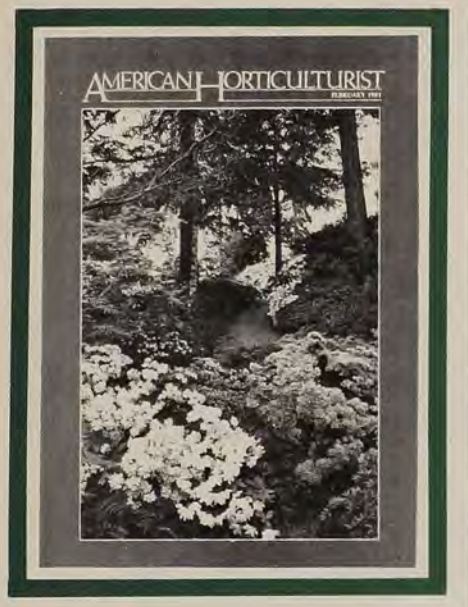
K. Van Bourgondien & Sons, Inc., 245 Farmingdale Rd., Babylon, NY 11702.

Wayside Gardens, Mentor Road, Hodges, SC 29653.

Weston Nurseries, East Main St., Rt. 135, Hopkinton, MA 01748.

White Flower Farm, Litchfield, CT 06759.

LETTERS



Tree Peonies

As plantsmen who have been producing 50 named varieties of tree peonies for almost a decade, we were pleased to see the February article by Mr. De Blasi. However, our long experience suggests that his cultural recommendations are far too cautious and would, if taken literally, cause a great many gardeners to miss out on the beauties of this remarkable plant.

First, our nursery, where some 1,800 stock plants and 10,000 grafts in production beds grow quite happily, is located at 1,100 feet in the northwest corner of Connecticut where temperatures regularly touch minus 15, occasionally minus 20. Snow cover is not constant in a typical winter. This is full zone hardier than the Zone 5 suggested as their maximum range, and we routinely ship to customers in Zone 3. These are *very* rugged plants once established.

Second, we have display borders in which tree peonies grow quite splendidly about three feet in front of a hedge of columnar buckthorn on one side and a lawn on the other. The buckthorn is a very vigorous plant. The reason for the caution about nearby plantings is, presumably, competition for nutrition. It is, in our view, unwarranted.

Third, spring planting of tree peonies is poor practice, even if they are offered in containers. Fact is, they do rather poorly in containers and are likely not to have been grown in them—which means the plant has probably been in the transplanting process for months and is rather weak. Yes, the Japanese manage to maintain exquisite specimens in large containers, but we know of no nursery, including this one, that does so successfully.

Finally, patience is not required with tree peonies if you are dealing with a serious grower. Our grafts are sold after three or four years in the fields here. They are large and well-rooted, with multiple eyes, and have bloomed here. This makes for a high success ratio on transplants, early bloom for the customer, and an opportunity to rogue the crop for mislabeling before shipment. Small grafts, many of which are imported from Japan and immediately resold, are not very good value though they may be bought cheaply.

The above is offered only to encourage more people to get acquainted with these extraordinary flowers.

Amos Pettingill
White Flower Farm
Litchfield, Connecticut

I am just writing to say how much I enjoyed the article by Anthony J. De Blasi on the Japanese tree peonies. It is so vividly and imaginatively written and gives good information. It has inspired me to try some of them, to give one as a gift. Thank you, and thank him also.

Lenora Sattmann
Miramonte, California

Integrated Pest Control

I would like to express my appreciation to you and author Nigel E. A. Scopes for the very informative and stimulating article, "Integrated Pest Control" [February, 1981 issue]. I was recently at an agricultural fair in San Diego County and was thoroughly nauseated by the perverted orientation of growers and farmers toward chemical pesticides. Of course, I know generally the relationship between the use of chemical pesticides and beneficial insects, but your article gave such specific details that I am astounded at my ignorance on the topic. Surely integrated pest management is the wave of the future, particularly with increased costs of petroleum-derived pesticides. I hope you will continue to carry articles of this nature. Citing commercial sources of the agents discussed is, of course, invaluable.

R. Mitchel Beauchamp
The California Native Plant Society
National City, California

FROM PLANT BREEDER TO HOME GARDENER: SELECTING THE PLANTS WE GROW

Who chooses the flowers and vegetables of the future? "You do" would be a facile but misleading answer. In the final accounting, the home gardener shapes the general direction of seed breeding—his or her buying or refusing to buy new varieties tells the plant breeder whether his programs are on target—but breeders can't afford to take a wait and see attitude. The time lag between the conception of a breeding program and the general availability of seeds and plants is too great—and too expensive. Consequently, plant breeders breed what they think you, the home gardener, would like and would buy.

At many junctures the scientist is limited within the species in question by the state of the arts in plant breeding. Still, more and more "breakthroughs" are being made by plant breeders, brilliantly synthesizing techniques from the theories and practices of several scientific disciplines. But intricate genetic possibilities have a way of eluding the plant breeder when it comes to the details of implementation. He must proceed toward a goal in a series of small steps. You could compare the plant breeder to an architect developing model plans to suit a large committee. He or she listens to all concerned parties, then attempts to construct a representative model that can be produced in quantity at a price the market can bear. That model, by the way, is never introduced before it is tested nationwide.

Goldsmith

Goldsmith

Doris Brumbach

TOP: *Zinna* 'Peter Pan Flame'. BELOW RIGHT: *Dianthus* 'Magic Charms'. LEFT: Visitors at Cylburn Wildflower Preserve rate All-America Selections winners. The garden is located at 4915 Greenspring Avenue, Baltimore, MD 21209. Call (301) 396-0180 for information regarding visiting hours and special events.

Two of the "concerned parties" who, along with home gardeners, have a say in the specifications for new model flowers and vegetables are bedding plant growers and commercial producers of vegetables for fresh market or processing.

Before you comment, "Who invited them?", understand that their interests usually parallel your own. Bedding plant growers want new varieties that will bloom quickly in flats, packs or pots, stay in condition for an extended period in the retailer's hands and "take" strongly and surely when transplanted. As for the commercial vegetable growers who have been drawn and quartered by every writer who has a

bone to pick with mass marketing and/or the private enterprise system that supplies most of our food, their indirect contribution to home gardeners has been immense. They have poured millions of dollars of research into the breeding of vegetable varieties to meet specific production, harvesting, processing or marketing needs. Most of the benefit has come in the form of multiple resistance to plant diseases, extreme productivity, tolerance to weather stresses and compact plants. In pursuing these goals, breeders neglected, with a few vegetable species, to keep pace with flavor and texture, but this was a comparatively benign omission.

An additional restriction on the plant breeder is that he is bound by a budget that must cover everything from new isolation cages, to labor for hand pollination, to elaborate equipment for electrophoresic analysis of tissue. He has to arrange priorities for breeding projects that must be based on, "Will it sell?" If a proposed new variety, like any other new product, can't promise enough profit within a short time to more than return developmental costs, it will not advance beyond the early experimental stage.

Complicating this system of research, development and marketing is the fact that the free world's vegetable and flower marketers introduce more than 100 genuinely new garden varieties every year. There is no way for seed marketers to list all these new introductions, much less exert equal marketing pressure on each, so some languish. When you compound this breakdown in implementation with the preference of some gardeners for old varieties, a plant breeder is fortunate to have any of his new creations return a profit.

Where, then, does the plant breeder get his ideas for new varieties and the confidence to implement them? Letters from home gardeners; visits to bedding plant growers and marketers; suggestions from his company sales force; brainstorming sessions with home garden seed marketers; basic research in garden plants by university scientists; advice from Extension Service specialists who serve both home gardeners and commercial growers; and the stimulating influence of meetings with fellow scientists in professional societies.

Plant breeders love to "hang around" incognito at shows and expositions. They find the experience instructive. Acting like Joe or Jane Citizen, they mingle with visitors at trial grounds and display gardens eavesdropping on comments. They staff information booths in meetings of garden writers, instructors and broadcasters who are in frequent contact with the gardening public. There, they get an earful of, "Why don't you . . .?"

Despite flat spots on the wheels of progress, the visions of plant breeders often match the preferences of home gardeners. There was an incredible acceptance of 'Sugar Snap' pea, the Gold Medal All-America Selection, for example. The public purchased 1,750,000 pounds of 'Sugar Snap' seeds in just two gardening seasons.

Consider also the synchronicity when a poll of 500 visitors was taken at the All-America Selections Display Garden at Cylburn Wildflower Preserve and Garden Center in Baltimore, Maryland. Each visitor was asked to rate 200 varieties of annual flowers on trial. Would the home gardeners' answers coincide with those of the professional judges, many of whom were plant breeders? By a vast majority, their responses supported the judges' choices.

Among the flowers on display were 'Blitz' hybrid impatiens and 'Apricot Brandy' celosia, previously selected by the professional judges of All-America Selections as national prize winners for 1981 introduction. The home gardeners overwhelmingly chose 'Blitz' as the best flower in the 1980 trials. 'Apricot Brandy' ranked sixth in preference among all flowers and first among the celosias.

The good eye of professional judges for attractive flowers also showed up in the popularity of All-American Award winners from past years. Scorekeepers at the trials at Cylburn found 'Magic Charms' (Bronze Medal, 1974) to be the most popular dianthus; 'Queen Sophia' (Bronze Medal, 1979) to be the most popular marigold; 'Holiday Time' (Bronze Medal 1980) to be the most popular ornamental pepper; 'Sangria' (Bronze Medal, 1980) to be the most popular verbena; and 'Peter Pan Flame' (Silver Medal, 1980) to be tied for first place as the most popular zinnia.

From this degree of agreement between professional judges and amateurs, it would follow that you can trust plant breeders and judges to properly represent the interests of home gardeners in choosing the flowers and vegetables of the future.

—James W. Wilson

James W. Wilson is the Executive Secretary of All-America Selections, Inc., and the National Garden Bureau.

Continued from page 23

to adjust more easily to their new and sometimes difficult surroundings. The method also enabled her to stay within a more modest budget.

To transplant successfully, it was important to determine optimum times for moving the different species. Magnolias, for example, she found were best moved in March. The many rhododendrons and azaleas could most easily be moved anytime during the month of April. The Warminster brooms, *Cytisus* x *praecox,* on the other hand, she found did not like being moved at all. They were planted in their temporary quarters while still in their pots, until it was time to locate them permanently.

The early spring garden display at St. John's now begins with a variety of bulbs, many of which are replaced yearly to ensure good bloom. These include tulips as well as crocus, crested iris, grape hyacinth and daffodils. Adding to the colorful array are Kwanzan cherry trees (*Prunus serrulata* 'Kwanzan'), crabapples and magnolias.

There are also numerous azaleas and rhododendrons. Her favorites include the rhododendrons 'Cornell Pink', 'Ramapo', a purple-flowered dwarf, and the buff yellow 'Mary Fleming'. Surrounding evergreens include dwarf hemlock, *Tsuga canadensis* 'Nana'; holly barberry, *Mahonia aquifolium;* a cultivar of the Japanese laurel, *Aucuba japonica,* with broad, mottled, yellow and green leaves; lily-of-the-valley bush, *Pieris japonica;* yews and several holly varieties.

The blooming sequence continues with Warminster broom's pale-yellow flowers borne on gracefully cascading branches. These fade just before the appearance of the pink, feathery plumes of *Astilbe* 'Peach Blossom' and the tall lavender globes of a flowering onion species.

In an area of the church yard where the shade is more dense, Miss Berdan developed a small woodland garden. Here, white stones graduate from small to larger sizes and are planned to give the effect of a series of pools. The formerly flat terrain has been raised into levels adding depth and a change of pace from the rest of the churchyard. Strolling these meandering paths, the visitor gains close views of ferns, trilliums, native columbines and epimediums, along with hardy primroses. Two fastigiate yews provide contrast and vertical accents.

ABOVE: Pamela Berdan at work in the garden she designed. LEFT: View of the garden with the church building visible in the background.

By mid-June, flowers appear on the first of an assortment of hosta hybrids planted throughout the garden. Their blooms will continue all summer long. Hostas are Pamela Berdan's favorite perennials, which she praises as "tidy and reliable and willing to grow where nothing else will."

Included among the collection are *H. undulata,* which has variegated leaves and spikes of trumpet-shaped, lilac-colored flowers; *H. ventricosa,* with its dark-green leaves and purple flower spikes; and *H. sieboldiana* 'Blue Angel', which has blue-gray leaves and pale-lavender flowers.

The summer garden continues with blooms on hydrangeas and daylilies. The mainstay of color in summer is provided by impatiens and nicotiana. She is particularly proud of these plants as they have successfully self-sown for several years. In one corner, there is enough sun to support respectable blooms on rose cultivars, which include 'Faberge', 'Good News' and 'Apricot Nectar'.

The chores of watering and fertilizing this garden continue, yet Miss Berdan is still working to achieve even better color and contrast for all four seasons. If you were to visit the St. John's garden today, you would find it hard to imagine just how much this yard has changed since she began. Entering through the flower-framed opening in an old brick wall, now completely covered with *Clematis montana* var. *rubens,* it is easy to assume that all these plants have been happily growing in the churchyard since the day St. John's was built. Pamela Berdan shrugs off such observations, insisting simply that "that's just what any good garden is supposed to look like."

St. John's-in-the-Village is located at 224 Waverly Place in Greenwich Village. Visitors are welcome, but it is preferred that they call in advance [(212) 243-6192] since access to the gardens is through the church office property and not directly from the street.

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BEGONIAS

Build a begonia/episca collection with cuttings. 60¢ and up. Easy. Inexpensive. Catalog-instructions $1. Some varieties unique. Gifthorse Greenhouse, New Johnsonville, TN 37134.

BONSAI

BONSAI—Indoor and Outdoor plants, Tools, Books, Imported Pots. Catalog "AH" $1.00 Refundable. THE BONSAI FARM, 13827 Hwy. 87 South, Adkins, TX 78101 (Near San Antonio).

INTERNATIONAL BONSAI, the definitive quarterly magazine filled with step-by-step instructions on bonsai training. Illustrated beginner's articles in each issue also features Japanese gardens and rare plant material. 1981 subscription (4 issues) $12.00. INTERNATIONAL BONSAI, P.O. Box 23894-AH, Rochester, NY 14692.

BOOKS

All-color TROPICA, enlarged 2nd Edition, 7,000 photos, $115.00. Pictorial Cyclopedia EXOTICA, 12,000 photos, $78.00. EXOTIC PLANT MANUAL, 4,200 photos, $37.50. EXOTIC HOUSE PLANTS, 1,200 photos, $8.95. Shipped prepaid if check with order. Circulars gladly sent. ROEHRS, Box 125, E. Rutherford, NJ 07073.

BOOK SEARCH SERVICE

Send me that list of gardening, horticultural books you've wanted for so long. Out of print, antiquarian, or just plain second hand. I'll let you know what I can find. No obligation. (You might also have a list of hard to find detective or mystery stories.) Edward F. Smiley, Bookseller, RD 5, 43 Liberty Hill Rd., Bedford, NH 03102.

BROMELIADS

THE BROMELIAD TREASURY offers a selection of decorative species and hybrid Bromeliads at very reasonable prices. Unique 18 page DESCRIPTIVE LIST, $1.00, refundable with first order. Please mention this ad. 639 Bend Drive, Sunnyvale, CA 94087; Phone (408) 245-2729 Eves. & Weekends.

BROMELIADS—10 Medium size, labeled ready to pot. $12.50 postpaid, three page listing for stamp. CORNELISON BROMELIADS, 225 San Bernadino, N. Fort Myers, FL 33903.

CACTUS

Winter hardy cactus to minus 20 degrees. Many varieties, both prickly pears and barrels. Send stamp for price list. Intermountain Cactus, 2344 South Redwood Rd., Salt Lake City, UT 84119.

CARNIVOROUS PLANTS

Carnivorous, woodland terrarium plants and supplies. Book, *The World of Carnivorous Plants,* $6.50 postpaid. Illustrated catalog 25¢, Peter Pauls Nurseries, Canandaigua, NY 14424.

WIP—World's largest grower of exotic carnivores, over 75 varieties. Now featuring rare Tropical Pitcher Plants (Nepenthes). Fully illustrated catalog 50¢. WIP, Box 303C, Grant, FL 32949.

DAFFODIL BULBS

Naturalizing Mixtures (8 + varieties): Special Mixed Colors or All-Yellow, Bushel $68.; Peck

$21. 10% Discount before June 15. Postpaid East of Mississippi. 10% extra West. Free folder features varieties, collections. River's Edge Farm, RD 3, Box 228A, Gloucester, VA 23061.

DAYLILIES

Ten named varieties. Wide color and season range $10.00 Send stamp for descriptive catalog. TRANQUIL LAKE NURSERY, 45 River St., Rehoboth, MA 02769.

DWARF & MINIATURE PLANTS

DWARF CONIFERS, Miniature Roses and Perennials specially selected by height and spreading habits to enhance any rock garden, specialized garden or trough or basket garden. Send $1.00 for Catalog (deductible on first order) to TWIN PEAK NURSERY, PO Box 196, Oceanside, NY 11572.

EPIPHYLLUMS (ORCHID CACTI)

EPIPHYLLUMS (ORCHID CACTI), Rhipsalis, Rattail Cacti, Hoyas—we specialize in ALL of these. Super 1981 full color catalog just out! Filled with over 75 color pictures, 10 great FREE bonus coupons, separate Bookshop Catalogue offering 208 GREAT indoor/outdoor plant books. Send $1.00 (deductible/first order): RAINBOW GARDENS, Box 721-AH, La Habra, CA 90631 Credit cards accepted!

EVERGREENS-DWARF CONIFERS

Over 100 varieties of dwarf evergreens described by *size, shape, color and texture.* For rock gardens, porch and patio and dwarf conifer gardens. Catalog $1.00 refundable. WASHINGTON EVERGREEN NURSERY, Box 125 AH, South Salem, NY 10590.

Dwarf conifers, rare evergreens, unusual plants, bonsai material. Mail order, Gallon size. Catalog $1.00 deductible. TICKLE CREEK NURSERY, 822 N.W. 23rd Ave., Portland, OR 97210.

BABY EVERGREENS, Seeds, Seedlings, Ornamentals and Xmas Tree stock, Azaleas, Rhododendrons. Flowering shrubs, Blueberries. Catalog Free. GIRARD NURSERIES, Geneva, OH 44041.

FOR SALE

Outstanding home in exclusive section of Westport, Connecticut. Two bedrooms, maid's room, etc., with attached greenhouse. Beautifully landscaped with extraordinary collection of rare alpines, unusual shrubs, trees and compatible plantings—a finished garden for the keen horticulturist. Gardens have been featured in major publications. If interested please reply to: PO Box 1114, Darien, CT 06820 Att.: E. Woodward.

FRUIT TREES

Newest Color Catalog, Specializing in Southern Gardens; Fruit Trees, Grapevines, Berry plants, Nut trees, Flowering & Ornamental trees. Send $1. Sunripe Nursery, Sumner, GA 31789.

FUCHSIAS

LEARN ABOUT FUCHSIAS. Join AMERICAN FUCHSIA SOCIETY. Membership for calendar year 1981, including monthly "Bulletin" January thru December, $8.00 USA, $9.00 foreign. Write AMERICAN FUCHSIA SOCIETY, Hall of Flowers, Golden Gate Park, San Francisco, CA 94122.

GARDEN FURNITURE

Solid Teakwood Garden Seats—featured in the arboretums & gardens of England. The perfect heirloom gift for church, park or private garden. Send $2.00 (deductible) for the 10-page British color catalogue and current price list. Precipitation, Inc. 17317 Germantown Rd., Germantown, MD 20767. (301) 428-3434.

GENETIC SANCTUARY AND POSITION SOUGHT

Botanical research foundation—Conservator, extensive genetic collection historic cereal grasses, Early American, and ancient crop species—to fulfill combined Foundation needs is seeking use of a property for a Genetic Sanctuary, and also a supplemental, employed position for its Director to combine with Foundation research duties, involving on-site management or similar residential position. Site to be used to conduct research, conservation and seed production work for public inheritance, among collection; scale can be arranged to fit the site. Advantages: enrichment of property through demonstration nurseries of historic crops and rare plants on living display and undergoing increase; availability, Director's extensive management skills, through employment in independent capacity. Write: The KUSA Research Foundation, PO Box 761, Ojai, CA 92023.

GESNERIADS

WORLD'S LARGEST COLLECTION OF RHIZOMATOUS GESNERIADS—(Achimenes—Kohlerias—Smithianthas—Gloxinias—Many Others) Informative and descriptive catalog $1.25. ISLAND GESNERIADS, Box 853AH, Anna Maria, FL 33501.

GOURDS

DELIGHTFUL HOBBY AND MONEY-MAKER-Brochure: How to dry, cure and craft gourds. Send $3.00 to Pawlak's Place, 730 Miner Road, Dept. AH, Highland Heights, OH 44143.

GREENHOUSE GROWING

PROPAGATION BREAKTHROUGH—Don't gamble, use only the best mist controls. Guarantee versatile, portable, indoor, outdoor, automatic, economical. Write Aquamonitor, Box 327, Huntington, NY 11743.

GREENHOUSE OR HYDROPONICS

Greenhouses, Greenhouse supplies, Hydroponic equipment and trays write to: Utah Greenhouse Mfg. Department AH 481, 9345 Quail Hollow Cir., Sandy, UT 84092.

GROUNDCOVERS

Superb plants. Unbeatable prices. Ajuga, Liriope, Ivies, Vinca, More! Catalog 25¢. GROUNDCOVERS, Box 8662-A, Greenville, SC 29604.

Pachysandra—Ideal Permanent Evergreen groundcover plants. Thrive in most soils, sun or shade. Plant 6" apart. Sturdy, well-rooted plants, postpaid: 50-$12.50; 100-$21.95; 500-$79.95; 1,000-$135.00. "Finest Quality Stock." Guaranteed to live or we'll replace up to 1 full year. Folder on request. PEEKSKILL NURSERIES, Shrub Oak 17, NY 10588.

HARPER HORTICULTURAL SLIDE LIBRARY (PAMELA HARPER).

We supply many of the pictures in this and other

garden magazines. You may rent these and 25,000 others, or buy duplicates. Lecture programs on many topics. Catalog $1. 219 Robanna Shores, Seaford, VA 23696.

HAWAIIAN PLANTS

HAWAIIAN PLANTS AND SEEDS. Send 50¢ for our Catalog of Rare and Unusual Plants from HAWAII. Hana Gardenland, PO Box 248AH, Hana, HI 96713.

HEATHS AND HEATHERS

HEATHS AND HEATHERS as well as superhardy, landscape-size azaleas and rhododendrons. Catalog $1.00 (deductible). CARLSON'S GARDENS, Box 305-AHH, South Salem, NY 10590.

HERB PLANTS

250+ varieties—culinary, medicinal, fragrant—spring/fall planting guides. Informative catalog $1. List SASE. FOXHILL, Box 7A, Parma, MI 49269.

HERBS

FREE: OLD-TIMEY HERB CATALOG, SIX PACKETS herb seeds. Handling $1.00 each offer. Both: $2.00. Plants, books, teas, recipes, scented geraniums; natural products. YANKEE PEDDLER, Dept. AH81, Burton, TX 77835.

Culinary-Medicinal-Fragrant garden herbs for your enjoyment. Mountain grown plants shipped with cultural instructions. Catalog with packet catmint seed 25¢. High Meadow Farm, DAH, Box 357, Hayesville, NC 28904.

LAVENDER, ROSEBUDS, POTPOURRI, herbs, spices, essential oils. Scottish soaps: wood hyacinth, primrose . . . Wholesale/Retail catalogue 30¢. Potpourri Crafting Booklet $2.00. Tom Thumb Workshops, Box 3496-AH, Alexandria, VA 22302.

HOUSE PLANTS

Dracaena, Philodendrons, Palms, Euphorbias, Sansevierias, Aloes, Bulbs, Haworthias, Pachypodiums, Adenia, Adenium, Testudinaria, Ipomoea, Curcurbitaceae, Cyphostemma, Raphionacme, Anacampseros, Pelargoniums, Sarcocaulons, Cotyledons, Senecios, Othonnas, Didiereaceae, Stapeliads, Sarcostemmas, Ceropegias, Encephalartos, Bowenia, Lepidozamias, Macrozamias, Cycas, Zamias, Ceratozamias, Dioons, Dischidias, Hoyas, Ferns, Bamboo, Bonsai, Flowering Bushes and Trees, Evergreen Bushes and Trees, Groundcovers, Ivy, Orchids, Orchid Cactus. Catalog full of photos and drawings plus newsletter 4 times a year $4. ENDANGERED SPECIES, 12571(A) Red Hill, Tustin, CA 92680.

INDOOR GARDENING

GARDEN IN EVERY NOOK AND CRANNY OF YOUR HOME. Join the Indoor Light Gardening Society of America, Inc. and receive LIGHT GARDEN, the magazine for indoor gardeners, five times yearly, $8.00. Seed exchange, robins, plant culture guides, chapters. Write ILGSA, Dept. AH, 128 West 58th Street, New York, NY 10019.

IRIS

Siberian Iris—Ten named varieties. Broad color and season range. Stamp for descriptive catalog. TRANQUIL LAKE NURSERY, 45 River St., Rehoboth, MA 02769.

MINIATURE ROSES

MINIATURE ROSES: Catalog specializing in miniature roses for indoor, greenhouse or outdoor planting, dwarf conifers, suitable for bonsai or the specialized garden, and perennials and especially selected by height and spreading habit to be useful in the small garden. Send $1.00 (deductible on first order) to TWIN PEAK NURSERY, PO Box 196-AHS, Oceanside, NY 11572.

MISCELLANEOUS

PECANS: Quart each halves, pieces, meal. Three-quart sampler $9.95 postpaid. Tenpeco, Box 638 HO, Rutherford, TN 38369.

COMPOST SHREDDER—Under $25.00. Build adaptor for your rotary mower. For easy to follow plans send $3.00 to RAMSHRED, PO Box 4493, Dept. AH, Martinez, GA 30907.

Shade cloth for patio or greenhouse. Eight densities available. Custom sewn with reinforced binding and brass grommets. Last for years. Call (404) 778-8654, 24 hours a day. Yonah Manufacturing Company, P.O. Box 280, Cornelia, GA 30531.

GET RID OF MOLES, deer, rabbit, SLUGS, cats and dogs without harming them. Plus organic methods for pests and disease control. Send $2.00 to: ORGANIC BUD, Box 134, Parksville, B.C. VOR 2SO.

POTPOURRI—Secret Blend. Absolutely Heavenly. Sample—$2.00 + 75¢ Postage and Handling. Includes free price list—tea—coffee—spices. THE GENERAL STORE, 113 West 3rd, Maryville, MO 64468.

FREE CATALOG listing great values on test meters, pots, flats, soil conditioners and other accessories. Send 30¢ in stamps for postage to Grow-n-Energy, Box 508A, Baldwin Place, NY 10505.

TEAS—Gourmet—Over 50 varieties to choose from. Tea Sampler Pack—$4.99 + 75¢ Postage and Handling. Includes free price list—tea—coffee—spices. THE GENERAL STORE, 113 West 3rd, Maryville, MO 64468.

NEWSLETTERS

COMMON GROUND. An environmental newsletter reporting on issues that concern the land and its people in the mid-Atlantic states. 12 monthly issues for only $4.00. Subscribe now or send for free information. Common Ground, 7016 Benjamin St., McLean, VA 22101.

NURSERY

Dwarf evergreens, uncommon trees. Visitors welcome. Displays labeled. Browsing encouraged. Please send a stamp or two for our list. (No shipping) DILATUSH NURSERY, 780 RT 130, Robbinsville, NJ 08691.

PERENNIALS

We are offering our first collection of perennials, wildflowers and selected woody plants for spring planting. Our brochure is most informative. Please send fifty cents and plan to apply this cost to your purchase. Allen W. Bush, Holbrook Farm & Nursery, Route 2, Box 223B16, Fletcher, NC 28732.

PHALAENOPSIS (MOTH) ORCHIDS

Blooms for months. Seedlings to blooming size, white, pink, yellow, peppermint and novelty types, $8.00-$20.00 up. Add 15% shipping U.S.A. Send for list. GREEN VALLEY ORCHIDS, RD 1, Box 233S, Folsom, LA 70437. (504) 796-5785.

GARDENER'S MARKETPLACE CONT'D

PIPER METHYSTICUM

Wanted plants—no cuttings—of *Piper methysticum*. Shipper must have required USDA permits. W. Hart, PO Box 7564, Louisville, KY 40207.

PLANT HEATER

Aztec Radiant Heater using only 60 watts (less than a nickel for 12 hours continuously) is ideal for starting seeds and growing plants indoors. Excellent for desk or small area heating. UL Listed. Special to AHS members $12.50 plus $1 shipping. Special quantity rates to garden clubs. Send for "Sun Gro" leaflet. Medallion Products, 7910 West Blvd. Drive, Alexandria, VA 22308. (703) 768-6892.

PLANT HORMONES

"MERISTEM" valuable phalaenopsis by producing keikis with hormones. Experiment with other difficult-to-propagate plants. Complete with detailed illustrated instructions and updated notes. 15cc for $15. 45cc for $35. Wholesale inquiries invited. PLANT HORMONES, Box 354V, McMaster University, Hamilton, Ontario L8S 1CO, Canada.

POSITION AVAILABLE

Assistant Garden Editor for *Southern Living* Magazine. Responsibilities include copy writing and working with photographers on horticultural and landscape design subjects. Applicant must have degree in horticulture and previous writing experience. Prefer knowledge of southwest garden problems. Send resume and qualifications to Dr. John Floyd, Southern Living, P.O. Box 523, Birmingham, AL 35201.

RARE BULBS

RARE BULBS: Ammocharis, Amaryllis (Hippeastrum species), Crinum, Clivia, Cyrtanthus, Haemanthus, Hymenocallis, Manfreda, Polianthes, Zephyrantheae, etc. Descriptive list $1.00. MARCIA'S, 255 Galveston Road, Brownsville, TX 78521.

ROSES

GROW INDOORS AND OUTDOORS. No yard or apartment is too small to enjoy the pleasure of growing these little roses. Free color catalog of selected varieties. NOR'EAST MINIATURE ROSES, INC., BOX "AH," ROWLEY, MA 01969.

SEEDS

Thousands of rare and unusual seed from every continent. Also, Barnhaven Silver Dollar Primroses. Catalog $1.00 (deductible), FAR NORTH GARDENS, 15621AH Auburndale, Livonia, MI 48154.

Free Don Hastings Seed Catalog: Write PO Box 745, Norcross, GA 30091.

TETRAPLOID DAYLILIES

Over 450 hybrids; exotic new Tetraploid Introductions. Catalog $1.00, deductible with order for plants. SEAWRIGHT GARDENS, 134 Indian Hill, Carlisle, MA 01741 (617) 369-2172. Visitors welcome!

TEXAS WILDFLOWERS

Colorful catalog lists seeds of 201 Texas wildflowers, plus trees, shrubs, cacti. Many in bulk quantities. Also books, Bluebonnet prints, calendars, Newsletter, notecards. Send $1 (refundable) to Green Horizons, 500 Thompson, Kerrville, TX 78028.

TREE PROBLEMS—BOTANICAL OR LEGAL

For Directory of members of the American Society of Consulting Arborists—the experts in tree care and appraisals for legal matters, write: ASCA, 12(C) Lakeview Avenue, Milltown, NJ 08850.

TROPICALS

Marantaceae and Other Tropicals. 50¢ for list. La Green Enterprises, 41-701-A5 Kumuhau St., Waimanalo, HI 96795.

UNCOMMON SEEDS

Our latest catalog features many new seeds and bulbs not previously offered. If you are a serious grower of uncommon plants, our catalog is specially for you. 15¢ stamp. The Banana Tree, 715 Northampton St. Easton, PA 18042.

UNIQUE CATALOGS

MAKE POTPOURRI, Perfumes, Pomanders, Lotions, Herbal remedies, Fragrant Gifts. New recipes . . . Free catalog . . . Supplies . . . Large SASE. SCENT SHOP, 5500 Greenville #106AH, Dallas, TX 75206.

UNUSUAL PLANTS AT AFFORDABLE PRICES

Containerized starter plants of *Wild fruits*—*Conifers*—*Hardy Western Natives*—*Bee Plants*—*Other Ornamentals* Wealth of information in our descriptive listing—$1.00. FORESTFARM, 990 Tetherah, Williams, OR 97544.

VEGETABLE SEEDS

Save money, on your grocery bills: Grow your own vegetables from seeds. These vegetables were specially chosen for balcony/patio, city, suburban and country gardens. Information: G.B. Enterprises, 655 Jeffrey St. #103, Boca Raton, FL 33431.

WILD BIRD FEEDERS

WILD BIRD FEEDERS: Finest Window, Porch, Deck, Terrace, Hanging, Pipe Mounted. Nest Homes. Free catalog. Dialabird, 554S Chestnut Street, Westwood, NJ 07675.

WILDFLOWERS

Washington wildflower safaris to Cascades and Olympics with professional naturalist. Nature study camps in Alaska. Camping Hawaii. Brad's Tours, 401 E. Mercer #31L, Seattle, WA 98102.

Wildflower Seed Catalog. Send 50¢ for new illustrated copy. Facts, folklore and culture. MIDWEST WILDFLOWERS, Box 64G, Rockton, IL 61072.

WOODLAND PLANTS

Many varieties of hardy ferns, wild flowers and native groundcovers grown in containers. Eliminates the risk of trying to establish collected plants. Also carry native trees and shrubs. Container grown shrubs that attract birds and wildlife. Write for catalogue—send $1.50. Special prices to the trade. Panfield Nurseries, Inc., 322 Southdown Road, Huntington, NY 11743.

Discover the joy of creating your own woodland garden. Native ferns, woodland groundcovers and wildflowers-container grown. Write for catalogue and visit Panfield Nurseries, Inc., 322 Southdown Road, Huntington, L.I., N.Y. Send $1.50 for Catalogue. Open Sunday also—April, May and June.

PRONUNCIATION GUIDE

Guide to Botanical Names in This Issue

The accent, or emphasis, falls on the syllable which appears in capital letters. The vowels which 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 concolor
A-beez CON-col-or
Achillea filipendulina
ah-KILL-ee-ah fill-i-pen-dew-LINE-ah
Adiantum pedatum
a-dee-AN-tum pe-DAY-tum
Allium senescens var. *glaucum*
AL-ee-um se-NESS-senz var. GLAW- cum
Allium tuberosum
AL-ee-um too-bur-O-sum
Allyssum murale
ah-LISS-um mure-AL-ee
Alyssum saxatile
ah-LISS-um sacks-ah-TILL-ee
Amelanchier laevis
am-el-ANK-ee-er LEE-vis
Anemone blanda
an-em-O-nee BLAN-da
Anemone pulsatilla
an-em-O-nee pul-sa-TILL-ah
Anemonella thalictroides
ah-nem-o-NELL-ah thal-ik-tro-EYE-deez
Arctostaphylos uva-ursi
ark-toe-STAFF-il-us OO-va UR-see
Astilbe X arendsii
ah-STILL-be AIR-ens-zee-eye
Athyrium filix-femina
ah-THIGH-ree-um FILL-ix FEM-in-ah
Aucuba japonica
aw-KOO-ba ja-PON-i-ka
Aurinia saxatilis
aw-RIN-ee-ah sacks-ah-TILL-iss
Bauhinia bough-HIN-ee-ah
Benzoin aestivale
BEN-zo-in est-i-VAL-ee
Botrychium lunaria
bo-TRICK-ee-um loo-NAIR-ee-ah
Cercis canadensis
SIR-sis can-ah-DEN-sis
Cercis chinensis
SIR-sis chi-NEN-sis
Ceterach officinarum
SET-er-rack o-fiss-i-NAIR-um
Chaenomeles kee-NOM-el-eez
Chionodoxa luciliae
ky-on-o-DOCK-sa loo-SILLY-ee
Chrysanthemum arcticum
kris-AN-thee-mum ARK-ti-cum
Cinnamomum camphora
sin-ah-MO-mum camp-FOR-ah
Cinnamomum cassia
sin-ah-MO-mum KASS-ee-ah
Cinnamomum zeylanicum
sin-ah-MO-mum zey-LAN-i-kum
Claytonia virginica
clay-TONE-ee-ah vir-GIN-i-ka
Clematis montana var. *rubens*
CLEM-ah-tiss mon-TAN-ah var. REW-benz
Clusia KLU-see-ah
Crataegus X lavallei
cra-TEE-gus la-VALL-ee-eye
Cytisus X praecox
si-TEE-sus PREE-cox
Dianthus x allwoodii
dy-AN-thuss all-WOOD-ee-eye
Draba sibirica DRAB-ah sy-BEER-i-ka
Dryopteris filix-mas
dry-OP-ter-is FILL-ix-MAS
Epigaea repens
ep-i-GEE-ah REE-penz
Geranium sanguineum var. *prostratum*
jer-A-nee-um san-GWIN-ee-um var. pra-STRAY-tum
Gesneria ges-NAIR-ee-ah
Helleborus niger
hell-eh-BORE-us NY-ger
Helleborus orientalis
hell-eh-BORE-us or-ee-en-TAY-liss
Hepatica americana
ha-PAT-i-ka a-mer-i-KAN-ah
Hosta sieboldiana
HOSS-ta see-bold-ee-A-na
Hosta undulata
HOSS-ta un-dew-LAY-ta
Hosta ventricosa
HOSS-ta ven-tri-KOSE-ah
Ilex opaca
EYE-lex o-PACK-ah
Inula ensifolia
EN-you-la en-si-FOL-ee-ah
Isatis tinctoria
EYE-sa-tiss tink-TOR-ee-ah
Laurus nobilis
LORE-us NO-bil-iss
Lindera benzoin
LIN-der-ah BEN-zo-in
Litsea LIT-see-ah
Lobelia
lo-BEEL-ee-ah/lo-BEEL-ya
Magnolia stellata
mag-NOL-ee-ah/mag-NOL-ya stell-A-ta
Mahonia aquifolium
ma-HONE-ee-ah ak-qui-FOL-ee-um
Malus sargentii
MAL-us sar-GENT-ee-eye
Mertensia virginica
mer-TEN-see-ah vir-GIN-i-ka
Nepenthes ampullaria
ne-PENTH-theez amp-yew-LARE-ee-ah
Nepenthes burbidgei
ne-PENTH-theez bur-BIDGE-ee-eye
Nepenthes fusca
ne-PENTH-theez FUSS-ka
Nepenthes lowii
ne-PENTH-theez LOW-ee-eye
Nepenthes maxima
ne-PENTH-theez MAX-i-ma
Nepenthes rafflesiana
ne-PENTH-theez raf-fulls-ee-A-na
Nepenthes ventricosa
ne-PENTH-theez ven-tree-KOSE-ah
Ocotea o-ko-TEE-ah
Ophioglossum vulgatum
oph-ee-o-GLOSS-um vul-GAY-tum
Osmunda regalis
oz-MUN-da re-GALE-iss
Oxydendrum arboreum
ox-ee-DEN-drum ar-BOR-ee-um
Persea americana
PER-see-ah a-mer-i-KAN-ah
Persea borbonia
PER-see-ah bor-BON-ee-ah
Persea indica
PER-see-ah IN-di-ka
Phlox subulata
FLOCKS sub-yew-LAY-ta
Phyllitis scolopendrium
fy-LIT-iss sko-low-PEND-ree-um
Pieris floribunda
PY-er-iss flor-i-BUN-da
Pieris japonica
PY-er-iss ja-PON-i-ka
Pinus aristata
PY-nus air-iss-TAY-ta
Pinus flexilis
PY-nus FLECKS-il-iss
Platycodon grandiflorus
plat-ee-CO-don grand-i-FLOOR-us
Prunus serrulata
PRUNE-us ser-rew-LAY-ta
Pyrus calleryana
PY-russ kall-er-ee-A-na
Rhododendron keiskei
ro-do-DEN-dron KY-ski-eye
Rhododendron mucronulatum
ro-do-DEN-dron mew-kron-yew-LAY-tum
Rhododendron schlippenbachii
ro-do-DEN-dron schlip-en-BACH-ee-eye
Rondeletia ron-dell-ET-ee-ah
Sanguinaria canadensis
sang-gwin-AY-ri-ah can-ah-DEN-sis
Sassafras albidum
SASS-a-frass AL-bi-dum
Scilla siberica
SILL-ah sy-BEER-i-ka
Scilla tubergeniana
SILL-ah too-ber-gen-ee-A-na
Sedum acre
SEE-dum A-kree
Sedum kamtschaticum
SEE-dum kam-SHOT-ti-kum
Sedum spectabile
SEE-dum speck-TAB-i-lee
Shortia galacifolia
SHORT-ee-ah ga-lace-i-FOL-ee-ah
Thymus adamovicii
THY-mus add-ah-mo-VICK-ee-eye
Thymus serphyllum rosea
THY-mus sir-FY-lum ROSE-ee-ah
Trillium erectum
TRILL-ee-um ee-RECK-tum
Tsuga canadensis
SUE-ga can-ah-DEN-sis
Umbellularia californica
um-bell-yew-LARE-ee-ah kal-i-FORN-i-ka
Viburnum X bodnantense
vy-BUR-num bod-nant-EN-see
Viola macloskeyi var. *pallens*
vy-O-la ma-KLOSS-kee-eye var. PAL-enz
Viola soraria vy-O-la so-RARE-ee-ah
Zelkova zel-KO-va

The Works®

The daffodil mixture that is really a mixture. It blooms for weeks and lasts a lifetime.

'The Works' is unique because it is made up of *only* fine, named Daffodil varieties of recent origin, not a seedling in the lot. Each of these top-grade, double-nosed bulbs will bloom the first year. 'The Works' has a long season of bloom because it contains all classes of Daffodils, except miniatures, and is carefully balanced among Trumpets, which have yellow, golden, bi-color, or pink blossoms; Flatcups in great variety, with flaring petals and heavily-ruffled flat cups; members of the Poetaz group, some of them doubles; Cyclamineus Hybrids having shorter stems holding smaller flowers; and Triandrus Hybrids with clusters of bloom on each stalk. This is a delightfully informal way to naturalize Daffodils and it may amaze you to see so many kinds you've never seen in bloom—unless you've been to Holland in the spring.

Daffodils, as you may know, are *nearly indestructible* perennials—they seem to last as long as Peonies, which is a lifetime. They bloom sensationally the first spring, and grow more beautiful each year thereafter. A planting of Daffodils naturalized here 45 years ago still blooms gloriously, but is now more extensive, for the bulbs are great self-propagators. Pick blooms for indoor bouquets. What more could one ask?

You wouldn't expect a premium Daffodil mixture to sell for less than $43.00 a hundred, and it doesn't. But $43.00 is *less* than the price of many mixtures whose smaller bulbs simply will not produce flowers of similar quality. 'The Works' is sold only by the 100 (for 500 to one address, deduct 5%). For prepaid handling and delivery, please add 10% east of the Mississippi, 15% west. Connecticut residents please add sales tax.

Bulbs will be shipped in time for fall planting and purchasers will receive an annual subscription to our catalogue called, quite rightly, The Garden Book. Please order now. 'The Works' almost always sells out early and cannot be reshipped from Holland.

—A. Pettingill

White Flower Farm

P l a n t s m e n

Litchfield 7708, Connecticut 06759

® Registered Tradename